



Levee Analysis and Mapping Plan Ellenville Flood Damage Reduction Project

Village of Ellenville, New York

April 2018



FEMA

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Acronyms

BFE	Base Flood Elevation
CERC	Community Engagement and Risk Communication
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
LLPT	Local Levee Partnership Team
LOMR	Letter of Map Revision
NAVD 88	North American Vertical Datum of 1988
NFIP	National Flood Insurance Program
NGVD 29	National Geodetic Vertical Datum of 1929
NYSDEC	New York State Department of Environmental Conservation
SFHA	Special Flood Hazard Area
STARR II	Strategic Alliance for Risk Reduction
USACE	U.S. Army Corps of Engineers

Definitions

The terms below have been used in this document. Additional terms are provided in FEMA's *Analysis and Mapping Procedures for Non-Accredited Levee Systems* (July 2013) in the Glossary of Levee Terms. This document is available from the FEMA Library at https://www.fema.gov/media-library-data/20130726-1922-25045-4455/20130703_approachdocument_508.pdf.

Base Flood Elevation (BFE) – The elevation of a flood having a 1-percent chance of being equaled or exceeded in any given year.

Levee Analysis and Mapping Procedures* – Levee Analysis and Mapping Procedures include Sound Reach, Freeboard Deficient, Overtopping Analysis, Structural-Based Inundation, and Natural Valley. Details on these approaches can be found in FEMA's *Analysis and Mapping Procedures for Non-Accredited Levee Systems* (July 2013).

Leveed Area* – A spatial feature in the NLD defined by the lands from which flood water is excluded by the levee system.

Levee Reach – Any continuous section of a levee system to which a single analysis and mapping procedure may be applied.

Levee System – A flood hazard-reduction system that consists of a levee, or levees, and associated structures, such as closures, pumps and drainage devices, which are constructed and operated in accordance with sound engineering practices.

Local Levee Partnership Team (LLPT) – A work group that can be facilitated by FEMA when a non-accredited levee system in a community or project area will be analyzed and the areas landward of the levee system will be mapped. The primary function of this group is to share information/data and identify options based on stakeholder roles and knowledge.

Non-Accredited Levee System – A levee system that does not meet the requirements spelled out in the National Flood Insurance Program (NFIP) regulations at Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations (44CFR§65.10), *Mapping of Areas Protected by Levee Systems*, and is not shown on a FIRM as reducing the flood hazards posed by a 1-percent-annual-chance or greater flood.

Zone A – An area inundated by 1-percent-annual-chance flooding, for which no BFEs have been determined.

Zone D – Area of undetermined but possible flood hazard.

*All definitions on this page except for these are from FEMA's *Analysis and Mapping Procedures for Non-Accredited Levee Systems* (July 2013).

0 Executive Summary

In 1974, the U.S. Army Corps of Engineers (USACE) constructed the Ellenville Flood Damage Reduction Project (Ellenville FDRP), comprised of multiple levee systems, bridge and channel improvements, and drainage appurtenances, to reduce flood risk within the Village of Ellenville. The Federal Emergency Management Agency's (FEMA's) Flood Insurance Study (FIS) report and Flood Insurance Rate Map (FIRM) for Ulster County, New York depict the levee systems within the Ellenville FDRP as non-accredited.

FEMA's guidance was revised in 2013 to incorporate a new Levee Analysis and Mapping Procedure which provides a suite of flexible procedures to perform flood hazard analysis and mapping (see Section 1 of this report). The Village of Ellenville (Village) and neighboring Town of Wawarsing (Town) have a levee discovery project where the Ellenville FDRP, located in the Village but also potentially impacting a small area of the Town, is being studied using the Levee Analysis and Mapping Procedures (see Section 2). This study will help identify potential options the Village may have to show the levee as providing reduced flood hazard on the FIRM.

In May of 2017, FEMA Region II partnered with stakeholders in the Village and the Town to form a collaborative Local Levee Partnership Team (LLPT) and worked to determine potential Levee Analysis and Mapping Procedures for the Ellenville FDRP (see Sections 3 and 4 respectively). The process involved the collection and group evaluation of available data, creation and evaluation of an initial data analysis (see Section 5), and detailed discussions on mapping needs.

The information gained through the extensive coordination of the LLPT and the initial data analysis performed, supports the development of this document — a plan outlining potential reach analysis procedures. This document informs the potential paths forward for the Village (see Section 6). The Village is currently considering the benefits and costs of the Freeboard Deficient Procedure and accreditation to depict the flood hazard for leveed areas of the Ellenville Levee. The effective FIRM dated November 16, 2016 depicts leveed areas of the non-accredited Ellenville Levee System. Should the Village elect to revise the FIRM in the future through the Freeboard Deficient Procedure or accreditation, the Village may pursue a Letter of Map Revision (LOMR) instead of waiting for the FEMA Regional Office to incorporate updates into future mapping studies.

1 Introduction

Under FEMA's prior levee approach, a levee system that did not meet the National Flood Insurance Program (NFIP) requirements outlined in Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations (44CFR§65.10) was analyzed and mapped as if it provided no protection during a base (1-percent-annual-chance) flood. This was known as the "without levee" approach.

Some stakeholders expressed concern about the “without levee” approach. Members of both the U.S. House of Representatives and the U.S. Senate echoed this concern and asked FEMA to consider discontinuing the “without levee” approach. Accordingly, FEMA drew on current modeling techniques to refine the identification of flood hazard reduction that non-accredited levee systems provide. This process recognizes the uncertainty associated with hazard identification of leveed areas.

FEMA, its Production and Technical Services contractor Strategic Alliance for Risk Reduction (STARR II) and Community Engagement and Risk Communication contractor (CERC) initiated the Levee Analysis and Mapping Procedures process for the levee systems of the Ellenville FDRP within the Village and Town. Recent technological advances in data collection methods and hydrologic and hydraulic modeling were leveraged as part of this process. FEMA’s Levee Analysis and Mapping Procedures for non-accredited levees is a more refined approach to mapping flood hazards in leveed areas.

The Levee Analysis and Mapping Procedures process also:

- Leverages local knowledge and data, with proactive stakeholder engagement in LLPTs;
- Aligns available resources for engineering analyses and mapping commensurate with the level of risk in leveed areas; and
- Considers the unique characteristics of each levee system from an engineering perspective.

The levee systems of the Ellenville FDRP are non-accredited. At the request of the community, FEMA is using the Levee Analysis and Mapping Procedures process to evaluate potential flood hazard mapping options in leveed areas. This will inform the Village’s decision on how they would like to depict the levee-related flood hazards in the Village in the future.

This report is the result of the collaboration between FEMA, the Village of Ellenville, Town of Wawarsing, Ulster County, New York State Department of Environmental Conservation (NYSDEC), USACE, and other local stakeholders. This report documents the evaluation of data, initial data analysis, as well as the community’s preferred Levee Analysis and Mapping Procedure.

2 Levee System Description

2.1 Flood Protection Measures in the Village of Ellenville

The Ellenville FDRP is a USACE designed and constructed flood control project made up of three levee systems; Fantine Kill Left Bank Levee, Beer Kill Left Bank/Fantine Kill Right Bank Levee, and the Beer Kill Right Bank Levee as shown in Figure 1.



Figure 1: Ellenville FDRP Levee System Alignments

The levee systems include earthen levee and concrete flood wall sections, associated drainage appurtenances, and channel relocation. Bridge improvements were also part of the project but were constructed by local stakeholders. The approximate locations of the earthen embankments and concrete floodwalls are shown in Figure 2.



Figure 2: Levee Embankments and Floodwalls

The project construction was completed in 1974 and is now owned, operated, and maintained by the NYSDEC. The Ellenville FDRP does not have any pump stations for interior drainage; however, interior drainage facilities include gated gravity-drained conduits, swales, and a ponding area.

2.2 Community NFIP and FIRM History

Tables 1 and 2 summarize the communities' NFIP and FIRM history.

Table 1. Summary of Communities in Project Area

County	Community	Participating in the NFIP?	Estimated Number of Potentially Impacted Structures in Leveed Area ¹
Ulster County	Village of Ellenville	Yes	9
Ulster County	Town of Wawarsing	Yes	1 industrial facility

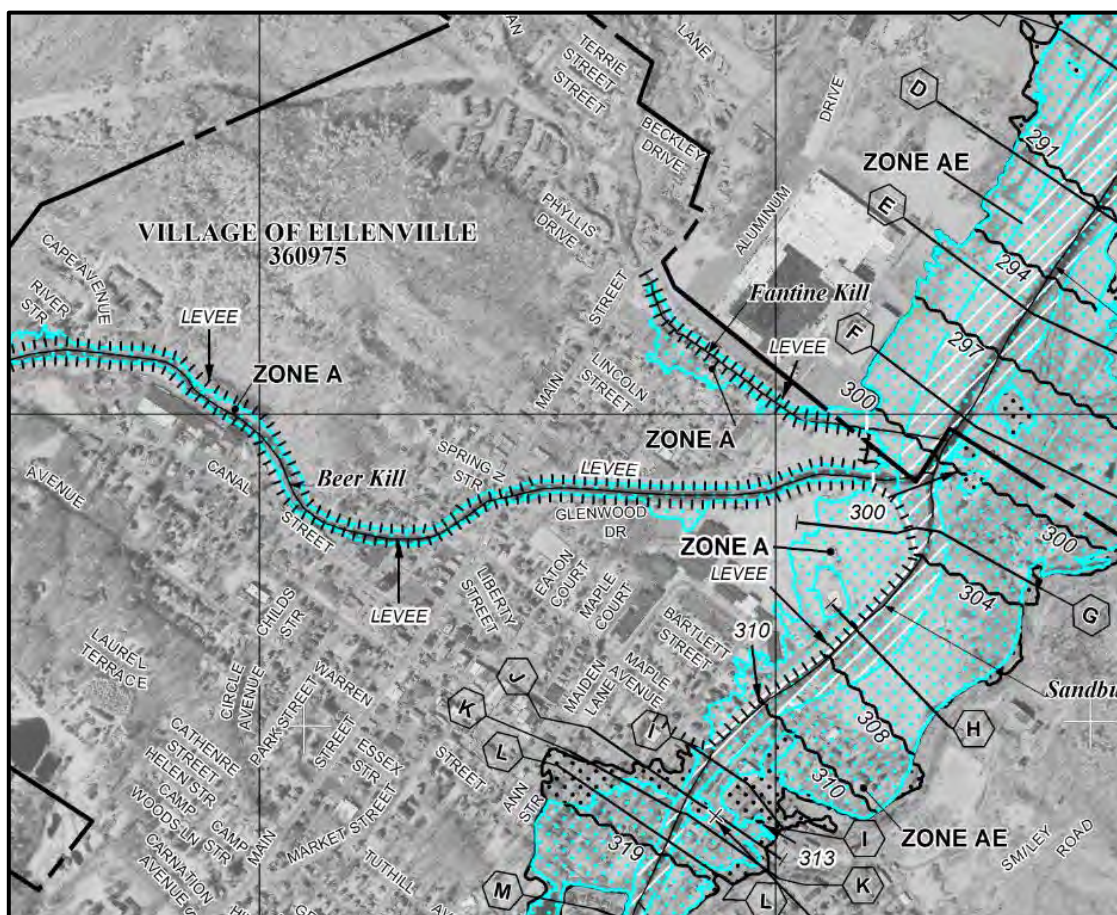
¹ Levee protected area from 1-percent-annual-chance flood hazard from November 16, 2016 FIRM.

Table 2. Community Map History

Community Name	Initial Identification	Flood Hazard Boundary Map Revision Date(s)	FIRM Effective Date	FIRM Revision Date(s)
Village of Ellenville	May 24, 1974	June 18, 1976	July 5, 1983	November 18, 2016
Town of Wawarsing	September 13, 1974	June 10, 1977	September 15, 1983	November 18, 2016

A countywide FIS report was issued for Ulster County, New York on November 18, 2016. According to the FIS report, “This flood-control project is not mapped as providing protection against the 1-percent-annual-chance flood.” No certified documentation is available to show the Ellenville FDRP meets the minimum requirements of 44CFR§65.10 of the NFIP Regulations.

The effective FIRM for Ulster County dated November 18, 2016, Figure 3, depicts the flood risk in leveed areas of the Ellenville FDRP as Zone A SFHA.



**Figure 3: Approximate Study Area from
Ulster County, NY FIRM No. 36111C0685F, Revised November 18, 2016**

3 Local Levee Partnership Team

The LLPT was formed to provide FEMA with data and input, including feedback on the procedures to be used for analyzing and mapping the levee systems, based on local levee conditions. The stakeholders who participated in the LLPT for this project are listed in Table 3.

Table 3. LLPT Participants

LLPT Member	Contact Information
Joseph Stoeckeler	Village of Ellenville jstoeckeler@villageofellenville.com
Brian Schug	Village of Ellenville bschug@villageofellenville.com
Leonard Distel	Town of Wawarsing wawsupervisor@hvc.rr.com
Burt Samuelson	Ulster County bsam@co.ulster.ny.us
Kathy Fallon	Office of Congressman John Faso 845-514-2322; Kathy.fallon@mail.house.gov
Don Fletcher	Barton and Loguidice dfletcher@bartonandloguidice.com

LLPT Member	Contact Information
Mark Lukasik	Tectonic Engineering mlukasik@tectonicengineering.com
Richard Geike	GM2 Associates
Charles Bazydlo	Law Office of Charles T. Bazydlo, P.C. 845-361-3668; cbazydlo@hvc.rr.com
Bill Nechamen*	NYSDEC <i>*Since this meeting, Bill Nechamen has retired. Alan Fuchs will assume his roles.</i>
Brad Wenskoski	NYSDEC 518-402-8082; brad.wenskoski@dec.ny.gov
Alan Fuchs**	NYSDEC 518-402-8185; alan.fuchs@dec.ny.gov <i>**Took over for Bill Nechamen when Bill retired.</i>
Arvind Goswami	NYSDEC 518-402-8186; Arvind.goswami@dec.ny.gov
Anna Servidone	NYSDEC 518-402-8147; Anna.servidone@dec.ny.gov
John Harrington	NYSDEC 845-256-3055; John.harrington@dec.ny.gov
Lynn Meeker	NYSDEC Lynn.meeker@dec.ny.gov
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Ali Bachowski***	USACE <i>***Since meeting left NY District USACE, Encer Schaefer now covering</i>
Brittney Hyde	USACE Brittney.R.Hyde@usace.army.mil
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4 Stakeholder Engagement

4.1 LLPT Meeting 1

A FEMA-led project team under the leadership of Shudipto Rahman, engaged the Ellenville FDRP stakeholders at the LLPT Meeting 1 held at the Ellenville Government Building on June 7, 2017. The overall intent of the meeting was to gain local insight on the status and data available for the Ellenville FDRP, introduce the Levee Analysis and

Mapping Procedures concepts with respect to the levee systems, and begin to establish the stakeholders who would like to participate in the LLPT.

An overview of the methods available to depict flood risks of leveed areas under current Levee Analysis and Mapping Procedures guidance was also discussed during the meeting along with a timeline for the levee project. Additional details regarding the LLPT 1 meeting are provided in Appendix A.

4.2 LLPT Meeting 2

On September 12, 2017, the LLPT Meeting 2 was held to review the Initial Data Analysis and discuss outcomes from the data collection process for the levee systems. During the meeting, the FEMA project team discussed the draft results of the Initial Data Analysis for the Natural Valley Procedure, Structural-Based Inundation Procedure, and the Freeboard Deficient Procedure. The Overtopping Deficient Procedure was determined to be not applicable. Additional details regarding the LLPT 2 meeting are provided in Appendix B.

A touchpoint call was hosted with the LLPT on December 4, 2017 to provide updates to the group since the LLPT 2 meeting and preview the draft Levee Analysis and Mapping Plan. Notes from this meeting are also provided in Appendix B.

Subsequent to this call, the Village provided FEMA with two USGS Scientific Investigations Reports regarding groundwater to consider in support of the levee analysis. The Village expressed concern about the findings contained in the reports and how groundwater may be contributing to flooding in their community. The USGS documents, listed below and provided in Appendix G, include discussion on groundwater sampling, hydrologic assessment, and potential impacts with respect to tunnel shutdowns within the watershed.

- *Preliminary Assessment of Water Chemistry Related to Groundwater Flooding in Wawarsing, New York, Scientific Investigations Report 2009-11; and*
- *Preliminary Analysis of the Hydrologic Effects of Temporary Shutdowns of the Rondout-West Branch Water Tunnel on the Groundwater-Flow System in Wawarsing, New York, scientific Investigations Report 2012-5015.*

While groundwater flow may be impacted by the leaky Rondout-West Branch Water Tunnel or may influence basement seepage, the flow is typically a small fraction of surface flooding. For example, the tunnel leak was estimated by the Village to be 19 million gallons/day which equates to approximately 30 cfs; however, the 1-percent-annual-chance flow for Beer Kill is approximately 6,000 cfs, and approximately 15,000 cfs for Sandburg Creek. Furthermore, it is rare to have access to detailed data on groundwater conditions that can be used to characterize surface flooding behavior. Although groundwater impacts do not directly correlate with the levee analyses, the Village's concern is noted and discussions on this topic may continue outside of this levee project.

4.1 LLPT Meeting 3

A LLPT Meeting 3 was held on February 26, 2018 to present the overall findings of the Levee Analysis and Mapping Plan to the Village Board and the LLPT prior it being finalized. Notes from this meeting are provided in Appendix C.

5 Initial Data Analysis

FEMA project team members from STARR II developed an Initial Data Analysis, which is an approximate analysis using available data to approximate the floodplain boundary for each relevant Levee Analysis and Mapping Procedures approach initially determined. This informed the discussions in LLPT Meeting 2 (See Appendix B for LLPT 2 Meeting Notes) and the touchpoint call prior to LLPT Meeting 3. Details of the reach analysis and application of reach analysis procedures are provided below.

5.1 Reach Analysis

For the purposes of the Levee Analysis and Mapping Procedure hydraulic analyses, the three Ellenville FDRP levee systems (see Figure 2) were separated into reaches based on the adjacent stream and modeled separately. For example, the Beer Kill Right Bank Levee System was modeled as a reach along Sandburg Creek and a reach along Beer Kill.

The top of levee profile from the USACE National Levee Database was compared to the 44 CFR§65.10 minimum freeboard requirements for each levee system reach. The profile comparisons are included in Appendix D.

The results of the profile comparisons indicate that the left descending reach along Sandburg Creek could be considered a Sound Reach (see Section 5.5) as it is estimated to meet minimum freeboard requirements. The majority of the left and right descending reaches along Beer Kill are also estimated to be at or above the elevation of the 1-percent-annual-chance flood resulting from the approximate study of Beer Kill, except near the North Main Street crossing. While these reaches may be able to be considered Sound Reaches if the entire levee crest meets minimum freeboard requirements, for the purpose of this analysis, the reaches were also conservatively considered Freeboard Deficient.

Along Fantine Kill, the top of levee elevations for the left descending and right descending reaches are estimated to be at or above the elevation of the 1-percent-annual-chance flood (except for potentially near the upstream end of the right descending reach; however, they do not meet minimum freeboard requirements and are considered Freeboard Deficient.

5.2 Natural Valley Procedure

The Natural Valley Procedure is completed for all levee systems to identify the potential leveed area associated with the 1-percent-annual-chance flood. This is completed through hydraulic modeling of a levee system as though it is not reducing flood risk and allowing flow to be conveyed on both the riverside and landside of the levee system while the levee

itself remains. For the levee reaches along Beer Kill, the traditional HEC-RAS 5.0.3 hydraulic analysis (1-Dimensional, steady flow) was enhanced to a 2-Dimensional, unsteady flow analysis to better capture the overland flow potential away from the channel.

5.3 Structural-Based Inundation Procedure

The Structural-Based Inundation Procedure incorporates a hypothetical breach analysis to evaluate the flood risk within the leveed area and was completed for all levee systems. The analysis was completed using HEC-RAS 5.0.3 (2-Dimensional, unsteady flow) at 3 hypothetical breach locations (typically upstream, central, and downstream) along each levee reach. For example, the Beer Kill Right Bank levee system was breached at 3 locations along the left descending reach of Sandburg Creek and at 3 locations along the right descending reach of Beer Kill. The resulting inundation area is a composite of the breach results for levee reaches. The breach locations were developed for modeling purposes only and do not indicate historic or future breach development at these locations.

5.4 Freeboard Deficient Procedure

The Freeboard Deficient Procedure can be applied if the 1-percent-annual-chance flood does not overtop the levee crest and levee crest does not meet the freeboard standards in 44 CFR§65.10. For Freeboard Deficient levee systems, the leveed area (as determined using the Natural Valley Procedure) is depicted as Zone D. The Zone D designation is a possible, but undetermined, flood hazard where property owners are not subjected to mandatory federal flood insurance purchase rules in situations where a mortgage is held on an insurable structure secured by federally-regulated loans. Zone D also gives communities discretion in the measures adopted for flood damage reduction under their floodplain management ordinance.

5.5 Sound Reach Procedure

A Sound Reach can be described as a reach of a levee system that meets minimum freeboard requirements in accordance with the standards in 44 CFR§65.10 and has been designed, constructed, and maintained to withstand the flood hazards posed by a 1-percent-annual-chance flood. A levee system comprised only of Sound Reaches would be considered an accredited levee system as each reach would meet all of the standards in 44 CFR§65.10.

Table 4 summarizes the potential application of the analysis procedure for each levee system broken down by reach.

Table 4. Ellenville FDRP Potential Analysis Procedures

Ellenville FDRP Levee System	Reach	Potential Application of Analysis Procedures				
		Natural Valley	Structural- Based Inundation	Overtopping	Freeboard Deficient	Sound Reach
Fantine Kill Left Bank	Fantine Kill Left Descending	✓	✓	✗	✓	✗
Beer Kill Left Bank/Fantine Kill Right Bank	Beer Kill Left Descending	✓	✓	✗	✓	✗ ¹
	Fantine Kill Right Descending	✓	✓	✗	✓	✗
Beer Kill Right Bank	Sandburg Creek Left Descending	✓	✓	✗	✗	✓
	Beer Kill Right Descending	✓	✓	✗	✓	✗ ¹

5.6 Review of Initial Data Analyses

It should be noted that the findings of the Initial Data Analysis are non-regulatory and are intended to inform the path forward for identification of flood risk associated with the levee system. The findings may be used for emergency planning purposes; however, they are subject to change and due process, and should not be used outside of this levee stakeholder group for any regulatory activities. The flood risk due to interior drainage in the leveed area is also not depicted and would need to be evaluated in the future prior to updating the FIRM.

The findings of the Natural Valley and Structural Based Inundation Procedures are shown by stream in Appendix H for ease of viewing. However, it should be noted that the impacts to the total leveed area of each levee system should be considered when evaluating the potential mapping options moving forward. Summary results from the Initial Data Analysis are included in Table 5 and shown in Figures 4 through 7.

¹ The Beer Kill Left Descending and Beer Kill Right Descending reaches may be considered Sound Reaches if the levee crest is found to be at or above minimum freeboard standards of 44CFR§65.10.

Table 5. Results from the Initial Data Analysis

Ellenville FDRP Levee System	Reach	Approximate Length of Levee Segment (ft)	Flooding Source(s)	Approximate # Structures Impacted	Comments: Natural Valley Procedure² (Figure 4)	Comments: Structural-Based Inundation Procedure³ (Figure 5)	Comments: Freeboard Deficient Procedure⁴ (Figure 6)	Comments: Sound Reach (Figure 7)
Fantine Kill Left Bank	Fantine Kill Left Descending	1,300	Fantine Kill	Natural Valley – 1 Structural-Based Inundation - 1	Natural Valley inundation area more conservative than effective FIRM; however, overbank flooding not previously identified.	More conservative results than Natural Valley Procedure. May be utilized for emergency planning.	The Freeboard Deficient Procedure applies for the levee system if the top of levee is at or above the 1-percent-annual-chance flood, but the levee crest does not meet minimum freeboard requirements.	Not applicable, levee does not meet minimum freeboard requirements.
Beer Kill Left Bank/ Fantine Kill Right Bank	Beer Kill Left Descending	3,800	Beer Kill	Natural Valley - 8 Structural-Based Inundation - 11	Natural Valley inundation area adjacent to Fantine Kill similar to effective FIRM; however, Beer Kill Left Descending Natural Valley could inundate shared leveed area.	More conservative results than Natural Valley Procedure. May be utilized for emergency planning.	The Freeboard Deficient Procedure could apply for the levee system if the top of levee is at or above the 1-percent-annual-chance flood, but the levee crest does not meet minimum freeboard requirements.	- The Beer Kill Left Descending reach could be considered a Sound Reach⁵ if levee crest meets minimum freeboard requirements. - Fantine Kill Right Descending – Not applicable but could be considered Freeboard Deficient.
	Fantine Kill Right Descending	1,650	Fantine Kill	Natural Valley – 2 Structural-Based Inundation -1				
Beer Kill Right Bank	Sandburg Creek Left Descending	2,500	Sandburg Creek	Natural Valley -1 Structural-Based Inundation - 4	Natural Valley inundation area adjacent to Sandburg Creek similar to effective FIRM; however, Beer Kill Right Descending Natural Valley could inundate shared leveed area.	More conservative results than Natural Valley Procedure. May be utilized for emergency planning.	- Freeboard is met along Sandburg Creek (Sound Reach); however, the Beer Kill Right Descending reach levee crest was approx. at or above the BFE except at N. Main Street. - The Freeboard Deficient Procedure could apply for the Beer Kill Right Descending reach if the top of levee is at or above the 1-percent-annual-chance flood.	- The Beer Kill Right Descending reach could be considered a Sound Reach⁵ if levee crest meets minimum freeboard requirements. - If both levee reaches are Sound Reaches, the levee system could be considered accredited.
	Beer Kill Right Descending	6,900	Beer Kill	Natural Valley - 33 Structural-Based Inundation - 115				

² Depicts levee system as not reducing flood risk. No additional data required to support future analysis or mapping.

³ Hypothetical levee breach analysis. No additional data required to support future analysis or mapping.

⁴ Freeboard requirement (44 CFR§65.10(b)(1)) is not met, but the top of levee is above the 1-percent-annual-chance flood. Certified data compliant with 44§CFR 65.10 and Freeboard Deficient procedures required to support future analysis or mapping.

⁵ All minimum requirements of 44 CFR§65.10 are met, including freeboard. Certified data compliant with 44 CFR§65.10 required to support future analysis or mapping.

Figures 4 and 5 show the approximate inundation areas for the 1-percent-annual-chance flood for all three Ellenville FDRP levee systems for the estimated Natural Valley and Structural-Based Inundation Procedures.

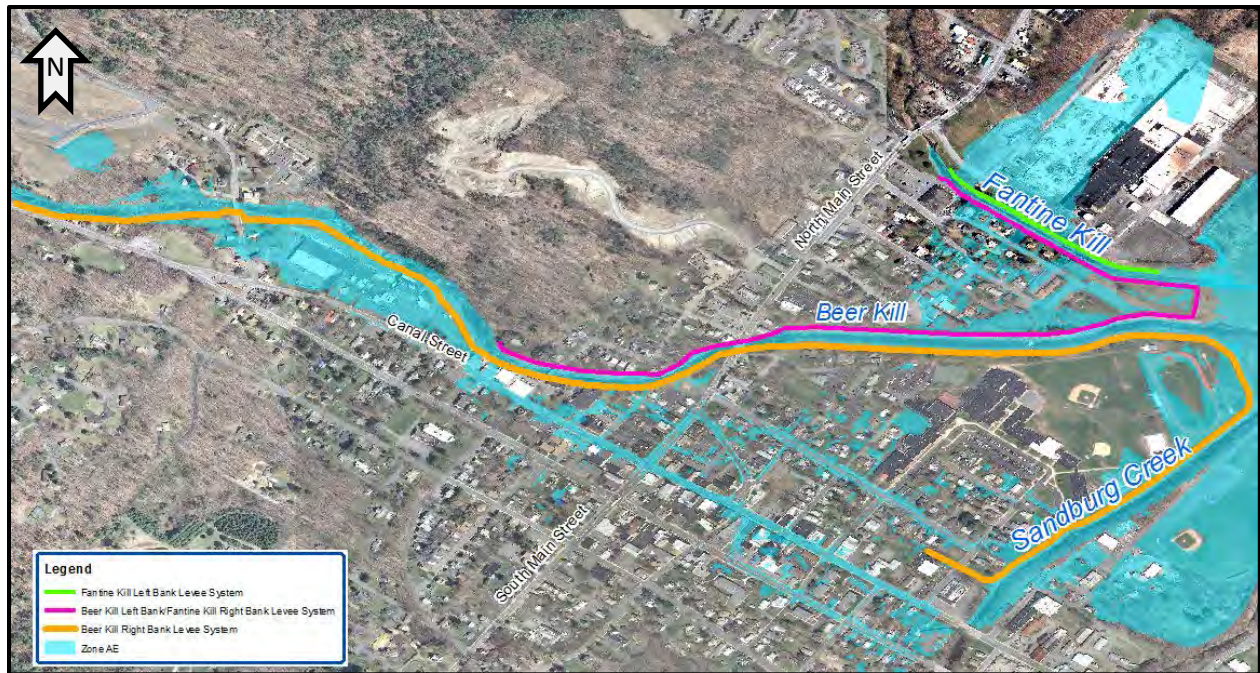


Figure 4: Natural Valley Procedure – All Levees

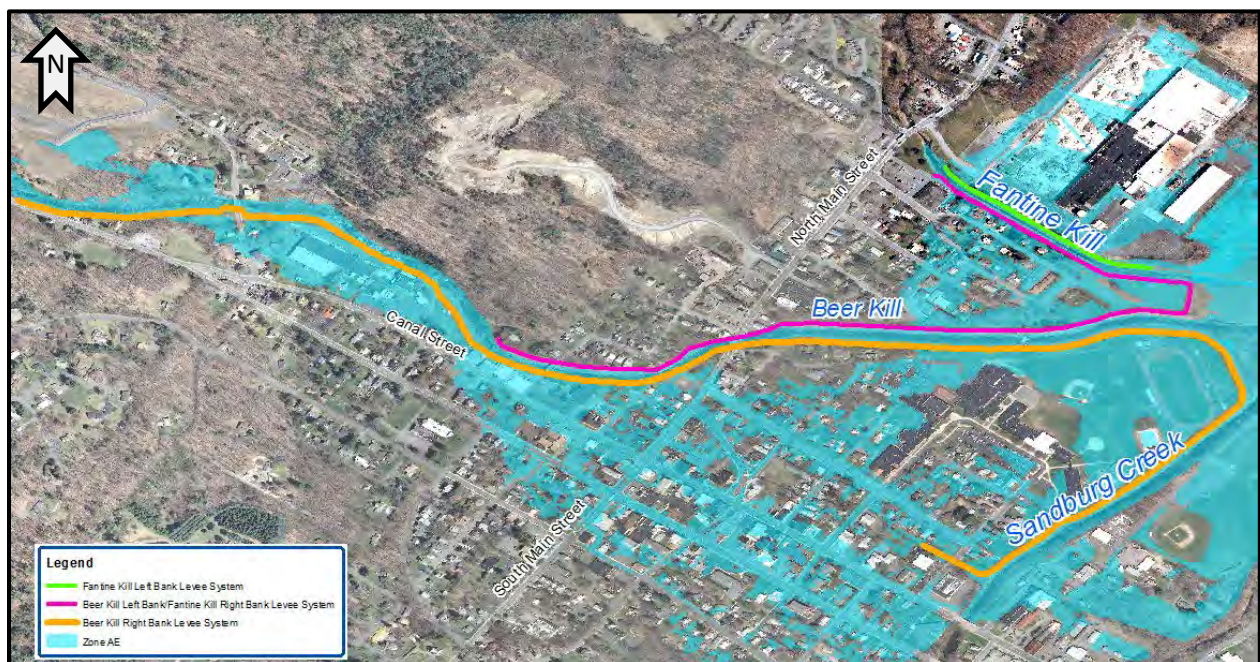


Figure 5: Structural-Based Inundation Procedure – All Levees

Figure 6 shows the approximate 1-percent-annual-chance flood inundation areas for the Fantine Kill and Beer Kill Left Bank/Fantine Kill Right Bank levee systems for the Freeboard Deficient Procedure. The approximate inundation area for the Beer Kill Right Bank levee system reflects the Freeboard Deficient Procedure for the Beer Kill Right Bank reach and the Sound Reach Procedure for the Sandburg Creek reach.

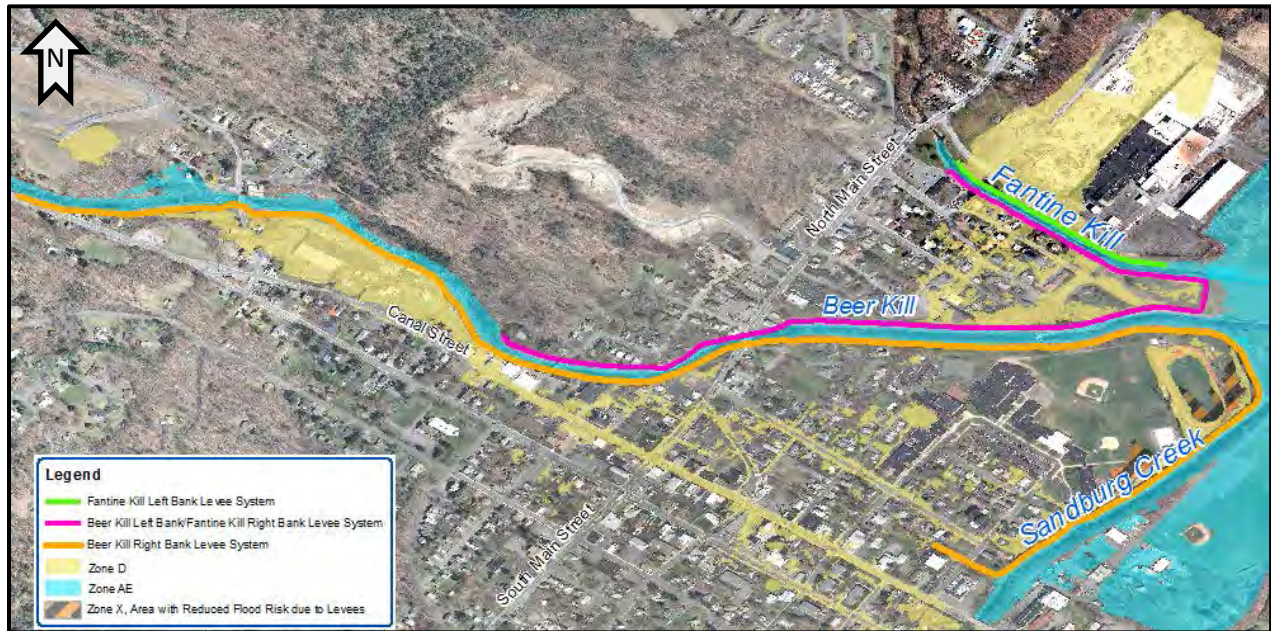


Figure 6: Freeboard Deficient Procedure – Ellenville FDRP

Figure 7 shows the approximate inundation areas for the 1-percent-annual-chance flood for the Beer Kill Left Bank/Fantine Kill Right Bank levee system and for the Beer Kill levee system under the Sound Reach Procedure. It should be noted that the inundation area for the Fantine Kill Right Bank reach of the Beer Kill Left Bank/Fantine Kill Right Bank levee system and the Fantine Kill Left Bank levee system are shown as Natural Valley since these levee crests are below the minimum freeboard requirements.

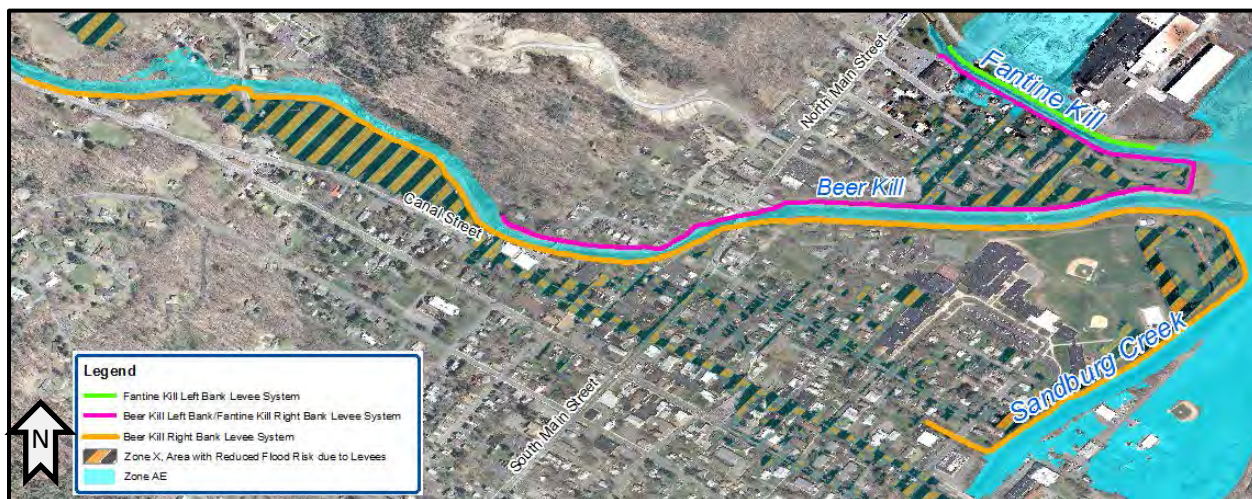


Figure 7: Sound Reach Procedure – Beer Kill Right Bank Levee, Beer Kill Left Bank Levee Reach of Beer Kill Left Bank Levee/Fantine Kill Right Bank Levee

6 Path Forward

6.1 Levee Analysis and Mapping Procedures

The Ellenville FDRP included in this study is shown as non-accredited on the effective FIRM. No certified documentation is available to show the Ellenville FDRP meets the minimum requirements of 44CFR§65.10 of the NFIP Regulations. At the request of the Village of Ellenville, FEMA engaged the community through the Levee Analysis and Mapping Procedures process to help identify potential options to evaluate the flood risk for the leveed areas of the Ellenville FDRP. The Village is currently considering Freeboard Deficient Procedure and accreditation to depict the flood hazard for leveed areas of the Ellenville Levee; however, they are currently weighing the costs and benefits prior to moving forward.

Should the community be able to provide certified data in support of all minimum requirements of 44 CFR§65.10 for a levee system, the levee system could be shown as accredited with the flood risk of the leveed area shown as shaded Zone X.

Should the community be able to provide 44 CFR§65.10 compliant data for a levee system, for all but freeboard criteria (Freeboard Deficient Procedure), and the top of levee elevation is certified to be at or above the 1-percent-annual-chance flood, the flood risk of the leveed area could be shown as Zone D.

If the community does not provide 44 CFR§65.10 compliant data, the effective FIRM dated November 17, 2016 will not be changed until warranted by future mapping updates.

Due to the recent flood risk mapping for the levee system becoming effective November 18, 2016, FEMA does not anticipate updating the flood risk maps in the near future;

however, 44 CFR§65.10 compliant levee data in support select levee analysis and mapping procedures may be submitted at any time through the LOMR process to update the FIRM. It is recommended that the community coordinate with FEMA Region II in advance of any submittal to keep the Region apprised of the status of the levee systems. FEMA's Levee Accreditation Checklist has been included in Appendix F for reference.

7 References

FEMA: Non-Accredited Levee Analysis and Mapping Guidance, September 2013

USACE, National Levee Database (GeoDatabase Version 3.0 dated 07-28-2015), 2015.

Appendix A

Stakeholder Engagement - LLPT Meeting 1 Information

[Full Appendix Provided Separately](#)

Meeting Notes

ATTENDEES

JOSEPH STOECKELER

(Name not on sign in sheet)
jstoeckeler@villageofellenville.com

Village of Ellenville

BRIAN SCHUG

Village of Ellenville

LEONARD DISTEL

Town of Wawarsing

BURT SAMUELSON

Ulster County Planning

KATHY FALLON

Congressman Faso's Office

DAN FLETCHER

Barton and Loguidice

MARK LUKASI

Tectonic Engineering

CHARLES BAZYDLO

Hydro Aluminum, Inc.

BILL NECHAMEN

NYS Department of
Environmental
Conservation

ANNA SERVIDONE

NYS Department of
Environmental
Conservation

BERHANU GONFA

NYS Department of
Environmental
Conservation

JOHN HARRINGTON

NYS Department of
Environmental
Conservation

ARVIND GOSWAMI

NYS Department of
Environmental
Conservation

BRAD WENSKOSKI

NYS Department of
Environmental
Conservation

VILLAGE OF ELLENVILLE

LEEVE ANALYSIS AND MAPPING PROCEDURES (LAMP) MEETING

Date: June 7, 2017

Time: 9:00 AM – 11:00 AM

LOCATION

Ellenville Government Building
2 Elting Court
Ellenville, NY 12428

Action Items	Owner
1. Contact U.S. Geological Survey (USGS) about the NYC Rondout Reservoir to discuss ways in which it would affect the Village (ex: leaking aqueduct).	FEMA
2. Ask the US Army Corps of Engineers (USACE) about the proposal for projects (study or flood control) in the Rondout Corridor or areas that would affect the Village.	FEMA
3. Send out presentation slides.	FEMA
4. Find modeling data for the Fantine Kill study.	FEMA
5. Share the File Transfer Protocol (FTP) site details: Browser link: https://projstftp.stantec.com FTP Client Hostname: projstftp.stantec.com Port: 22 (can be used within an FTP client to view and transfer files and folder; e.g., FileZilla) Login name: UCNLD1135 Password: 4367002	FEMA
6. Share a link to Levee Analysis and Mapping Procedures (LAMP) guidance with the attendees: https://www.fema.gov/final-levee-analysis-and-mapping-approach .	FEMA

NOTES

The meeting began with the facilitator, Thomas Song, introducing himself and thanking everyone for attending. He discussed that the Federal Emergency Management Agency (FEMA) prioritizes working with communities on projects to aid officials in building community flood resilience.

Meeting Notes

ALAN SPRINGETT

FEMA

SHUDIPTO RAHMAN

FEMA

ATTENDEES (cont)

STEPHANIE NURRE

STARR II – Mapping
Consultant

THOMAS SONG

FEMA Outreach Consultant

- Introductions of attendees (See attached sign in sheets).

The presentation was handed off to Shudipto Rahman. Mr. Rahman provided an overview of levee risk and reviewed the former methods of mapping the flood risk for non-accredited levees that led FEMA to develop LAMP. Mr. Rahman discussed why LAMP is important for the Village:

- The outputs of LAMP will provide improved risk information to be used as the basis for planning and decision making.
- The LAMP plan will incorporate collaborative discussions and data collected throughout the LAMP process used in this risk assessment.
- This project will not immediately result in new flood maps but gives a more accurate depiction of risk. This information will be valuable in any future flood map updates.

The presentation continued with a general overview of the three phases in a LAMP project. Mr. Rahman then went into greater detail on each of the phases: Discovery, Advanced Analysis, and Mapping.

Mr. Rahman concluded his part of the presentation by reiterating the importance of the Local Levee Partnership Team (LLPT). He then handed the presentation off to the technical project lead, Stephanie Nurre.

Ms. Nurre began by showing an orthographic image of the levee areas and pinpointed where the levees were located according to current information.

QUESTION: An attendee asked for a copy of the map.

ANSWER: Stephanie noted that a project FTP site will be provided to share data among the LLPT members. *Note: since the meeting, the site was set up, and the details are in the Action Items section.*

Ms. Nurre continued by showing an image of the effective Flood Insurance Rate Map (FIRM) of the levee area. She went explained the Base Flood Elevation (BFE) standard and other information about FIRMs.

QUESTION: An attendee asked if the levees were ever accredited.

ANSWER: Alan Springett explained the maps from 1983 showed the levees provided protection because there was no FEMA definition of a levee and it was taken for granted that it did provide protection. The Physical Map Revision project initiated in 2009 updated the area and took a different approach to levees. In this analysis, the levee along the Beer Kill appeared to contain the base flood discharge. The levee along the Fantine Kill did not. As noted in the 2009 meeting, FEMA is returning to the Village to discuss an improved approach to analyze flood risk in areas impacted by a non-accredited system.

QUESTION: An attendee asked if the levees can ever be accredited.

ANSWER: Mr. Springett explained that there are legal requirements that must be met to have the system accredited. Volume 44 Code of Federal Regulations (CFR) § 65.10 lays out the requirements for levee accreditation, which includes certification by a professional engineer.

Meeting Notes

Comment: Brian Schug recalled that meeting attendees in 2009 discussed the deficiencies in the levee, that the Village officials did not know who could certify it, and that they had no funding source for work on the levees, so the levees became “unaccredited.” He went on to state that this led to Special Flood Hazard Areas being shown on the landward side of the levees that were not there before.

ANSWER: Bill Nechamen clarified that in 2009, the Village could not certify the levee, so the levees were shown as non-accredited. There was an issue with the funding. It is unclear who is going to pay for the work to get the levees certified. He went on to state that this a problem faced by many communities. State and local governments need information to analyze what protection the non-accredited levees provide and what will be needed to fix it. Then the Village can then decide if the cost is a good investment.

Mr. Springett added that LAMP looks at a levee in its own unique situation. FEMA needs local input. He provided the example of the levee along the Beer Kill and how the model did not show the water going over the bank. We may be able to show the risks more distinctly.

Ms. Nurre resumed her presentation by explaining that in the past, levees were either viewed as accredited or not. Now, with LAMP, there is a suite of approaches that may be applied to assess the flood risk. A levee system can be evaluated as separate reaches, each analyzed based on its unique characteristics.

Ms. Nurre then went over the levee data needs and referred everyone to FEMA’s LAMP guidance for more information (<https://www.fema.gov/final-levee-analysis-and-mapping-approach>). She went over each of the items on the list shown on slide 16.

- It was shared that USACE has levee crest elevations.

Ms. Nurre went over each LAMP procedure in detail. She discussed the purpose and data requirements for each of the procedures as well as their pros and cons. The points she made were:

- Fantine Kill and Beer Kill are currently mapped as Zone A floodplains. An approximate study of these streams is anticipated as part of the LAMP study.
- Historical data regarding levee breaches or deficiencies could support a breach analysis.
- The overtopping procedure would require submittal of data. Referring back to what was discussed in the 2009 meeting, the levee along the Sandburg Creek appeared to meet the freeboard requirement.
- The definition of a D Zone and its implications.

Comment: Brian Schug stated the Village uses a 3 foot freeboard; however, he was referring to the elevation of structures, not levee freeboard.

Response: Bill Nechamen clarified that the freeboard requirement discussed in this meeting refers to the levee freeboard, not elevation of structures.

Ms. Nurre then asked for an update on local activities or any concerns or comments about the area/levees.

The Village Manager, Joe Stoeckeler, informed everyone that the Village was awarded NY Rising money (\$2M outside the Village and \$1M inside). Barton & Loguidice and Tectonic are the two firms that have been contracted to do streambed and streambank restoration projects in separate

Meeting Notes

stream segments. The projects need about 40 easements to proceed. The Village has been struggling to develop appropriate legal language to define the easements needed which may be the reason for the mixed reactions from the residents. Without the cooperation of all residents, the completion of the projects is uncertain.

- Official from Ulster County (Mr. Burt Samuelson) offered to share what information he has.
- The Department of Environmental Conservation (DEC) also offered to share any information they have.

Mr. Stoeckeler went over the history of the Village's agreement to maintain the levees 40 years ago. He commented that the Village may not want to continue doing so if the levees don't provide protection.

- To help the Village find funding to meet 44 CFR § 65.10 requirements, Mr. Springett gave funding examples. He suggested leveraging available state and federal grant programs to help meet the cost.

QUESTION: Mr. Stoeckeler asked about the average cost of the engineering work involved in accreditation.

ANSWER: Mr. Springett responded that it is hard to provide an average because of the large range of figures. He said he has seen costs from as low as \$50,000 to as high as \$300,000 for the engineering work.

Mr. Stoeckeler brought up a few items that he thought could assist the Village:

- He would like Congress to authorize a USACE project in the Rondout Corridor that was proposed decades ago.
- There is a possibility of building a sports arena in the area that can help the Village. This has not been confirmed and he did not have any other details.
- He and Leonard Distel believe the leaking NYC Rondout Reservoir Tunnel that runs underground within the vicinity of the Village is causing additional flooding. Brian Schug brought up a potential issue associated with the water release from the reservoir downstream of the Village. It may be bottlenecking the flow and causing higher water levels upstream. In both cases, the belief is the reservoir is impacting their area and they pointed to data the USGS developed on this issue.

Ms. Nurre resumed the presentation. She discussed LAMP Discovery again and reminded everyone this would be the starting point.

- Mr. Springett shared his best recollection on the flow rates for each stream. The DEC had information from the Operations and Maintenance (O&M) report.
- FEMA will be working with DEC and USACE to share information.
- Mr. Schug recommended FEMA take a snap shot in the downstream boundaries of the study. Ms. Nurre responded by reiterating the scope of this study and noted that the Village's recommendation will be taken into consideration and reviewed.
- The NYC Rondout Reservoir is upstream of the Village, and there are aqueducts that run underneath Ellenville and Wawarsing which move water across the Hudson River to the

Meeting Notes

Croton Watershed. The Village officials believe the last flood was partially due to the leaking reservoir aqueducts. The work to fix the problems with the tunnels may not start until 2022.

QUESTION: Will NYC flood prevention affect the flows in Ellenville?

ANSWER: Mr. Springett told the audience these projects were mainly directed to protect from the Atlantic Ocean side, and work will not begin for decades. He went on to talk about the Community Needs Management System.

- The Village is committed to providing data from their engineers.

Ms. Nurre informed everyone an FTP site will be set up to receive data from the community and other levee stakeholders that could be leveraged as part of this study. She also set up the framework for the analysis by referring to the procedures and the project's timeline. She also reminded the group that there will be additional meetings, and everybody will be updated on the progress in between meetings so there will be no surprises.

At this point, Ms. Nurre handed the presentation over to Mr. Rahman.

Mr. Rahman went over the importance of local information and offered support outside LAMP to help the communities mitigate their flood risk. He reiterated the importance of keeping the lines of communication open so FEMA could provide service and support as needed. Mr. Rahman also went over the importance of communicating risk information to residents.

Mr. Rahman continued by going over hazard mitigation planning.

The presentation ended with an overview of the USACE PL 84-99 program in general terms. Mr. Nechfamen and others from DEC provided some input. Interested parties were told to contact Ali Bachowski at the USACE NY District for more details via email at Ali.M.Bachowski@usace.army.mil.

Meeting Notes



FEMA

ELLENVILLE LAMP/LLPT 1 MEETING

SIGN-IN SHEET

June 7, 2017

PLEASE PRINT

Name	Affiliation	Phone Number	Email
1. Burt Samvelsen	Ulster County Planning	841-339-2490	bsam@co.ulster.ny.us
2. Kathy Fallon	Congressman Faso	845 514 2322	Kathy.Fallon@congress.gov
3. BRIAN SCHUG	Village of Ellenville	845-647-7030 ext. 310	Brian Schug bschug@villageofellenville.com
4. ANNA LARYD	Coordinator for SARA Extrajurisdictional Activities	845 361-3668	CLARYD@HUD.NY.GOV
5. MARK LUKASIK	Tectonic Engineering	845 534 5954	MLUKASIK@TECTONICENGINEERING.COM
6. ANNA SERVIGONE	NYS DEC	516 402 4147	anna.servigone@dec.ny.gov

Sheet ____ of ____

RiskMAP
Increasing Resilience Together

Meeting Notes



FEMA

Name	Affiliation	Phone Number	Email
7. Berhanu Gonfa	NYS DEC	914-428-2505 Ext 372	berhanu.gonfa@dec.ny.gov
8. John Harrington	NYS DEC	845-256-3055	john.harrington@dec.ny.gov
9. Dan Fletcher	Barton & Loguidice	518 218 1821	dfletcher@bartonandloguidice.com
10. Arvind Goswami	NYS DEC	518-402-8186	Arvind.goswami@dec.ny.gov
11. Brad Wenskosi	NYS DEC	518-402-8280	Brad.wenskosi@dec.ny.gov
12. Alan Springett	FEMA	212-680-8557	Alan.Springett@fema.dhs.gov
13. THOMAS SONG	FEMA CONSULTANT	914-343-6696	THOMAS.SONG@MBAKERINTL.COM
14. SHADIPRO RATHAN	FEMA	202-722-4223	SHADIPRO.RATHAN@FEMA.DHS.GOV

Sheet ____ of ____

RiskMAP
Increasing Resilience Together

Meeting Notes



FEMA

Name	Affiliation	Phone Number	Email
15. Bill Nechman	NYS DEC	518-402-8146	WILLIAM.NECHMAN@dec.ny.gov
16.			
17.			
18.			
19.			
20.			
21.			
22.			

Sheet ____ of ____

RiskMAP
Increasing Resilience Together

Requirements for Mapping Levees

Complying with Section 65.10 of the NFIP Regulations

As part of a mapping project, it is the levee owner's or community's responsibility to provide data and documentation to show that a levee meets the requirements of Section 65.10 of the National Flood Insurance Program (NFIP) regulations. Links to Section 65.10 and many other documents are available on FEMA's Web site at www.fema.gov/plan/prevent/fhm/lv_fpm.shtm.

The FEMA requirements in Section 65.10 are separated into five categories:

1. General criteria;
2. Design criteria;
3. Operations plans and criteria;
4. Maintenance plans and criteria; and
5. Certification requirements.

The requirements for each of these areas are summarized below.

(A) GENERAL CRITERIA

For purposes of the NFIP, FEMA will only recognize in its flood hazard and risk mapping effort those levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards that are consistent with the level of protection sought through the comprehensive floodplain management criteria established by Section 60.3 of the NFIP regulations. Section 65.10 of the NFIP regulations describes the types of information FEMA needs to recognize, on NFIP maps, that a levee system provides protection from the flood that has a 1-percent chance of being equaled or exceeded in any give year (base flood). This information must be supplied to FEMA by the community or other party seeking recognition of a levee system at the time a study or restudy is conducted, when a map revision under the provisions of Part 65 of the NFIP regulations is sought based on a levee system, and upon request by the Administrator during the review of previously recognized structures. The FEMA review is for the sole purpose of establishing appropriate risk zone determinations for NFIP maps and does not constitute a determination by FEMA as to how a structure or system will perform in a flood event.

(B) DESIGN CRITERIA

For the purposes of the NFIP, FEMA has established levee design criteria for freeboard, closures, embankment protection, embankment and foundation stability, settlement, interior drainage, and other design criteria. These criteria are summarized in subsections below.

(B)(1) FREEBOARD

For riverine levees:

- A minimum freeboard of 3 feet above the water-surface level of the base flood must be provided.
- An additional 1 foot above the minimum is required within 100 feet on either side of structures (e.g., bridges) riverward of the levee or wherever the flow is constricted.



- An additional 0.5 foot above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, is also required.

Exceptions to the minimum riverine freeboard requirements above may be approved if the following criteria are met:

- Appropriate engineering analyses demonstrating adequate protection with a lesser freeboard must be submitted.
- The material presented must evaluate the uncertainty in the estimated base flood elevation profile and include, but not necessarily be limited to:
 - An assessment of statistical confidence limits of the 1-percent-annual-chance discharge;
 - Changes in stage-discharge relationships; and
 - Sources, potential, and magnitude of debris, sediment, and ice accumulation.
- It must be also shown that the levee will remain structurally stable during the base flood when such additional loading considerations are imposed.

Under no circumstances will freeboard of less than 2 feet be accepted.

For coastal levees, the freeboard must be established at 1 foot above the height of the 1-percent-annual-chance wave or the maximum wave runoff (whichever is greater) associated with the 1-percent-annual-chance stillwater surge elevation at the site.

Exceptions to the minimum coastal freeboard requirements above may be approved if the following criteria are met:

- Appropriate engineering analyses demonstrating adequate protection with a lesser freeboard must be submitted.
- The material presented must evaluate the uncertainty in the estimated base flood loading conditions. Particular emphasis must be placed on the effects of wave attack and overtopping on the stability of the levee.

Under no circumstances will a freeboard of less than 2 feet above the 1-percent-annual-chance stillwater surge elevation be accepted.

(B)(2) CLOSURES

The levee closure requirement is that all openings must be provided with closure devices that are structural parts of the system during operation and design according to sound engineering practice.

(B)(3) EMBANKMENT PROTECTION

Engineering analyses must be submitted to demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability.

The factors to be addressed in such analyses include, but are not limited to:

- Expected flow velocities (especially in constricted areas);
- Expected wind and wave action;

- 
- Ice loading;
 - Impact of debris;
 - Slope protection techniques;
 - Duration of flooding at various stages and velocities;
 - Embankment and foundation materials;
 - Levee alignment, bends, and transitions; and
 - Levee side slopes.

(B)(4) EMBANKMENT AND FOUNDATION STABILITY

Engineering analyses that evaluate levee embankment stability must be submitted.

The analyses provided shall evaluate expected seepage during loading conditions associated with the base flood and shall demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability.

An alternative analysis demonstrating that the levee is designed and constructed for stability against loading conditions for Case IV as defined in U.S. Army Corps of Engineers (USACE) Engineering Manual 1110-2-1913, Chapter 6, Section II, may be used.

The factors that shall be addressed in the analyses include:

- Depth of flooding;
- Duration of flooding;
- Embankment geometry and length of seepage path at critical locations;
- Embankment and foundation materials;
- Embankment compaction;
- Penetrations;
- Other design factors affecting seepage (e.g., drainage layers); and
- Other design factors affecting embankment and foundation stability (e.g., berms).

(B)(5) SETTLEMENT

Engineering analyses must be submitted that assess the potential and magnitude of future losses of freeboard as a result of levee settlement and demonstrate that freeboard will be maintained within the minimum freeboard standards set forth in B(1).

This analysis must address:

- Embankment loads,
- Compressibility of embankment soils,
- Compressibility of foundation soils,



- Age of the levee system, and
- Construction compaction methods.

A detailed settlement analysis using procedures such as those described in USACE Engineering Manual EM 1110-1-1904 must be submitted.

(B)(6) INTERIOR DRAINAGE

An analysis must be submitted that identifies the source(s) of such flooding; the extent of the flooded area; and, if the average depth is greater than 1 foot, the water-surface elevation(s) of the base flood. This analysis must be based on the joint probability of interior and exterior flooding and the capacity of facilities (such as drainage lines and pumps) for evacuating interior floodwaters. Interior drainage systems usually include storage areas, gravity outlets, pumping stations, or a combination thereof.

For areas of interior drainage that have average depths greater than 1 foot, mapping must be provided depicting the extents of the interior flooding, along with supporting documentation.

(B)(7) OTHER DESIGN CRITERIA

In unique situations, such as those where the levee system has relatively high vulnerability, FEMA may require that other design criteria and analyses be submitted to show that the levees provide adequate protection. In such situations, sound engineering practice will be the standard on which FEMA will base its determinations. FEMA also will provide the rationale for requiring this additional information.

(C) OPERATIONS PLANS AND CRITERIA

For a levee system to be recognized, the operational criteria must be as described below. All closure devices or mechanical systems for internal drainage, whether manual or automatic, must be operated in accordance with an officially adopted operation manual, a copy of which must be provided to FEMA by the operator when levee or drainage system recognition is being sought or when the manual for a previously recognized system is revised in any manner. All operations must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP.

(C)(1) CLOSURES

Operation plans for closures must include the following:

- Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials, that will be used to trigger emergency operation activities and demonstration that sufficient flood warning time exists for the completed operation of all closure structures, including necessary sealing, before floodwaters reach the base of the closure;
- A formal plan of operation, including specific actions and assignments of responsibility by individual name or title; and
- Provisions for periodic operation, at not less than 1-year intervals, of the closure structure(s) for testing and training purposes.



(C)(2) INTERIOR DRAINAGE SYSTEMS

Interior drainage systems associated with levee systems usually include storage areas, gravity outlets, pumping stations, or a combination thereof. FEMA will recognize these drainage systems on NFIP maps for flood protection purposes only if the following minimum criteria are included in the operation plan:

- Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials, that will be used to trigger emergency operation activities and demonstration that sufficient flood warning time exists to permit activation of mechanized portions of the drainage system;
- A formal plan of operation, including specific actions and assignments of responsibility by individual name or title;
- Provision for manual backup for the activation of automatic systems; and
- Provisions for periodic inspection of interior drainage systems and periodic operation of any mechanized portions for testing and training purposes; no more than 1 year shall elapse between either the inspections or the operations.

(C)(3) OTHER OPERATION PLANS AND CRITERIA

FEMA may require other operating plans and criteria to ensure that adequate protection is provided in specific situations. In such cases, sound emergency management practice will be the standard upon which FEMA determinations will be based.

(D) MAINTENANCE PLANS AND CRITERIA

For levee systems to be recognized as providing protection from the base flood, the following maintenance criteria must be met:

- Levee systems must be maintained in accordance with an officially adopted maintenance plan, and a copy of this plan must be provided to FEMA by the owner of the levee system when recognition is being sought or when the plan for a previously recognized system is revised in any manner.
- All maintenance activities must be under the jurisdiction of a(n):
 - Federal or State agency;
 - Agency created by Federal or State law; or
 - Agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance.
- The maintenance plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained.
- At a minimum, the maintenance plan shall specify:
 - Maintenance activities to be performed;
 - Frequency of their performance; and
 - Person by name or title responsible for their performance.



(E) CERTIFICATION REQUIREMENTS

Data submitted to support that a given levee system complies with the structural requirements set forth in B(1) through B(7) above must be certified by a Registered Professional Engineer. Also, certified as-built plans of the levee must be submitted. Certifications are subject to the definition given in Section 65.2 of the NFIP regulations. In lieu of these structural requirements, a Federal agency with responsibility for levee design may certify that the levee has been adequately designed and constructed to provide protection against the base flood.

Appendix B

Stakeholder Engagement - LLPT Meeting 2 Information

[Full Appendix Provided Separately](#)

Meeting Notes

ATTENDEES

JOSEPH P.
STOECKELER
Village of Ellenville

BURT SAMUELSON
Ulster County Planning

MARK LUKASI
Tectonic Engineering

KATHY FALLON
Office of Representative
John Faso

DAN FLETCHER
Barton and Loguidice

LORI DUBORD
NYS Governor's Office of
Storm Recovery

ALAN FUCHS
NYS Department of
Environmental Conservation

LYNN MEEKER
NYS Department of
Environmental Conservation

JOHN HARRINGTON
NYS Department of
Environmental Conservation

BERHANU GONFA
NYS Department of
Environmental Conservation

ARVIN GOSWAMI
NYS Department of
Environmental Conservation

BRAD WENSKOSKI
NYS Department of
Environmental Conservation

SHUDIPTO RAHMAN
FEMA

STEPHANIE NURRE
STARR II

VILLAGE OF ELLENVILLE LEVEE FLOOD HAZARD IDENTIFICATION LOCAL LEVEE PARTNERSHIP TEAM (LLPT) MEETING 2

September 12, 2017 9:00-11:00 AM (EST)

Location:
2 Elting Court
Ellenville, NY 12428
3rd Floor Meeting Room

Action Item	Owner
1. Contact the U.S. Army Corps of Engineers to inquire about the Section 905(b) Reconnaissance Study Rondout Creek Watershed report on developmental impacts on agriculture and flooding in this area.	FEMA
2. FEMA will distribute meeting minutes to attendees.	FEMA
3. Refine Natural Valley and Structural-Based Inundation Procedure Analysis. Also, prepare a composite Natural Valley map for study area.	FEMA
4. Upload 2015 Periodic Inspection Report to the file transfer site and email Stephanie Nurre (Stephanie.Nurre@Stantec.com) upon completion, as well as access any data on the site. Browser link: https://projstftp.stantec.com FTP Client Hostname: projstftp.stantec.com Port: 22 (can be used within an FTP client to view and transfer files and folder; e.g., FileZilla) Login name: UCNLD1135 Password: 4367002	NYSDEC
5. Research contact at U.S. Geological Survey who may be able to discuss (with the Village) the NYC Rondout Reservoir and ways it may affect the Village.	FEMA
6. LLPT to share survey information on the FTP site for Fantine Kill study area, if available.	LLPT
7. Participate in a meeting to discuss possible levee-related projects with The Village and the Governor's Office of Storm Recovery.	FEMA/LLPT

AGENDA

- Review Ellenville's Levee Flood Hazard

Meeting Notes

THOMAS SONG

FEMA Outreach Consultant

PAIGE MANDY

FEMA Outreach Consultant

- o Local Levee System
- o Analysis and Mapping Procedures for Non-Accredited Levees
- Application of Reach Study Procedures
- Review Results of Initial Data Analysis
 - o Sandburg Creek
 - o Beer Kill
 - o Fantine Kill
- Discuss Next Steps in the Process

OVERVIEW

Thomas Song opened the meeting and facilitated introductions of attendees. Shudipto Rahman then provided a summary of the coordination efforts and data collected to date. Stephanie Nurre then presented the results of the initial data analysis for levees along Sandburg Creek, Beer Kill and Fantine Kill from the following reach analysis procedures: Natural Valley and Structural-Based Inundation. The draft results are shown in the LLPT 2 presentation.

NOTES

For the Sandburg Creek, Beer Kill, and Fantine Kill, the Natural Valley Procedure included an approximate model coordinated with the effective flowrates for the base flood (1-percent-annual-chance exceedance). The resulting water-surface elevations are similar to what is shown in the effective Flood Insurance Study report. The Structural-Based Inundation Procedure identifies the landside inundation area during hypothetical breach scenarios. The resulting inundation map is a combination of the 1-percent-annual-chance inundation areas from the outputs of hypothetical breaches at an upstream, downstream, and midpoint along the levee systems.

The Natural Valley for Beer Kill identified some additional inundation areas outside of those currently mapped on the effective Flood Insurance Rate Map near Cape Avenue. On the south side of the stream, the Village identified an area of interest near the newly identified inundation area. Additionally, the Structural-Based Inundation identified potential areas within the Village landside of the Beer Kill right descending levee that could be subject to shallow inundation (see depth grid) should the upstream end of the levee breach. The Village also noted that the landside areas in the community experience flooding from interior/urban flooding. It should be understood that flooding from both breach and interior sources would likely produce deeper and more extensive flood inundation areas.

The Natural Valley for Fantine Kill identifies potential inundation on the left descending side that is not currently shown on the effective FIRM. This is due to the previous analysis not encompassing the overbank area of the stream and rough estimates of the terrain where a portion of an industrial building has been removed. As discussed later in the notes, additional information regarding ground elevations in the area or other information for the subject area may be useful in further refining the draft analysis.

Meeting Notes

FEMA and the community worked together to better understand the community levee system, which included clarifying roles and responsibilities:

- FEMA shared that they do not own, operate or maintain levee systems;
- The Village expressed an interest in leveraging the levee analysis and mapping plan for hazard mitigation purposes. The community could enhance their hazard mitigation plan to include the levee hazards, which it currently does not. This could enable them to potentially pursue future grant funding opportunities that involve the levee systems.

During the discussion, the Village voiced concerns about how the levee analysis and mapping procedure would affect Ulster County's FIRM, which was created in 2016. FEMA reiterated to the community that at the current time, no new mapping project is forecasted to update the maps, especially due to the recent (2016) FIRM update. If the community is interested in accrediting the levees, FEMA can work with the community to provide additional information on the requirements and the Letter of Map Revision (LOMR) process to make official changes to the FIRM and the number of homes that are required to purchase flood insurance.

Stephanie Nurre will also update the top of levee profile exhibit to clarify the depicted data and include nearby street locations.

The Village has also requested that FEMA coordinate with the U.S. Army Corps of Engineers to analyze the Section 905(b) Reconnaissance Study Rondout Creek Watershed report on developmental impacts on agriculture and flooding in this area. Additionally, FEMA will also work with the U.S. Geological Survey to discuss the NYC Rondout Reservoir and its potential impact on the Village (ex: leaking aqueduct). It should be noted that the levee team is aware of and will document the Village's concerns; however, it is unlikely that these studies will be incorporated as updates to the current available data for the current levee identification project for the non-accredited levees.

FEMA reviewed next steps in the LLPT process, which are to collect any additional data from the community as well as plan for a final meeting where community members will be able to review the draft levee analysis and mapping plan. FEMA will work to schedule the LLPT 3 discussion of the draft plan during a Village Board meeting, which occurs on the second and fourth Monday of each month. If needed, FEMA has will host a touchpoint call prior to the LLPT 3 meeting.

DISCUSSION

- QUESTION: Did FEMA impose breach points into the system?
 - o RESPONSE: No, It's a hypothetical breach point.
- QUESTION: Can Natural Valley be defined as the elevation of the stream bed as it was there naturally?

Meeting Notes

- RESPONSE: The Natural Valley is the area inundated by a 1-percent-annual-chance flood, if the levee is not adequately containing the flow of water within the channel/reducing flood risk.
- QUESTION: What has the Village observed as far as flooding since the Beer Kill levee has been built?
 - RESPONSE: Around 50 percent of homes have had flooding in their basements.
- QUESTION: After the LLPT process, would the Village be mapped into the floodplain?
 - RESPONSE: No, the map will not be updated due to this analysis at this time. The results of the levee mapping project may be used at a future time when the map is being updated. At that time, FEMA will contact the community and determine whether new information or any updates could affect what was concluded before moving forward.
- QUESTION: We're working with the Governor's Office of Storm Recovery and engineering firms on stream restoration projects, will that get some of these structures out?
 - RESPONSE: One way to remove structures from an A Zone in the levee impact area is to certify the levee and submit the documentation for FEMA's review to accredit the levee. Additionally, a certified levee would show that the levee meets the minimum design, operation, and maintenance requirements of 44 CFR 65.10. The resulting risk level in the levee impact area would correlate to shaded X Zone, or moderate-risk area; however, there may be residual ponding areas that are considered Zone AE Special Flood Hazard Area (SFHA). The shaded X Zone does not have mandatory Federal flood insurance purchase requirements; however, areas of SFHA, like those associated with ponding, would have mandatory flood insurance requirements. Other ways to remove structures from an A Zone, regardless of its proximity to the levee, would be to go through the Letter of Map Amendment (LOMA) process. A LOMA is a legal document that declares a building to be outside the flood zone. There are two ways to obtain a LOMA. One way is for a homeowner to submit survey data that shows the structure's Lowest Adjacent Grade (or the lowest point of the ground level immediately next to a building) is higher than the identified Base Flood Elevation in the flood zone. The other way to obtain a LOMA would be in a situation where the structure is mistakenly identified to be in a flood zone.
- QUESTION: On shorter levees like this, are there fewer requirements for accreditation?

Meeting Notes

- RESPONSE: No, the size of the levee does not matter with the requirements. The size will affect the cost of obtaining certified documentation related to the levee.
- QUESTION: We were under the impression that at one point FEMA deemed these levees as providing protection?
 - RESPONSE: FEMA has never operated, owned or maintained levees. FEMA's role is to analyze flood risk in areas with and without levees. Prior to FEMA's levee analysis and mapping procedures process, maps may have shown a levee as containing water flow during a 1-percent-annual-chance flood without having the proper documentation showing technical proof that it would. FEMA is now going back to these levees and closely examining them with these new procedures to analyze flood risk and provide more comprehensive information regarding flood hazards in levee-impacted areas.

Meeting Notes

Department of Homeland Security
Federal Emergency Management Agency
Region II – Mitigation Division



ELLENVILLE MEETING SIGN-IN SHEET

Meeting Date/Time: Tuesday, September 12, 2017
9:00 AM – 11:00 AM

#	Name – PLEASE PRINT	Title	Organization/Town	E-Mail
✓1	John Harrington	General Mechanic	NYS DEC	John.harrington@dec.ny.gov
✓2	Lynn Meeker	Conservation Operations Supervisor	NYS DEC	Lynn.Meeker@dec.ny.gov
✓3	Burt Samuelson	Senior Planner	Ulster County Planning	bsam@co.ulster.ny.us
✓4	Stephanie Nurre	Project Manager	STARR II	stephanie.nurre@starrcc.com
5	Joseph P Strockelers	Vill Mgr	Village of Ellenville	jstrockeler@villageoffellenville.com
✓6	Charles Ritzky	ADP/IT	SARA/Hydrus	CRITZKY@HUS-MA-PA
✓7	Mark Lukasik	Vice President	TECHNICAL ENGINEERING	MLUKASIK@TECHNICALENGINEERING.COM
✓8	Kathy Fallon	Construction	Congressman Faso	Kathy.Fallon@email.house.gov
✓9	Don Fletcher	V.P.	BEL-Village Engineer	dfletcher@bartonandguidice.com
✓10	Mike Wendt	Investigator	Wawarsing	MichaelWendel@gmail.com
✓11	Lori DuBord	Se. Program Mgr	GOSR	lori.dubord@stormrecovery.ny.gov
✓12	Berhanu Gonfa	PE 1	NYS DEC	berhanu.gonfa@dec.ny.gov
✓	ALAN FUCHS			ALAN.FUCHS@



FEMA

RiskMAP
Increasing Resilience Together

Meeting Notes

ATTENDEES

JOE STOECKELER
Village of Ellenville

BRIAN SCHUG
Village of Ellenville

STEPHANIE NURRE
STARR II

CURTIS SMITH
STARR II

SHUDIPTO RAHMAN
FEMA Region II

THOMAS SONG
Mitigation Champion

PAIGE MANDY
FEMA Outreach
Consultant

SYLVIA SCHMIDT
FEMA Outreach
Consultant

VILLAGE OF ELLENVILLE

LEVEE ANALYSIS AND MAPPING PROCEDURES PROJECT UPDATE

December 4, 2017, 9:30 AM (EST)

Action Item	Owner
1. Thomas Song to coordinate with the Mayor of the Town of Nichols and communicate potential dates to Ellenville officials.	FEMA
2. Ellenville to send a copy of the USGS study to Stephanie Nurre with Thomas Song and Shudipto Rahman copied.	Ellenville

Update: Brian sent the USGS report to Stephanie.

SUMMARY

Purpose of the call was to introduce the draft Levee Analysis and Mapping Plan. The plan is meant to serve as a culmination of the information exchanged, results from the initial analysis, and discussions from all the work up to now. Another purpose was to follow up on questions presented during the Local Levee Partnership Team (LLPT) 2 meeting.

A call with stakeholders from the Department of Environmental Conservation (DEC) was also planned. Both meetings discuss the same topics.

NOTES

The call included a discussion of the refined Natural Valley procedure for the Beer Kill Levee systems. Additionally, the application of the Structural-Based Inundation procedure to the Ellenville Levee systems was revisited and involved a detailed description on modeling breaches in three locations along each system.

Refined Natural Valley Procedure

The flood hazards associated with the Natural Valley analysis for Beer Kill were initially determined by using a 1-dimensional analysis which did not allow for a view of flow going away from the stream. Instead, it only captured flow in the area contained in the modeled stream cross section.

Meeting Notes

The refined Natural Valley analysis incorporated a 2-dimensional analysis. This enhanced analysis showed more streets flooded in the community than previously recognized.

Q: Village: Where would work need to be done to remove Canal Street from flooding risks? Is it a correct assumption from the analysis that work will need to commence around Bloomer Street?

A: FEMA: This is the Natural Valley analysis, an analysis we perform for every levee as a baseline. If the data to have the levee accredited is not available, then this area could be shown as inundated, as if the levee didn't exist.

Q: Village: Everyone acknowledges that there is a levee here; why is it not taken in account on these maps, even unaccredited (non-accredited)?

A: FEMA: The levee analysis and mapping procedures process is for non-accredited levees. The first initial analysis was the Natural Valley procedure. The Natural Valley procedure is an approach where the levee is not considered to reduce the flood risk associated with the 1-percent-annual-chance flood.

It is understood that certain engineering standards are required, but the Ellenville representatives feel it is unfair to assume no effect from the levee. If all levees were accredited, the areas in green (Special Flood Hazard Areas) would be in Shaded Zone X with no federally mandated flood insurance requirements.

Q: Village: What is the definition of freeboard?

A: FEMA: For levees, a minimum of 3 feet above the 1-percent-annual-chance flood level. A more detailed explanation would state that there is a minimum of 3 ½ feet at the upstream end sloping to 3 feet at the downstream end. Within 100 feet of any river crossing (bridges, culverts, etc.), the minimum freeboard is 4 feet. A minimum of 2 feet of freeboard above the 1-percent-annual-chance flood can be accepted for accreditation with additional analysis showing that it meets the requirements of 44 CFR 65.10(b)(1)(ii).

Q: Village: How does the accreditation process relate to local law?

A: FEMA: Local and state requirements should also be met, but FEMA reviews levee accreditation packages with respect to the requirements of 44 CFR 65.10.

The Village also stated that they have a local flood law calling for 3 feet of freeboard for every structure. This reference to freeboard is likely related to elevating buildings/structures above the Base Flood Elevation and is not levee related.

Meeting Notes

Q: Village: Is it an obvious conclusion that the village should gather resources to get the Beer Kill Levee accredited?

A: FEMA: The Ulster County Flood Insurance Rate Maps are not due to be updated for at least another 5 years, but most likely it will be longer. The results of the Initial Data Analyses for the Ellenville Levee System provide an enhanced assessment of the potential flood hazards related to the levee system. While what we have done so far will not initiate changes in flood insurance requirements now, it may affect what will be shown on future maps. It could be worthwhile to inform residents of the changes to their flood risk.

Q: Village: Is it fair to summarize that everything below Beer Kill, down to Canal Street, would need flood insurance in the future?

A: FEMA: Flood insurance is required for buildings shown in an SFHA on the effective FIRMs that have federally backed mortgages. Buildings not shown in a flood zone on the 2016 Ellenville FIRM are not required to purchase flood insurance. Changes from the initial data analysis are being shared to provide risk awareness, help make decisions, and provide a starting point for future mapping efforts.

Q: Village: Does it make sense to get the Beer Kill Levee documents certified, if affordable?

A: FEMA: That decision is up to the village. The village will need to decide if the benefits are worth the cost. The options are to do nothing related to the levees because the FIRM is not changing in the near future; provide certification for levee accreditation; or the Freeboard Deficient Procedure that would result in Zone D.

The Town of Nichols recently had a levee accredited. The Mayor of Nichols is open to having a conversation with other communities interested in levee accreditation and can share the town's experience to help other communities decide whether it is a viable option for them. A meeting will be coordinated and Ellenville will be invited.

Brian and Joe are interested in attending this appointment.

Concern was expressed that leaking in the tunnel connected to the Rondout Reservoir could cause additional flooding and negatively impact the community.

The Environmental Protection Director at the DEC has been contacted and is working to provide a local contact who can discuss these concerns in more detail. The DEC

Meeting Notes

has an ongoing environmental impact statement outside of what has been focused on in the levee analysis process.

Ellenville will be meeting with Techtonic to discuss getting the Beer Kill Levee accredited.

The models from the levee analysis will be available to Ellenville for their use. FEMA recommends the village provide updates before/during a project involving the levees to make sure the work meets agency requirements.

A copy of the 2015 periodic inspection report from USACE on the levee system is available on the File Transfer Protocol (FTP). The report will provide the village a comprehensive view of the levee system. DEC will be providing the annual inspection report to FEMA and FEMA will provide this to the community as well, once available.

A copy of the USACE 2007 Reconnaissance report is also available on the FTP site for the community to access.

The 2007 study talked about the condition of stream area flooding, erosion, debris clogging streets, and the maintenance of aging flood control projects, but it did not include discussion of any leaking in the tunnel.

A link to the FTP site was sent out in earlier emails. FEMA will provide the link again.

The owners of the hydro-aluminum site provided a plan to the FEMA Levee Team with spot elevations around the former hydro-aluminum site. This data was reviewed, but did not contain information for the part of the site where the building was removed and ground elevations were estimated based on the best available data.

Q: Village: Is there anything else to discuss before previewing the levee plan?

A: FEMA: No. A draft report will be sent out after the call today. The report will have the results of the levee data analysis, an overview of the mapping procedure, the reason for the program, meeting notes contained in the appendix, and presentations of the analysis.

Q: FEMA: Is it a fair to summarize that the Village of Ellenville may want to accredit their levees?

A: FEMA: Ellenville will consider levee accreditation.

Meeting Notes

There could be a case for the Freeboard Deficient Procedure along the Beer Kill where the levee does not meet the freeboard requirement. If FEMA receives the supporting data outlined in 44 CFR 65.10 that shows the levee meeting all the requirements of accreditation except the needed freeboard, then the levee impacted area could be identified as Zone D.

Q: Village: Will you be sending us the next plan/analysis?

A: FEMA: Yes. The next step is for the draft plans to be sent to the LLPT, stakeholders, and DEC for review and comment. They will have a few weeks to provide comments. We will set up a webinar to go through this with you. Any interested stakeholders or LLPT members are invited as well, prior to report finalization.

As a reminder, FEMA Region II resources are limited due to multiple disaster recovery efforts in other parts of the county. If the village would like to have more discussions, other resources such as FEMA contractors may be used.

Appendix C

Stakeholder Engagement - LLPT Meeting 3 Information

Meeting Notes

ATTENDEES

MAYOR JEFFREY KAPLAN

Village of Ellenville

DEPUTY MAYOR RAYMOND YOUNGER

Village of Ellenville

TRUSTEE FRANCISCO OLIVERAS

Village of Ellenville

TRUSTEE PATRICIA STEINHOFF

Village of Ellenville

TRUSTEE JOHN GAVARIS

Village of Ellenville

VILLAGE CLERK NOREEN DECHON

Village of Ellenville

VILLAGE MANAGER JOSEPH STOECKLER

Village of Ellenville

MARK LUKASI

Tectonic Engineering

KATHY FALLON

Congressman Faso's Office

DAN FLETCHER

Barton and Loguidice

SHUDIPTO RAHMAN

FEMA

ALAN SPRINGETT

FEMA

STEPHANIE NURRE

FEMA STARR II

THOMAS SONG

FEMA Outreach Consultant

PAIGE MANDY

FEMA Outreach Consultant

VILLAGE OF ELLENVILLE LOCAL LEVEE PARTNERSHIP TEAM (LLPT) MEETING 3

February 26, 2018 6:00-7:00 PM (EST)

Location:

2 Elting Court

Ellenville, NY 12428

3rd Floor Meeting Room

Action Item	Owner
1. FEMA to provide additional information about elevation certificates and other ways to reduce flood insurance costs for homeowners.	FEMA
2. FEMA to review the United States Geological Survey (USGS) report and follow up with the community around their findings on the relevancy of the USGS report.	FEMA

AGENDA

- Review Levee Flood Hazard
- Discuss Draft Levee Plan
- Questions?

MEETING SUMMARY

FEMA reviewed the Ellenville Flood Protection Project (Ellenville Levee) for levee systems along Sandburg Creek, Beer Kill and Fantine Kill with the Ellenville Board of Trustees and Ellenville Local Levee Partnership Team (LLPT).

Alan Springett, FEMA Region II Levee Mapping Team Lead, opened the meeting by providing a high-level overview of the project. Additionally, he shared a suggestion that the levee along Beer Kill should be given a more detailed study as FEMA's analysis determined it is of highest risk and the Village should consider planning for actions to minimize potential damage.

Mr. Springett explained briefly the analysis that went into the Levee Mapping Plan and its use to the community in the future. This includes using the data to: identify potential risk, update the Village's Hazard Mitigation Plan, and help accredit the levee should the Village choose that route.

FEMA and the Village discussed that the Levee Mapping Plan is a living public document that can be updated at any time and will not affect flood insurance

Meeting Notes

requirements. However, the data will be referenced and considered in future flood studies, should one be initiated. The plan will be distributed to interested parties, one of them being the County who will house the document on their website. It is also recommended that the Levee Mapping Plan be made publically accessible through the Village's website.

Village Supervisor Stoeckler explained that the Village believed the levee was previously accredited. Mr. Springett explained that the levee system was built in the early-to-mid 1970s and FEMA's accreditation requirements came out in the mid-1980s. The levee may have met the U.S. Army Corps of Engineers (USACE) requirements, but not FEMA requirements under Title 44, Section 65.10 of the Code of Federal Regulations,

Supervisor Stoeckler also explained that there were two potential projects that were of highest concern: accrediting their levee system and fixing their streambank. The Board will need to vote on which project to move forward with, and this would be dependent on the costs associated with each project. The project will be undertaken and scoped by Tectonic Engineering. Should the Village decide to move forward with accreditation, FEMA explained the Levee Plan will help provide technical information that Tectonic Engineering can utilize.

The LLPT 3 meeting is considered the final engagement in the Discovery Phase of the levee analysis and mapping process; however, FEMA reiterated that the plan being presented is a living document and the communication between the LLPT and FEMA should continue as questions come up or new information becomes available. Mr. Springett encouraged the Village to coordinate with FEMA before undertaking any project involving areas with flood risk and/or the levee system. FEMA is interested in ensuring that communities are more resilient and homeowners are not negatively affected by flood vulnerabilities associated with living near a levee. FEMA encouraged the community to reach out with any further questions.

The LLPT 3 meeting included attendance from the Village and was led by Alan Springett and Shudipto Rahman, the FEMA Project Monitor, as well as Thomas Song, who provided outreach support.

DISCUSSION

- QUESTION: Will this alter our flood maps?
 - o ANSWER: The flood map has not changed and will not change for the foreseeable future.
- QUESTION: What is the value of the Elevation Certificate and how long does it last?
 - o ANSWER: Each Elevation Certificate provides very specific information related to the elevation of a structure in relation to the risk in the area. This information is used for flood insurance rating purposes. Obtaining an Elevation Certificate is the responsibility of the homeowner. Elevation Certificates are

Meeting Notes

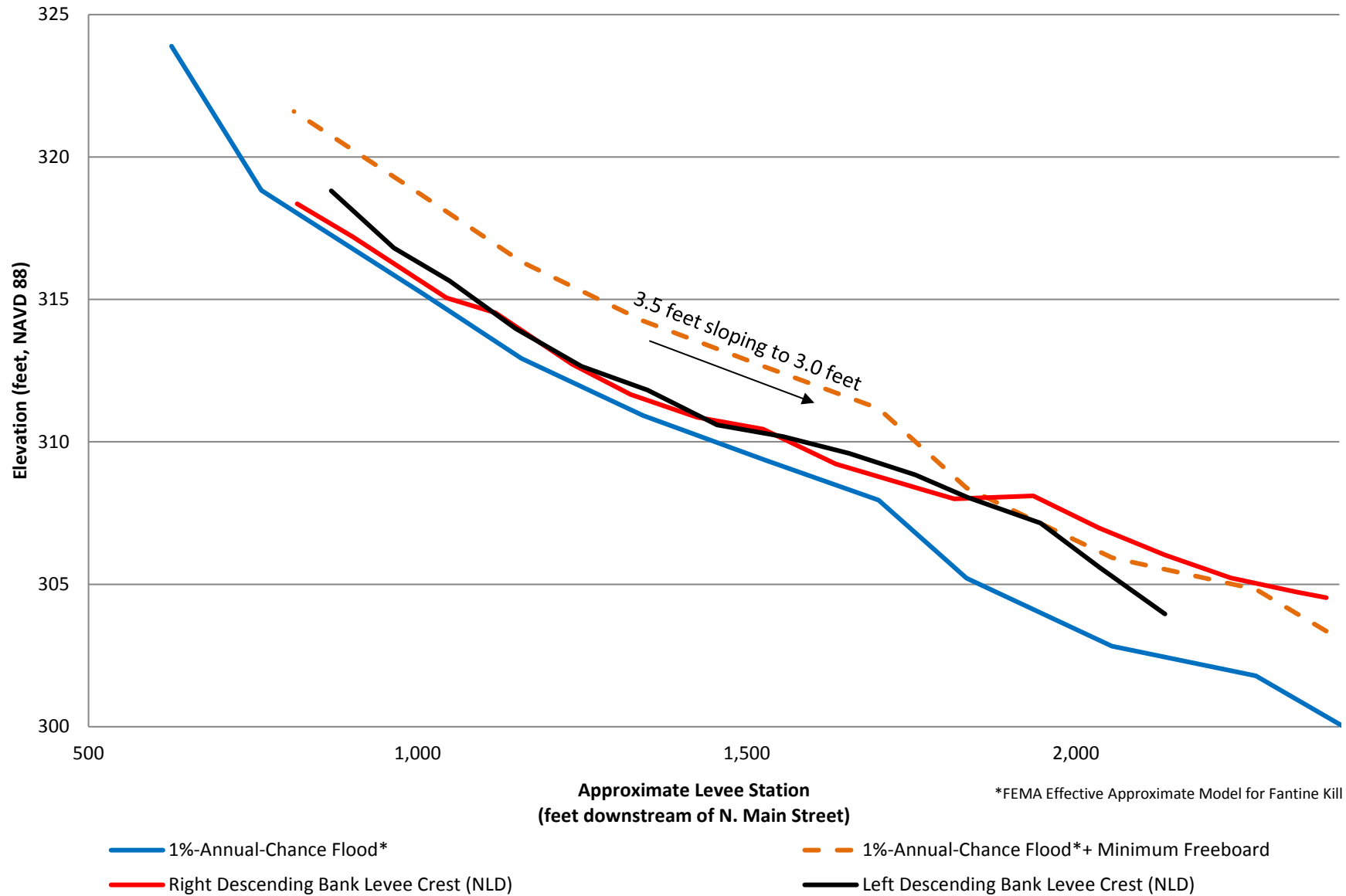
valid until changes are made to the structure that would affect the structure's elevation.

- QUESTION: Did FEMA take into account the USGS Water Quality and Roundout reports that were discussed in the LLPT 2 meeting?
 - o ANSWER: USGS preliminary assessment (Water Quality) talked about the groundwater sampling and different assessments that were completed in the area. The analysis that FEMA conducted was an initial, high-level analysis, and, unfortunately, the USGS reports were more groundwater-related. This does not directly relate to the overland flow modeling used in this analysis to determine the volume that goes into the stream. FEMA will provide the Village a more detailed response via email.
- QUESTION: Is FEMA telling the Village to accredit the levees?
 - o ANSWER: The goal of this project is to communicate the flood risk associated with living near the levee and equip the Village with all the information to make informed decisions to keep residents safe.
- QUESTION: What's happened is initially the walls were accredited at a certain height, but now the minimum has changed?
 - o ANSWER: The levees were constructed by the USACE using their standards and specifications, which may not meet the requirements for FEMA accreditation. In addition, levees are subject to continuous aging and environmental impact, which may lower their ability to meet design expectations.

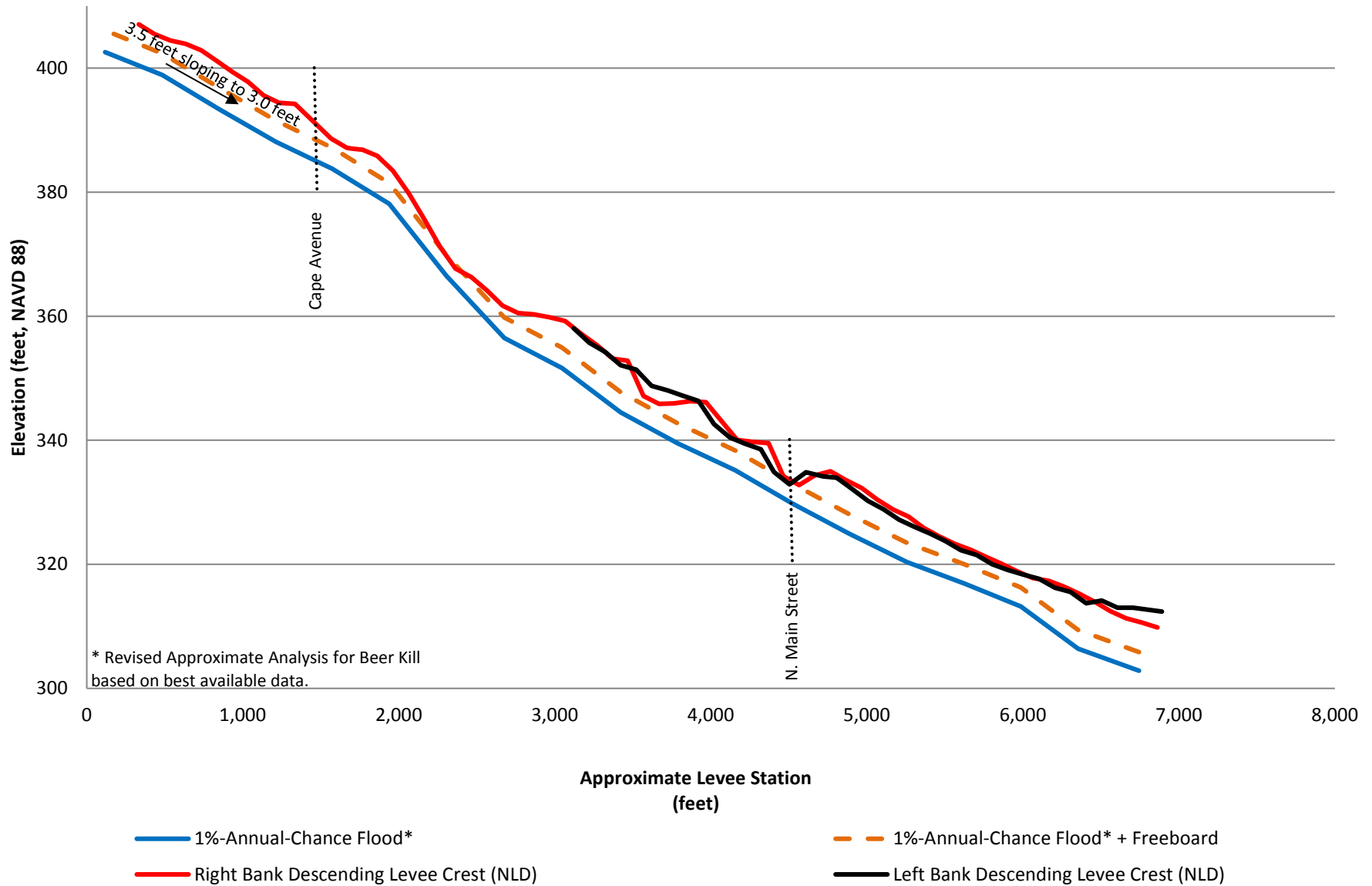
Appendix D

Freeboard Profile Comparison

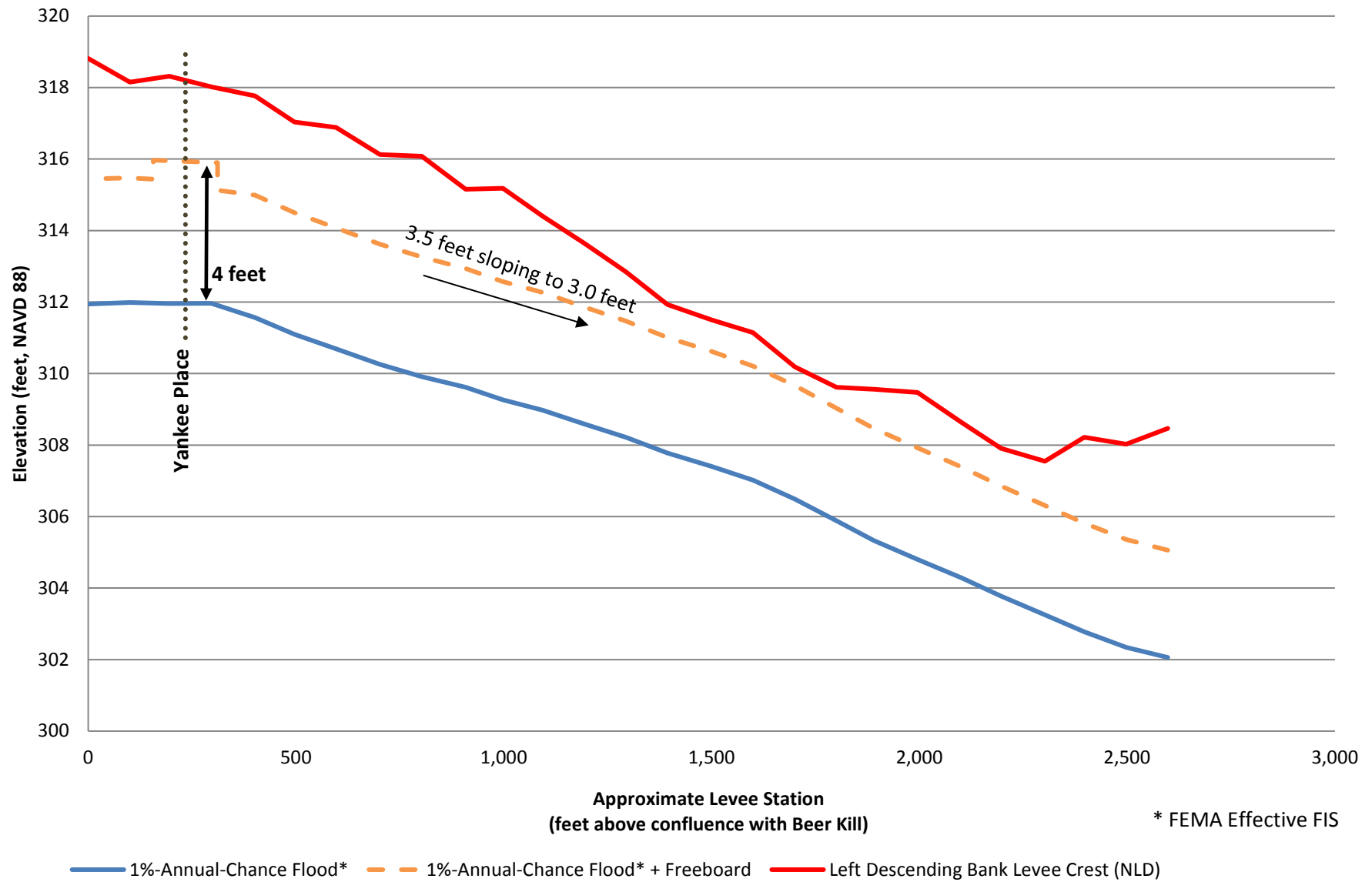
Fantine Kill Left Bank and Right Bank Levee Approximate Levee Crest Profiles



Beer Kill Left Bank and Right Bank Levees Along Beer Kill Approximate Levee Crest Profiles



Beer Kill Right Bank Levee Along Sandburg Creek Approximate Levee Crest Profile



Appendix E

Site Photographs

Beer Kill Left and Right Bank Levees Looking East from Main Street



Beer Kill Left and Right Bank Levees Looking East from
Just Downstream of Main Street



Beer Kill Left and Right Bank Levees Looking East from
Just Downstream of Main Street



Sandburg Creek Looking Northeast from Canal Street



Beer Kill Right Bank Levee System Along Sandburg Creek Near Yankee Place



Appendix F

Levee Accreditation Checklist

Meeting the Criteria for Accrediting Levee Systems on NFIP Flood Maps

How-to-Guide for Floodplain Managers and Engineers

A levee system is a flood protection system that consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices. A levee is a manmade structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

As part of the flood mapping process, the Department of Homeland Security, Federal Emergency Management Agency (FEMA) and its State and local mapping partners review levee system data and documentation.

It is the levee owner's or community's responsibility to provide data and documentation to demonstrate that a levee system meets National Flood Insurance Program (NFIP) requirements as described in Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations (44 CFR Section 65.10), which you may view on the FEMA Web site at www.fema.gov/plan/prevent/fhm/lv_fpm.shtm.

To be recognized as providing a 1-percent-annual-chance level of flood protection on the modernized NFIP maps, called Digital Flood Insurance Rate Maps (DFIRMs), levee systems must meet *and continue to meet* the minimum

design, operation, and maintenance standards (44 CFR Section 65.10)..

To help clarify the responsibilities of community officials, levee owners, or other parties seeking recognition of a levee system identified during a study/mapping project, FEMA issued Procedure Memorandum No. 34 (PM 34), *Interim Guidance for Studies Including Levees*, on August 22, 2005. PM 34 provided clarification of the procedures provided in Appendix H of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*.

FEMA issued Revised Procedure Memorandum No. 43, *Guidelines for Identifying Provisionally Accredited Levees*, on March 16, 2007, which allows issuance of preliminary and, in some cases, effective DFIRMs while communities/levee owners compile and submit required data and documentation. FEMA issued Procedure Memorandum No. 45, *Revisions to Accredited Levee and Provisionally Accredited Levee Notations*, in April 2008 to clarify map notes for accredited and provisionally accredited levee systems.

This document provides information regarding the types of data and documentation that must be submitted for levee systems to be accredited on DFIRMs, including a checklist and an index of further resources you may wish to consult.

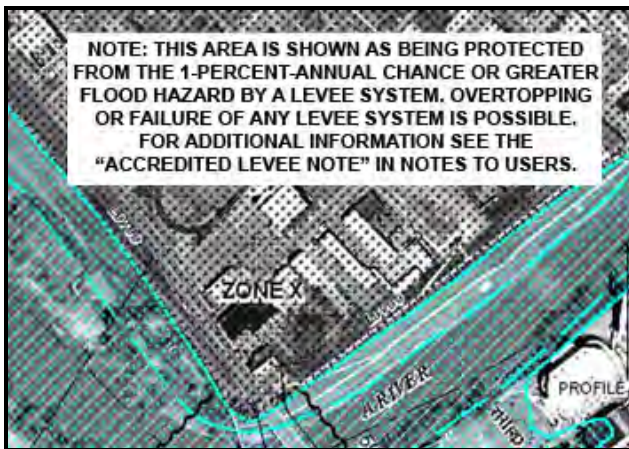
COMMUNITIES WITH LEVEE SYSTEMS SHOULD KNOW:

- The community and/or other party seeking recognition or continued recognition of a levee system must provide data and documentation showing that the levee system provides base (1-percent-annual-chance) flood protection for FEMA to credit the levee system with flood protection on a FIRM or DFIRM.
- Communities *must* actively participate in the levee system documentation process.
- Levee systems without sufficient data and documentation will not be credited with providing base flood protection.
- Some levee systems may qualify for the Provisionally Accredited Levee (PAL) designation.
- Guidance regarding the PAL designation and other levee issues is available at:

www.fema.gov/plan/prevent/fhm/lv_fpm.shtm

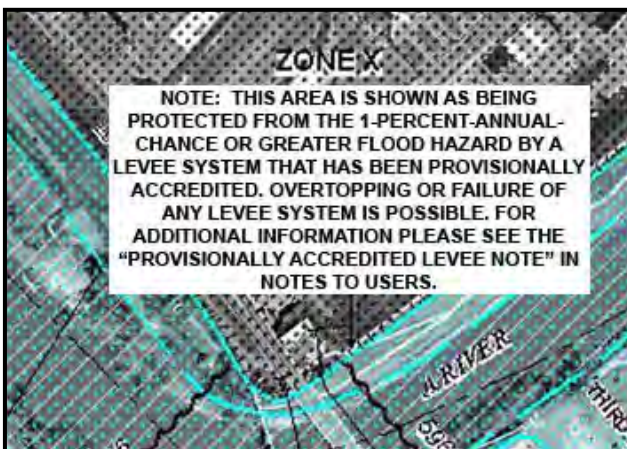
HOW FEMA WILL MAP LEVEE SYSTEMS

FEMA mapping requirements are designed to provide the people living and working behind levee systems with accurate, up-to-date flood hazard and risk information so that they may make wise decisions to minimize damage and loss of life. FEMA does not evaluate the performance of a levee system—this is the responsibility of the levee owner. FEMA is responsible for establishing levee system evaluation and mapping standards, determining flood insurance risk zones, and reflecting these determinations on DFIRMs.



Accredited Levee System

An accredited levee system is a system that FEMA has determined can be shown on a DFIRM as providing a 1-percent-annual-chance or greater level of flood protection. This determination is based on the submittal of data and documentation required by 44 CFR Section 65.10. The area landward of an accredited levee system is shown as a moderate-risk area, labeled Zone X (shaded), on the DFIRM except for areas of residual flooding, such as ponding areas, which will be shown as high-risk areas, called Special Flood Hazard Areas (SFHAs). Flood insurance is not mandatory in Zone X (shaded) areas, but is mandatory in SFHAs. FEMA strongly encourages flood insurance for all structures in levee-impacted areas.



Provisionally Accredited Levee (PAL) System

The PAL designation may be used for a levee system that FEMA has previously accredited with providing 1-percent-annual-chance flood protection on an effective FIRM/DFIRM, and for which FEMA is awaiting data and/or documentation that will show the levee system is compliant with 44 CFR Section 65.10. Before FEMA will apply the PAL designation to a levee system, the community or levee owner will need to sign and return an agreement indicating the data and documentation required for compliance with 44 CFR Section 65.10 will be provided within a specified timeframe. The impacted area landward of a PAL system also is shown as a moderate-risk area, labeled Zone X (shaded). Therefore, flood insurance is not mandatory for insurable structures in the levee-impacted area; however, it is strongly encouraged by FEMA as are other protective measures.



Levee System Not Accredited or De-accredited

If the levee system is not shown as providing 1-percent-annual-chance flood protection on an effective FIRM, the system is considered “not accredited” and the levee-impacted area is mapped as Zone AE or Zone A on a DFIRM, depending on the type of study performed for the area. If the levee system was previously shown as providing 1-percent-annual-chance flood protection on an effective FIRM or DFIRM, but does not meet the PAL requirements or is no longer eligible for the PAL designation, FEMA will de-accredit the levee system and re-map the levee-impacted area as an SFHA, labeled Zone AE or Zone A depending on the type of study performed. Flood insurance will be required for insurable structures with federally backed mortgages in SFHAs.



Design Criteria*	Section of the NFIP Regulations: 65.10(b)
Description: For levee systems to be recognized (i.e., accredited) by FEMA, evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists must be provided. The following requirements must be met:	
Checklist for Design Criteria:	
	Freeboard. Minimum freeboard required 3 feet above the Base Flood Elevation (BFE) all along length, and an additional 1 foot within 100 feet of structures (such as bridges) or wherever the flow is restricted. Additional 0.5 foot at the upstream end of a levee. Coastal levees have special freeboard requirements (see Paragraphs 65.10(b)(1)(iii) and (iv)).
	Closures. All openings must be provided with closure devices that are structural parts of the system during operation and designed according to sound engineering practice.
	Embankment Protection. Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability.
	Embankment and Foundation Stability Analyses. Engineering analyses that evaluate levee embankment stability must be submitted. The analyses provided must evaluate expected seepage during loading conditions associated with the base flood and must demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability. An alternative analysis demonstrating that the levee is designed and constructed for stability against loading conditions for Case IV as defined in the U.S. Army Corps of Engineers (USACE) Engineer Manual 1110-2-1913, <i>Design and Construction of Levees</i> , (Chapter 6, Section II), may be used.
	Settlement Analyses. Engineering analyses must be submitted that assess the potential and magnitude of future losses of freeboard as a result of levee settlement and demonstrate that freeboard will be maintained. This analysis must address embankment loads, compressibility of embankment soils, compressibility of foundation soils, age of the levee system, and construction compaction methods. In addition, detailed settlement analysis using procedures such as those described in USACE Engineer Manual 1110-1-1904, <i>Soil Mechanics Design—Settlement Analysis</i> , must be submitted.
	Interior Drainage. An analysis must be submitted that identifies the source(s) of such flooding, the extent of the flooded area, and, if the average depth is greater than 1 foot, the water-surface elevation(s) of the base flood. This analysis must be based on the joint probability of interior and exterior flooding and the capacity of facilities (such as drainage lines and pumps) for evacuating interior floodwaters.



Operation Plan*	Paragraph 65.10(c)(1) of the NFIP Regulations
Description: For a levee system to be recognized (i.e., accredited), the operational criteria must be as described below. All closure devices or mechanical systems for internal drainage, whether manual or automatic, must be operated in accordance with an officially adopted operation manual, a copy of which must be provided to FEMA by the operator when levee or drainage system recognition is being sought or when the manual for a previously recognized system is revised in any manner. All operations must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP.	
Checklist for Operation Plan:	
	Flood Warning System. Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials that will be used to trigger emergency operation activities; and demonstration that sufficient flood warning time exists for the completed operation of all closure structures, including necessary sealing, before floodwaters reach the base of the closure.
	Plan of Operation. A formal plan of operation including specific actions and assignments of responsibility by individual name or title.
	Periodic Operation of Closures. Provisions for periodic operation, at not less than one-year intervals, of the closure structure for testing and training purposes.
	Interior Drainage Plan. See below.
Interior Drainage Plan	Paragraph 65.10(c)(2) of the NFIP Regulations
Description: Interior drainage systems associated with levee systems usually include storage areas, gravity outlets, pumping stations, or a combination thereof. These drainage systems will be recognized by FEMA on NFIP maps for flood protection purposes only if the following minimum criteria are included in the operation plan.	
Checklist for Interior Drainage Plan:	
	Flood Warning System. Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials that will be used to trigger emergency operation activities; and demonstration that sufficient flood warning time exists to permit activation of mechanized portions of the drainage system.
	Plan of Operation. A formal plan of operation including specific actions and assignments of responsibility by individual name or title.



	Manual Backup. Provision for manual backup for the activation of automatic systems.
	Periodic Inspection. Provisions for periodic inspection of interior drainage systems and periodic operation of any mechanized portions for testing and training purposes. No more than 1 year shall elapse between either the inspections or the operations.
Maintenance Plan	Paragraph 65.10(d) of the NFIP Regulations
Description: For levee systems to be recognized as providing protection from the base flood (i.e., accredited by FEMA), the maintenance criteria must be as described herein.	
Checklist for Maintenance Plan:	
	Levee systems must be maintained in accordance with an officially adopted maintenance plan, and a copy of this plan must be provided to FEMA by the owner of the levee system when recognition is being sought or when the plan for a previously recognized system is revised in any manner.
	All maintenance activities must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance.
	This plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. At a minimum, the plan shall specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance.
Certification	Paragraph 65.10(e) of the NFIP Regulations
Description: Data submitted to support that a given levee system complies with the structural requirements set forth in “Design Criteria” (Paragraphs 65.10(b)(1) through (7) of the regulations) must be certified by a Registered Professional Engineer. Also, certified “as-built” plans of the levee must be submitted. Certifications are subject to the definition given in Section 65.2 of the NFIP regulations. In lieu of these structural requirements, a Federal agency with responsibility for levee design may certify that the levee has been adequately designed and constructed to provide protection from the base flood.	
Checklist for Certification Requirement:	
	All data submitted is certified by Professional Engineer or certified by a Federal agency.
	Certified as-built levee plans are included in the submittal.

A NOTE ABOUT FLOOD RISK AND FLOOD INSURANCE

Levee systems are designed to provide a *specific level of protection*. They can be overtopped or fail during larger flood events.

Levee systems also decay over time. They require regular maintenance and periodic upgrades to retain their level of protection. When levees do fail, they often fail catastrophically. The resulting damage, including loss of life, may be much greater than if the levee system had not been built.

For all these reasons, FEMA strongly encourages people in levee-impacted areas to understand their flood risk, know and follow evacuation procedures, and protect their property by purchasing flood insurance protection, by floodproofing, or by taking other protective measures.

CHECKLIST INFORMATION

The checklist provided in this fact sheet is meant to assist local community officials and levee owners in gathering the data and documentation that will be required for FEMA to show a levee system as providing 1-percent-annual-chance flood protection on the community's DFIRM. Where possible, text from the actual NFIP regulations (44 CFR Section 65.10) was used.

The checklist is set up according to the appropriate paragraph of 44 CFR Section 65.10. For example, Design Criteria can be found in Paragraph 65.10(b):

Design Criteria*	Section of the NFIP Regulations: 65.10(b)
Description: For levee systems to be recognized (i.e., accredited) by FEMA, evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists must be provided.	

For a comprehensive description of each item in this checklist, please see Appendix H of the *Guidelines and Specifications for Flood Hazard Mapping Partners*. Locations of this resource, and other useful resources, are provided below.

INDEX OF RESOURCES

This fact sheet is accessible, along with an assortment of other levee-related resources, through a dedicated portion of the FEMA Web site. The gateway to the FEMA-provided levee information, which is organized by stakeholder group to assist levee owners, community officials, and other stakeholders, is www.fema.gov/plan/prevent/fhm/lv_intro.shtm. The FEMA resources referenced in this fact sheet, listed below, are directly accessible through www.fema.gov/plan/prevent/fhm/lv_fpm.shtm.

- Procedure Memorandum No. 34, *Interim Guidance for Studies Including Levees*
- Revised Procedure Memorandum No. 43, *Guidelines for Identifying Provisionally Accredited Levees*.
- Procedure Memorandum No. 45, *Revisions to Accredited Levee and Provisionally Accredited Levee Notations*
- Appendix H, "Mapping of Areas Protected by Levee Systems," of *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- Section 65.10. *Mapping of Areas Protected by Levee Systems* of the NFIP regulations.

Flood insurance information can be found at www.fema.gov/business/nfip or on the NFIP's consumer Web site, www.FloodSmart.gov.

Links to the USACE Web site also are provided on the levee-dedicated pages; the resources discussed in this fact sheet are accessible through the USACE Web page at www.usace.army.mil/publications/eng-manuals.

Appendix G Collected Data

[Full Appendix Provided Separately](#)



Elevation Certificates: Who Needs Them and Why

If your home or business is in a high-risk area, your insurance agent will likely need an Elevation Certificate (EC) to determine your flood insurance premium. Floods mean rising water. Knowing your building's elevation compared to the estimated height floodwaters will reach in a major flood helps determine your flood risk and the cost of your flood insurance. An EC documents the elevation of your building for the floodplain managers enforcing local building ordinance, and for insurance rating purposes.

How an EC Is Used

If your building is in a high-risk area—a zone indicated with the letters A or V on a Flood Insurance Rate Map (FIRM)—the EC includes important information that is needed for determining a risk-based premium rate for a flood insurance policy. For example, the EC shows the location of the building, Lowest Floor Elevation, building characteristics, and flood zone.

Your insurance agent will use the EC to compare your building's elevation to the Base Flood Elevation (BFE) shown on the map being used for rating and determine the cost to cover your flood risk.

The BFE is the elevation that floodwaters are estimated to have a 1 percent chance of reaching or exceeding in any given year. The higher your lowest floor is above the BFE, the lower the risk of flooding. Lower risk typically means lower flood insurance premiums.

Who Needs an EC

For certain high-risk structures, an EC is required by an insurer as a condition for issuing flood coverage. There are exceptions. For example, if your building was constructed before your community's first FIRM became effective (known as pre-FIRM) and you are eligible for a subsidized rate, you do not need an EC to purchase coverage. However, subsidized rates for pre-FIRM buildings are being phased out through annual premium increases. Your full-risk rate is specific to the property, and an EC will be needed to calculate the property-specific full-risk rate. Depending on your elevation, the full-risk rate could already be lower than the subsidized rate.

Where to Get an Elevation Certificate for Your Building

1. Ask your local floodplain manager. One might already be on file. Every National Flood Insurance Program (NFIP)—participating community has a floodplain manager, but that person might have a different title or serve in multiple capacities.
2. Ask the sellers. When buying a property, ask the sellers to give you their EC. If they don't have an EC, ask if they can provide one before settlement.
3. Ask the developer or builder. In a high-risk area, the developer or builder might have been required to get an EC at the time of construction.
4. Check the property deed. ECs sometimes are included with the property deed.
5. Hire a licensed land surveyor, professional engineer, or certified architect who is authorized by law to certify elevation information. For a fee, these professionals can complete an EC for you. To find a professional surveyor:
 - Check with your State professional association for land surveyors.
 - Ask your State NFIP coordinator.
 - Talk to your local building permit office.

ECs are not required and are not used for rating in moderate- to low-risk areas (Zones X, B, and C), undetermined risk areas (Zone D), or certain high-risk areas eligible for other subsidies (e.g., Zones AR and A99). If you need to document that your building is in one of these zones, you can simply provide a copy of the current FIRM that marks the building's location or obtain a letter signed and dated by a community official listing the building's address and flood zone. The property will remain eligible for the NFIP grandfather procedure if continuous coverage is maintained.

When You Need a New EC

If you make substantial changes to your building in a high-risk area—for example, you make an addition to your home or convert the garage to living space—you likely need a new EC to reflect the new building characteristics and Lowest Floor Elevation.

When You Do Not Need a New EC

As long as the structure information on your EC is accurate, you do not need a new one. If you get an EC from the previous property owner or have a copy of the one on file with your community, your insurance agent can use the EC to rate your policy.

If your community adopted new FIRMs and your building has not changed, your insurance agent can rate your policy using the information on the old EC and the FIRM used to rate your policy. However, you might need to provide additional information, such as new photographs of your home or business.

Plan for the Future

Building code requirements might change over time as flood risk changes and maps are updated. If you are remodeling or rebuilding, consider elevating to lower your flood risk, which, in turn, can lower your flood insurance rates and reduce the financial impact of the next flood.

USEFUL TERMS

- **Base Flood:** The flood having a 1 percent chance of being equaled or exceeded in any given year.
- **Base Flood Elevation (BFE):** The water surface elevation, expressed as an elevation above sea level, of the base flood. This is the minimum elevation a community must adopt for building standards.
- **Flood Insurance Rate Map (FIRM):** A map issued by the Federal Emergency Management Agency (FEMA) showing flood hazard areas, BFEs, and risk premium zones.
- **Pre-FIRM:** Buildings constructed before the community's first FIRM. Communities might not have elevation information on file for these properties.
- **Post-FIRM:** A building constructed on or after the date of the initial FIRM for your community. FIRM effective dates can be found at [FEMA.gov/FEMA/csb.shtm](https://www.fema.gov/FEMA/csb.shtm).

Resources:

For flood insurance information and to find an agent: [FloodSmart.gov](https://www.floodsmart.gov)

Find your flood zone: [msc.FEMA.gov](https://www.msc.fema.gov)

Locate your State floodplain manager: [floods.org](https://www.floods.org)

Contact a surveyor from your National Society of Professional Surveyors state affiliate: [nsps.us.com](https://www.nsps.us.com)

Download a copy of the Elevation Certificate: [FEMA.gov/media-library/assets/documents/160](https://www.fema.gov/media-library/assets/documents/160)

MYTH: The NFIP encourages coastal development.

FACT: One of the NFIP's primary objectives is to guide development away from high-flood risk areas. NFIP regulations minimize the impact of structures that are built in SFHAs by requiring them not to cause obstructions to the natural flow of floodwaters. Also, as a condition of community participation in the NFIP, those structures built within SFHAs must adhere to strict floodplain management regulations enforced by the community.

In addition, the Coastal Barrier Resources Act (CBRA) of 1982 relies on the NFIP to discourage building in fragile coastal areas by prohibiting the sale of flood insurance in designated CBRA areas. While the NFIP does not prohibit property owners from building in these areas, any Federal financial assistance, including federally backed flood insurance, is prohibited. However, the CBRA does not prohibit privately financed development or insurance.

MYTH: Federal disaster assistance will pay for flood damage.

FACT: Before a community is eligible for disaster assistance, it must be declared a federal disaster area. Federal disaster assistance

declarations are issued in less than 50 percent of flooding events. The premium for an NFIP policy, averaging a little over \$500 a year, can be less expensive than the monthly payments on a federal disaster loan.

Furthermore, if you are uninsured and receive federal disaster assistance after a flood, you must purchase flood insurance to remain eligible for future disaster relief.

MYTH: The NFIP does not cover flooding resulting from hurricanes or the overflow of rivers or tidal waters.

FACT: The NFIP defines covered flooding as a general and temporary condition during which the surface of normally dry land is partially or completely inundated. Two properties in the area or two or more acres must be affected. Flooding can be caused by:

- Overflow of inland or tidal waters, or
- Unusual and rapid accumulation or runoff of surface waters from any source, such as heavy rainfall, or
- Mudflow, i.e., a river of liquid and flowing mud on the surfaces of normally dry land areas, or
- Collapse or subsidence of land along the shore of a lake or other body of water, resulting from erosion or the effect of waves, or water currents exceeding normal, cyclical levels.



National Flood Insurance Program

Myths and Facts about the National Flood Insurance Program

For more information about the NFIP and flood insurance, call
1-800-427-4661

or contact your insurance company or agent.

For an agent referral, call 1-888-435-6637
TDD 1-800-427-5593

<http://www.fema.gov/business/nfip>
<http://www.floodsmart.gov>



FEMA

Who needs flood insurance? Everyone!

And almost everyone in a participating community of the National Flood Insurance Program (NFIP) can buy flood insurance. Nationwide, more than 20,000 communities have joined the Program. In some instances, people have been told that they cannot buy flood insurance because of where they live. To clear up this and other misconceptions about National Flood Insurance, the NFIP has compiled a list of common myths about the Program, and the real facts behind them, to give you the full story about this valuable protection.

MYTH: You can't buy flood insurance if you are located in a high-flood risk area.

FACT: You can buy National Flood Insurance no matter where you live if your community participates in the NFIP, except in Coastal Barrier Resources System (CBRS) or other protected areas. The Program was created in 1968 to make federally backed flood insurance available to property owners who live in eligible communities. Flood insurance was then virtually unavailable from the private insurance industry. The Flood Disaster Protection Act of 1973, as amended, requires federally regulated lending institutions to make sure that mortgage loans secured by buildings in high-flood risk areas are protected by flood insurance.

Lenders should notify borrowers, prior to closing, that their property is located in a high-flood risk area and that National Flood Insurance is required.

MYTH: You can't buy flood insurance immediately before or during a flood.

FACT: You can purchase National Flood Insurance at any time. There is usually a 30-day waiting period after premium payment before the policy is effective, with the following exceptions:

1. If the initial purchase of flood insurance is in connection with the making, increasing, extending, or renewing of a loan, there is no waiting period. Coverage becomes effective at

the time of the loan, provided application and payment of premium is made at or prior to loan closing.

2. If the initial purchase of flood insurance is made during the 13-month period following the effective date of a revised flood map for a community, there is a 1-day waiting period. This applies only where the Flood Insurance Rate Map (FIRM) is revised to show the building to be in a Special Flood Hazard Area (SFHA) when it had not been in an SFHA.

The policy does not cover a "loss in progress," defined by the NFIP as a loss occurring as of 12:01 a.m. on the first day of the policy term. In addition, you cannot increase the amount of insurance coverage you have during a loss in progress.

MYTH: Homeowners insurance policies cover flooding.

FACT: Unfortunately, many home and business owners do not find out until it is too late that their homeowners and business multiperil policies do not cover flooding. The NFIP offers a separate policy that protects the single most important financial asset, which for most people is their home or business.

Homeowners can include contents coverage in their NFIP policy. Residential and commercial renters can purchase contents coverage. Business

owners can purchase flood insurance coverage for their buildings and contents/inventory and, by doing so, protect their livelihood.

MYTH: Flood insurance is only available for homeowners.

FACT: Most people who live in NFIP participating communities, including renters and condo unit owners, are eligible to purchase federally backed flood insurance. A maximum of \$250,000 of building coverage is available for single-family residential buildings; \$250,000 per unit for residential condominiums. The limit for contents coverage on all residential buildings is \$100,000, which is also available to renters.

Commercial structures can be insured to a limit of \$500,000 for the building and \$500,000 for the contents. The maximum insurance limit may not exceed the insurable value of the property.

MYTH: You can't buy flood insurance if your property has been flooded.

FACT: You are still eligible to purchase flood insurance after your home, apartment, or business has been flooded, provided that your community is participating in the NFIP.

MYTH: Only residents of high-flood risk areas need to insure their property.

FACT: All areas are susceptible to flooding, although to varying degrees. If you live in a low-to-moderate flood risk area, it is advisable to have flood insurance. Nearly 25 percent of the NFIP's claims come from outside high-flood risk areas. Residential and commercial property owners located in low-to-moderate risk areas should ask their agents if they are eligible for the Preferred Risk Policy, which provides inexpensive flood insurance protection.

MYTH: National Flood Insurance can only be purchased through the NFIP directly.

FACT: NFIP flood insurance is sold through private insurance companies and agents, and is backed by the federal government.

MYTH: The NFIP does not offer any type of basement coverage.

FACT: Yes it does. The NFIP defines a basement as any area of a building with a floor that is below ground level on all sides. While flood insurance does not cover basement improvements (such as finished walls, floors, or ceilings), or personal belongings kept in a basement (such as furniture and other contents), it does cover structural elements and essential equipment.

The following items are covered under building coverage, as long as they are connected to a power source, if required, and installed in their functioning location:

- Sump pumps
- Well water tanks and pumps, cisterns, and the water in them
- Oil tanks and the oil in them, natural gas tanks and the gas in them
- Pumps and/or tanks used in conjunction with solar energy
- Furnaces, water heaters, air conditioners, and heat pumps
- Electrical junction and circuit breaker boxes and required utility connections
- Foundation elements
- Stairways, staircases, elevators, and dumbwaiters
- Unpainted drywall walls and ceilings, including nonflammable insulation
- Cleanup

The following items are covered under contents coverage:

- Clothes washers and dryers
- Food freezers and the food in them

The NFIP recommends both building and contents coverage for the broadest protection.

Appendix H

Initial Data Analysis

[Full Appendix Provided Separately](#)

G.1. Sandburg Creek Reach

The effective HEC-2 hydraulic model for Sandburg Creek and resulting SFHA on the FIRM do not show the reach on the left descending bank as providing reduced flood risk. Because the HEC-2 hydraulic model was not available to use as the starting point for the levee reach analysis procedures, a new HEC-RAS 5.0.3 1-Dimensional, steady-state flow analysis was prepared using the best available data to recreate the Natural Valley condition on an approximate level. The results of the approximate Natural Valley analysis are similar to those of the HEC-2 hydraulic analysis and are shown in Figure G1.

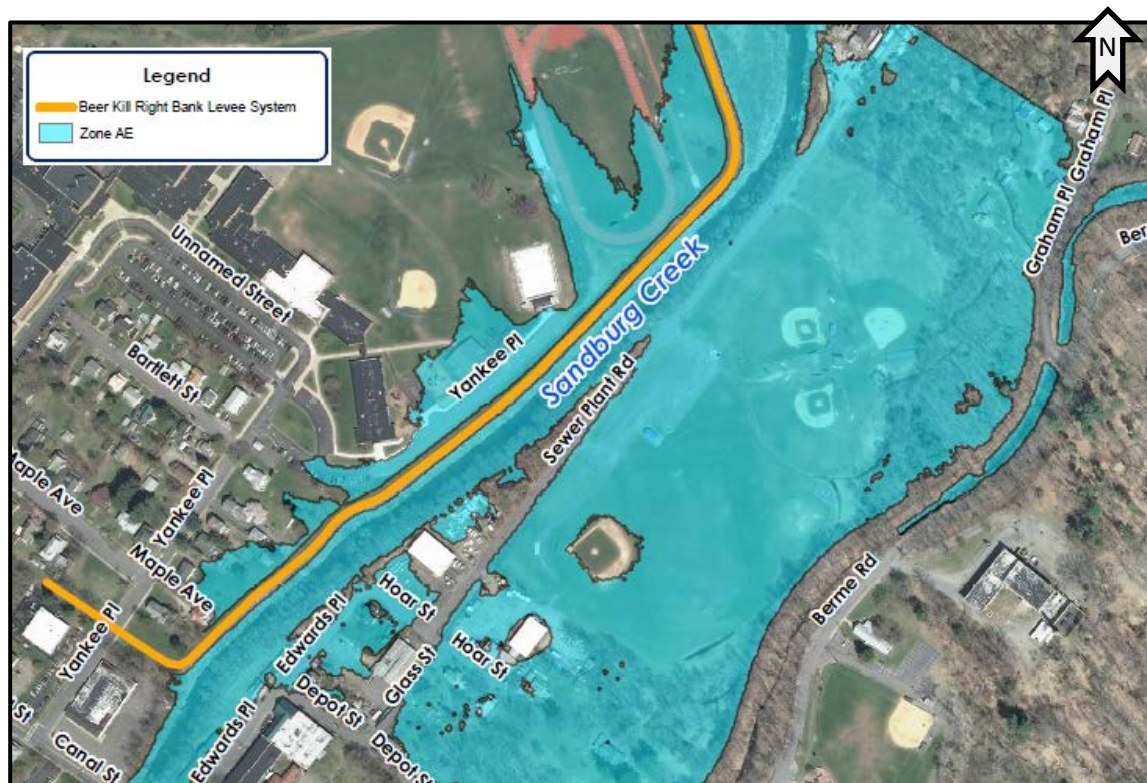


Figure G1: Natural Valley Procedure – Sandburg Creek Reach

The Structural-Based Inundation Procedure yields a slightly larger inundation area on the landside of the left descending reach of Sandburg Creek compared to the Natural Valley analysis. This analysis is more conservative than the Natural Valley analysis and could be used by the community for emergency planning purposes. Figure G2 shows the composite inundation area resulting from the analyses of the reach on the left descending bank of Sandburg Creek completed using HEC-RAS 5.0.3 (2-Dimensional, unsteady flow). Figure G3 shows the approximate depth grid for the Structural-Based Inundation Procedure.

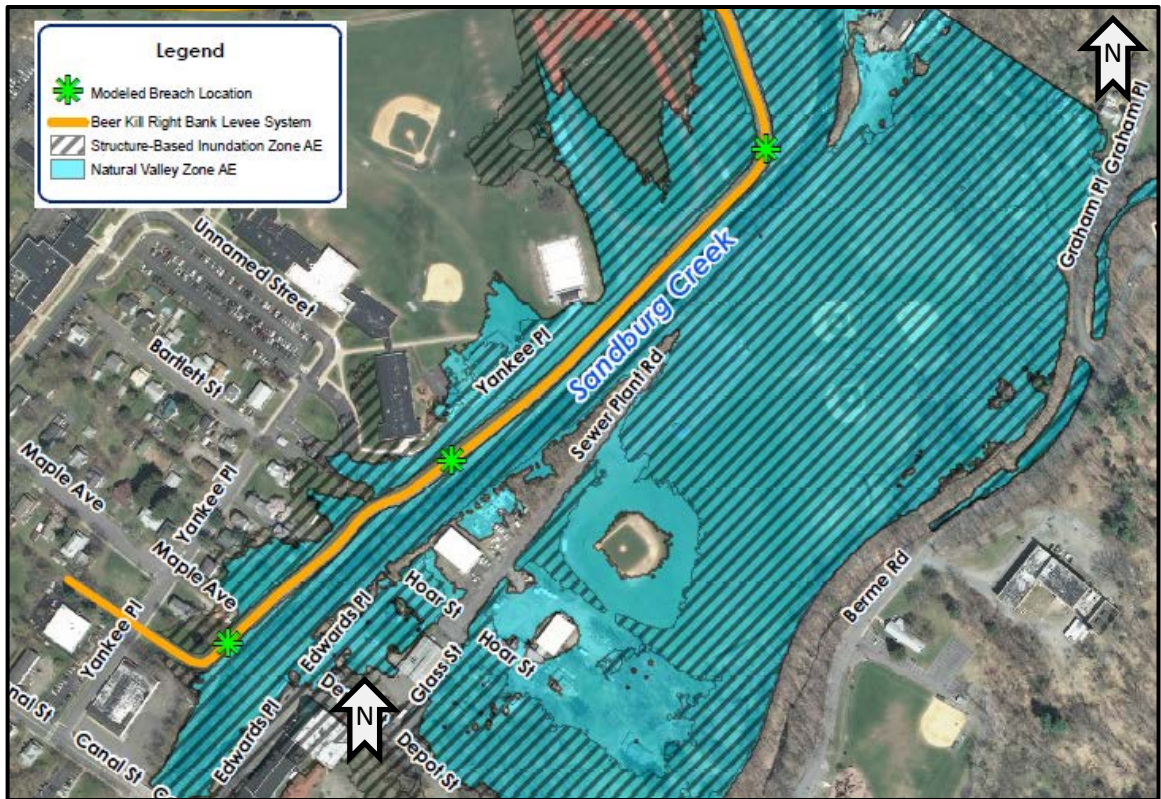


Figure G2: Structural-Based Inundation Procedure – Sandburg Creek Reach

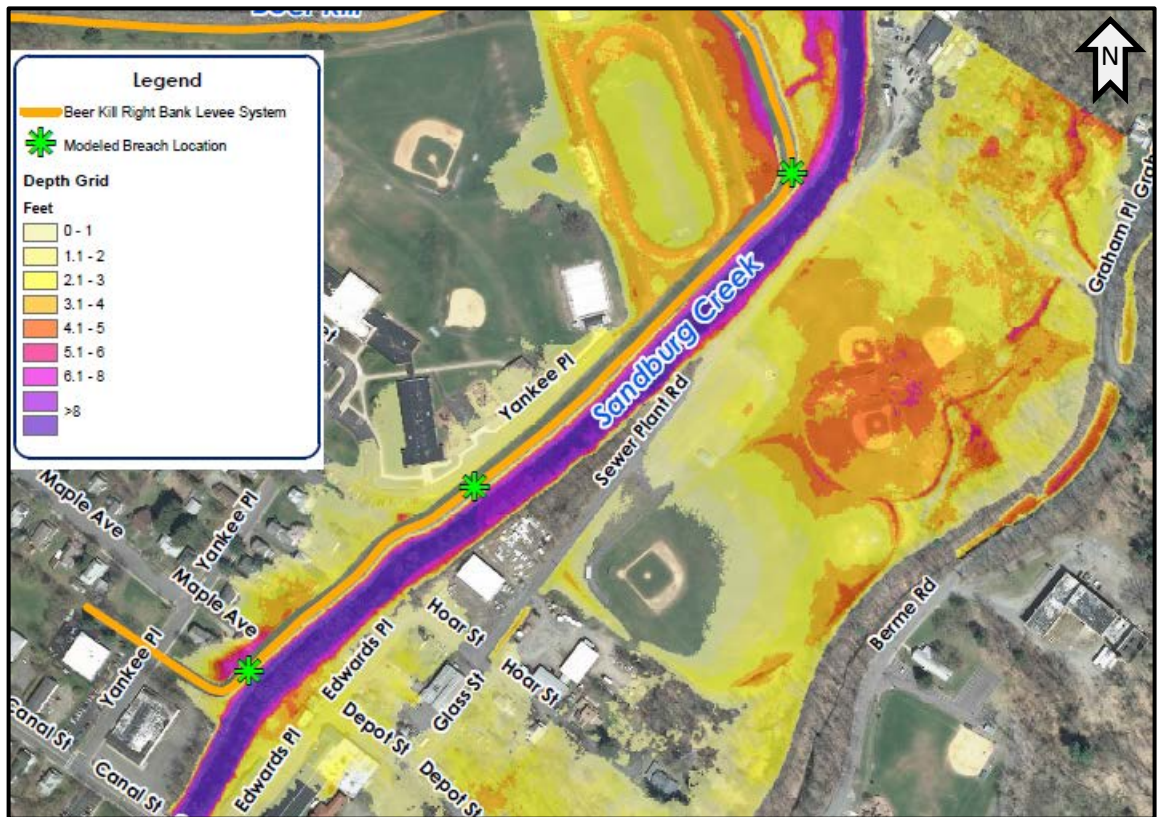


Figure G3: Structural-Based Inundation Procedure Flood Depth Grid–Sandburg Creek Reach

G.2 Beer Kill Reach

The effective, approximate HEC-RAS hydraulic model for Beer Kill and resulting Zone A SFHA on the FIRM show little flood risk due to the 1-percent-annual-chance flood on the landside of the levee reaches. The effective model was leveraged and updated to reflect the best available topographic information.

Further review of the area identified the potential for overbank flow to be conveyed away from Beer Kill near Canal Street and the right descending bank and downstream areas near the left descending bank of Beer Kill. Due to the potential impact on the Village, the Initial Data Analysis enhanced the approximate-level hydraulic analysis to a HEC-RAS version 5.0.3 2-Dimensional, unsteady flow model to refine the Natural Valley condition and identify potential flood risk in the leveed area. The resulting estimated inundation area for the 1-percent-annual-chance-flood from the approximate analysis is illustrated in Figure G4.

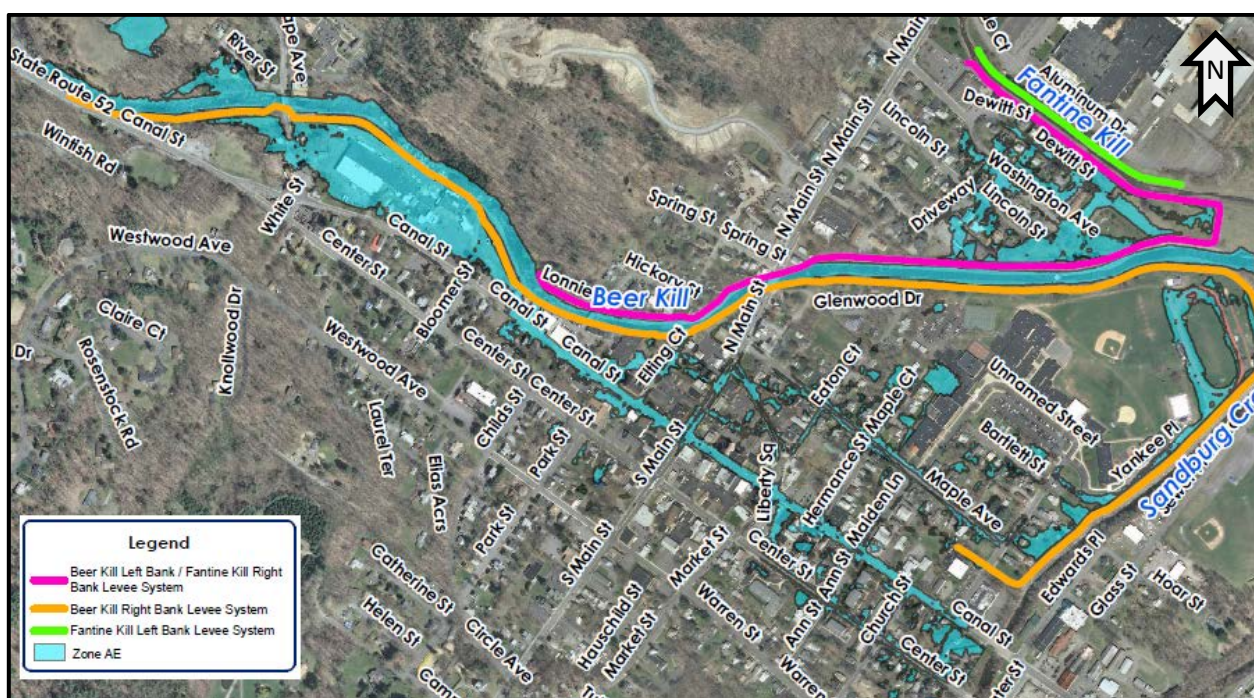


Figure G4: Natural Valley Procedure – Beer Kill Reaches

The Structural-Based Inundation Procedure yields a larger inundation area on the landside of the reach on both the right descending reach and downstream left descending reach of Beer Kill compared to the Natural Valley analysis. This analysis is more conservative than the Natural Valley analysis and could be used by the community for emergency planning purposes. Figure G5 shows the inundation area resulting from the analyses along Beer Kill completed using HEC-RAS 5.0.3 (2-Dimensional, unsteady flow). Figure G6 shows the approximate depth grid for the Structural-Based Inundation Procedure.

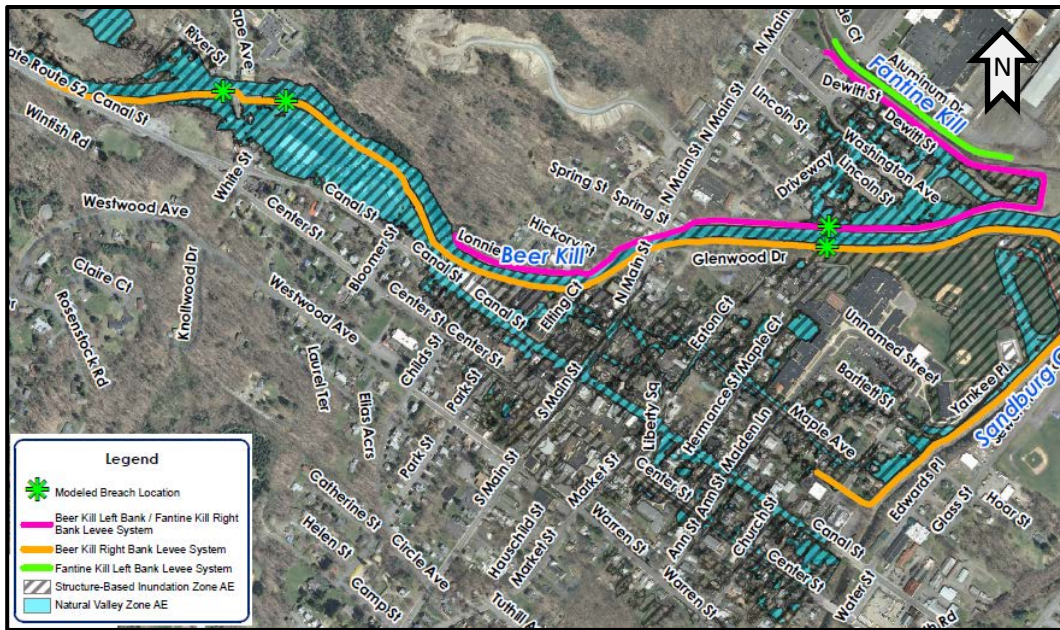


Figure G5: Structural-Based Inundation Procedure – Beer Kill Reaches

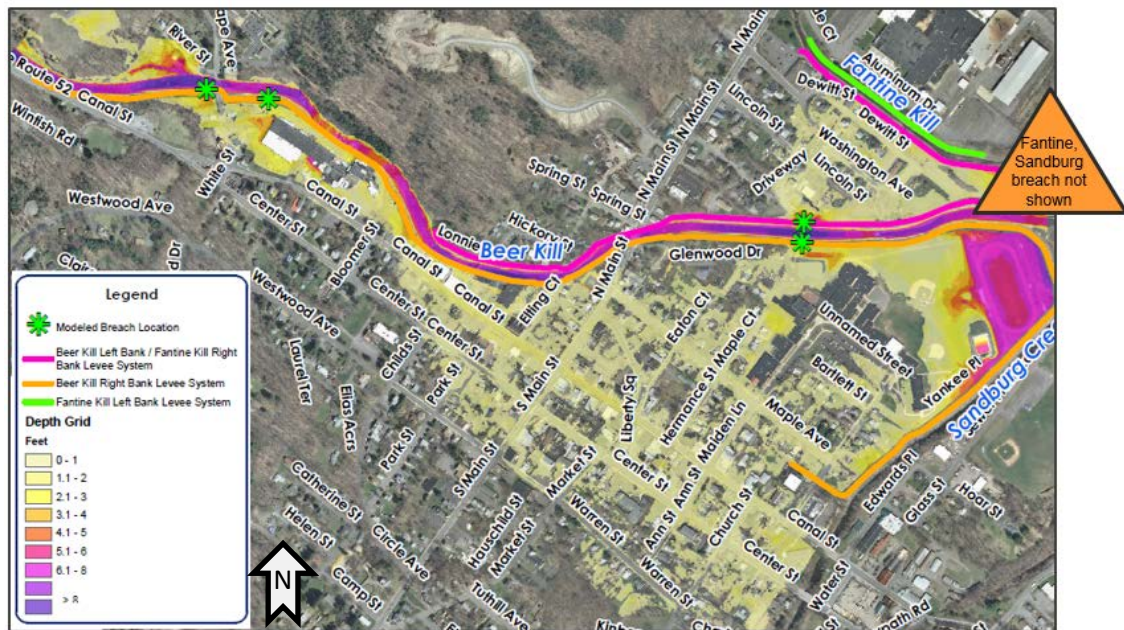


Figure G6: Structural-Based Inundation Procedure Flood Depth Grid – Beer Kill Reaches

G.3 Fantine Kill

The levee systems of the Ellenville FDRP along Fantine Kill are not shown as providing reduced flood risk on the effective FIRM. The leveed area that is inundated during the 1-percent-annual-chance flood on the effective FIRM is located near the upstream end of the Fantine Kill-Beer Kill levee system on the right descending reach of Fantine Kill.

The Initial Data Analysis leveraged the current, approximate-level hydraulic analysis of Fantine Kill to develop a HEC-RAS version 5.0.3 1-Dimensional, steady flow model to refine the Natural Valley

condition based on newer topographic data. The resulting estimated inundation area for the 1-percent-annual-chance-flood is illustrated in Figure G7. The inundation area resulting from the approximate-level analysis may be conservatively estimated, particularly on the left descending reach of the Fantine Kill levee system; however, the left descending bank of the stream appeared to be low based on field visit observations and available topographic data. Further review of the orthophotographs in this area indicates that the industrial building to the north of Fantine Kill has also been reduced in size; however, no updated detailed topographic data was available at the time of the approximate-level analysis.

Refinements of the Initial Data Analysis could be performed in the future to refine the estimated inundation area based on more detailed data.

The Structural-Based Inundation Procedure yields a larger inundation area on the landside of both the right descending and downstream left descending levee reaches compared to the Natural Valley analysis. This analysis is more conservative than the Natural Valley analysis and could be used by the community for emergency planning purposes. Figure G8 shows the inundation area resulting from the Structural-Based Inundation analyses along Beer Kill completed using HEC-RAS 5.0.3 (2-Dimensional, unsteady flow). Figure G9 shows the approximate depth grid for the Structural-Based Inundation Procedure.

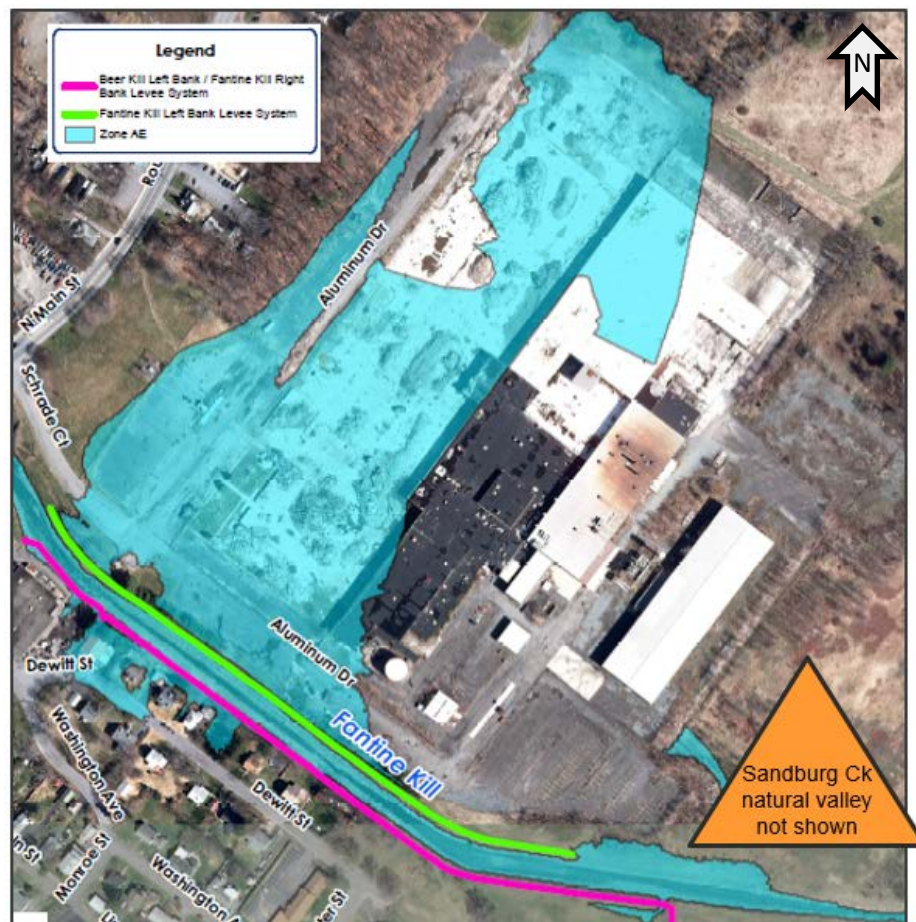


Figure G7: Natural Valley Procedure

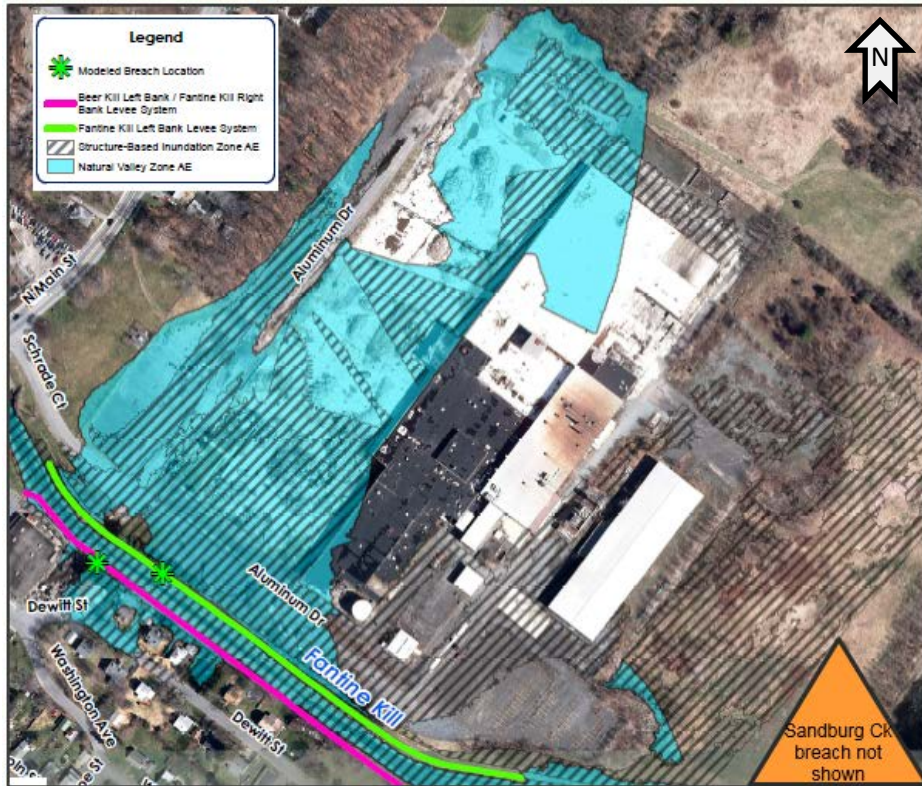


Figure G8: Structural-Based Inundation Procedure – Fantine Kill

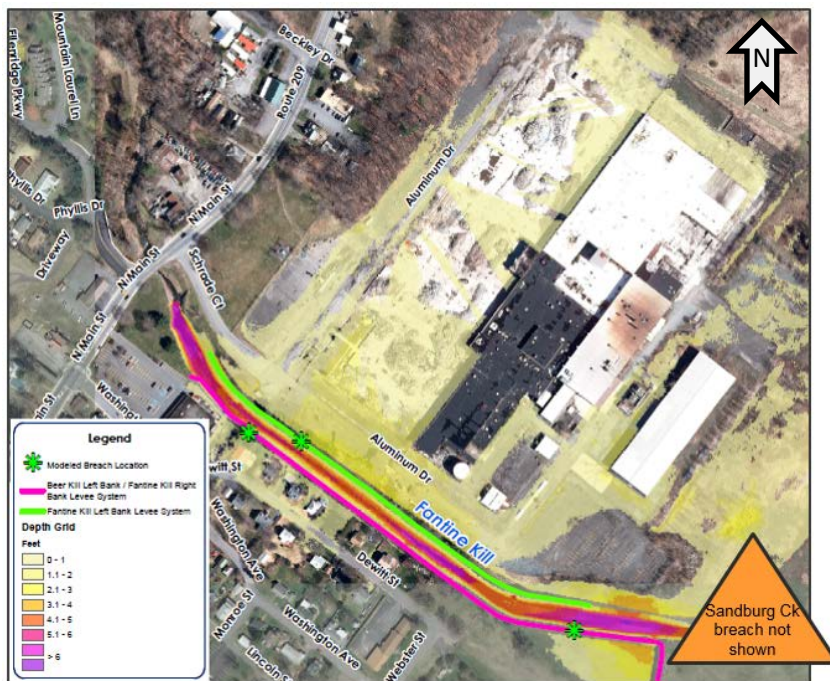


Figure G9: Structural-Based Inundation Procedure Flood Depth Grid – Fantine Kill