# Levee Analysis and Mapping Plan
# Village of Johnson City Levees

*Village of Johnson City*

June 2018

FEMA

RiskMAP
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## Acronyms

| | |
|---|---|
| BFE | Base Flood Elevation |
| FEMA | Federal Emergency Management Agency |
| FIRM | Flood Insurance Rate Map |
| FIS | Flood Insurance Study |
| LLPT | Local Levee Partnership Team |
| LOMA | Letter of Map Amendment |
| LOMC | Letter of Map Change |
| LOMR | Letter of Map Revision |
| NAVD 88 | North American Vertical Datum of 1988 |
| NGVD 29 | National Geodetic Vertical Datum of 1929 |
| NYSDEC | New York State Department of Environmental Conservation |
| 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 Procedure Approach*** – Levee Analysis and Mapping Procedures include Sound Reach, Freeboard Deficient Procedure, 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 –** All land areas that would be subject to inundation by the one percent annual chance flood if the levee system was not present.

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

**Levee Segment -** A discrete portion of a levee system that is operated and maintained by a single entity.

**Levee System** – A flood hazard-reduction system that consists of one or more levee segments and other features such as floodwalls and pump stations, which are interconnected and necessary to ensure exclusion of the design flood from the associated leveed area, and which are constructed and operated in accordance with sound engineering practices.

**Local Levee Partnership Team (LLPT)** – A work group that is 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 in the NFIP regulations at Title 44, Chapter 1, Section 65.10 of the Code of Federal Regulations (44 CFR § 65.10) and is not shown on a FIRM as reducing the base flood hazards.

**Zone D –** Area of undetermined but possible flood hazard.

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

# 0 Executive Summary

The Federal Emergency Management Agency's (FEMA's) Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM) for the Village of Johnson City, Broome County, New York must be revised to reasonably account for the hazard reduction impacts of non-accredited levees. 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). The Village of Johnson City has a flood management project where the levee systems are being studied using the Levee Analysis and Mapping Procedures (see Section 2).

In July of 2016, FEMA Region II partnered with stakeholders in the Village of Johnson City to form a collaborative Local Levee Partnership Team (LLPT) and worked to determine potential Levee Analysis and Mapping Procedures for the Village of Johnson City levee system (see Sections 3 and 4 respectively). The process involved the collection and group evaluation of available data, creation and evaluation of analysis and mapping, and detailed discussions on mapping needs.

The information gained through the extensive coordination of the LLPT is now supplemented by a recently completed "first pass" Levee Analysis and Mapping Procedure analysis (see Section 5). The information collected and the analysis performed allows for the development of this document—a plan outlining potential reach procedures. This document informs the path forward (see Section 6). Two LLPT meetings one in February of 2017 and another in May of 2018 allowed FEMA to present the first pass Levee Analysis and Mapping Procedure analyses and discuss the options for moving forward. Based on the limited information at this time, the Village of Johnson City has elected the Natural Valley procedure with the understanding that first pass analysis will be augmented with updated H&H prior to revised mapping. The Village has expressed interest, and retains the option to move forward with accreditation or other applicable Levee procedures at any time, should funding become available and sufficient information be provided to meet the applicable data requirements.

This Levee Analysis and Mapping Plan summarizes the discussions and decisions by FEMA and project stakeholders on how best to map the flood hazards landward of the Village of Johnson City levee systems.

# 1 Introduction

Under FEMA's prior levee approach, a levee system that did not meet the National Flood Insurance Program (NFIP) requirements 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 that such modeling is never precise.

FEMA, its Production and Technical Services contractor (STARR II) and Community Engagement and Risk Communication contractor (CERC) initiated the Levee Analysis and Mapping Procedures process for the levees in the Village of Johnson City. Recent technological advances in data

collection methods and hydrologic and hydraulic modeling were leveraged as part of this process. Levee Analysis and Mapping Procedures is a more refined approach to mapping flood hazards in areas landward of levee systems than the former approach.

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 the areas impacted by the levee; and
- Considers the unique characteristics of each levee system from an engineering perspective.

The levee systems in the Village of Johnson City are not currently accredited. FEMA is using the Levee Analysis and Mapping Procedures process to develop refined flood hazard mapping in areas landward of the levees. This will provide a more realistic representation of levee-related flood hazards in the Village of Johnson City. Updated regulatory flood hazard mapping is not anticipated in this community for a number of years, so this effort is intended to provide a more realistic representation of levee-related flood hazards in the City of Binghamton for community officials and emergency managers to use in development and preparedness planning.

The Levee Analysis and Mapping Procedures process is conducted in four phases:

- **Phase 0: Flood Structure Identification and Review:** Levee systems are identified and verified as being constructed, operated, and maintained as flood risk reduction structures. An LLPT is established during this phase.
- **Phase 1: Analysis and Mapping Plan Preparation:** LLPT meetings are held periodically to review available data and documentation. Discussions assist in the preparation of an Analysis and Mapping Plan based on the available information.
- **Phase 2: Analysis Preparation and Results Review (if applicable):** Analysis is performed by FEMA and shared with the LLPT to validate results against available data and documentation. Results are compared to effective FISs to update the LAMP Plan, if necessary. Draft maps prepared at this stage may be used as best available data for floodplain management.
- **Phase 3: FIRM Update, Due Process and Effective FIRM Issuance:** FIRM panels are updated with Phase 2 results. Communities and FEMA follow all NFIP regulatory due process procedures, and updated FIRM panels are adopted as the regulatory basis for local floodplain management.

This report describes the Levee Analysis and Mapping Plan for the Village of Johnson City levee systems, a result of the collaboration between FEMA, the Village of Johnson City, and Broome County, New York State Department of Environmental Conservation (NYSDEC), U.S. Army Corps of Engineers (USACE), and other local stakeholders. This report documents the progress through Phase 1, including the first pass analysis results and data evaluation, as well as the community's selection of the preferred Levee Analysis and Mapping Procedures scenario.

# 2 Levee System Description

## 2.1 Flood Protection Measures in the Village of Johnson City

The Village of Johnson City levee systems (see Figure 1) are comprised of a series of riverine flood control structures designed to reduce the flood risk from the Susquehanna River, Little Choconut Creek, and Finch Hollow Creek (see Figure 1) in the Village of Johnson City, Broome County, New York.

**Table 1. Village of Johnson City Flood Control Systems Data.**

| | |
|---|---|
| **Owner** | U.S. Army Corps of Engineers (USACE) |
| **Maintained by** | New York State Department of Environmental Conservation (NYSDEC) |
| **Built** | U.S. Army Corps of Engineers (USACE) - |
| **Flooding Source (s)** | Susquehanna River, Little Choconut Creek, and Finch Hollow Creek |
| **Length** | 3,872 ft |
| **Pump Stations** | 0 |
| **Closure Structures** | 0 |

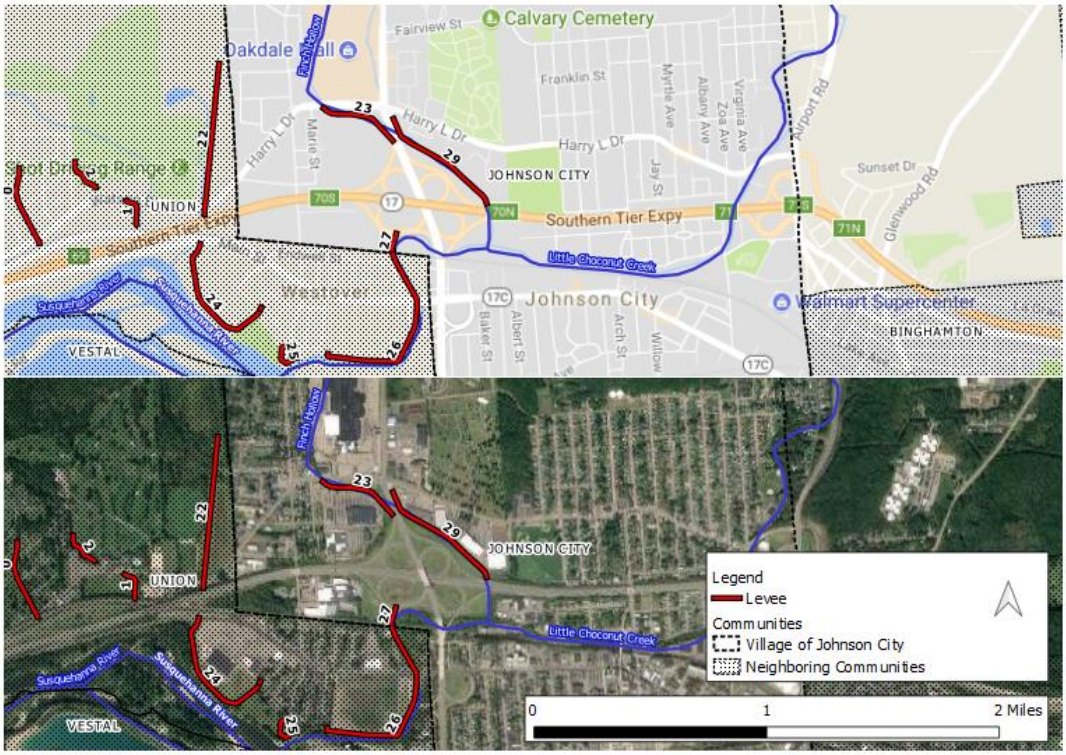



**Figure 1: General Location Map**

Due to the complexity and extent of the levees in the Village of Johnson City, unique identifiers (Levee ID's) were assigned for the purposes of this analysis. The assignment of Levee ID's was determined principally for Geographic Information Services (GIS) considerations and natural boundaries for use in facilitating Levee Analysis and Mapping Procedures meetings. Pertinent Levee ID for each segment identified in Figure 1 is summarized in Section 5.

## 2.2 Pump Stations

No pump stations were identified in the National Levee Database in the Village of Johnson City.

## 2.3 Levee Analysis and Mapping Procedures Flood Risk Project

Tables 2 and 3 summarize the communities' NFIP and FIRM history.

**Table 2. Summary of Communities in Project Area**

| County | Community | Participating in the NFIP? | Approximate Number of Structures Impacted by Levee Systems |
|---|---|---|---|
| Broome County | Village of Johnson City | Yes | 320 |

**Table 3. Community Map History**

| Community Name | Initial Identification | Flood Hazard Boundary Map Revision Date(s) | FIRM Effective Date | FIRM Revision Date(s) |
|---|---|---|---|---|
| Village of Johnson City | April 12, 1974 | September 19, 1975 | September 30, 1977 | None |

While the effective FIS for the Village of Johnson City states that existing local flood protection measures reduce the hazard from Susquehanna River, Finch Hollow and Little Choconut Creek, recent experience clearly identified the limits of that hazard reduction. The effective FIS states that protective measures in the town provides protection against a design storm of 126,000 cfs on the Susquehanna and the backwater effects on Finch Hollow and Little Choconut Creek. In comparison, based on the Post Tropical Storm (TS) Lee gage analysis, the 1-percent annual exceedance discharge is 119,663 cfs, which is just below the design storm.

A countywide FIS was issued in preliminary form for Broome County, New York on February 5, 2010. According to the FIS report, a majority of the levee sections on the Susquehanna River did not have adequate freeboard so the floodplain analysis was based on the without-levee scenario. The preliminary maps never went to Letter of Final Determination in Broome County, primarily due to a need for incorporating data from storm events that occurred after the data collection stage in the analysis. The regulatory flood hazard mapping updates will resume once a new comprehensive analysis can be performed.

## 2.4 Levee Analysis And Mapping Procedures Process Tasks

The Levee Analysis and Mapping Procedures process is divided into six distinct tasks: LLPT formation, Field Reconnaissance, Perform Initial Levee Analysis, Flood Risk Outreach, Complete Levee Analysis and Mapping Plan, and Produce Preliminary Products/Issue Preliminary (see Table 4).

**Table 4. Project Tasks**

| Task | Details | Tentative Start/End Dates* |
|---|---|---|
| LLPT Compilation (Phase 0) | Identification and outreach to individuals to serve on the LLPT. | 12/2/2015 – 12/10/2015 |
| Field Reconnaissance (Phase 1) | LLPT to determine levee reaches to study and potential analysis of those reaches. Perform field reconnaissance of these reaches. | 6/27/2016- 6/28/2016 |
| Perform Initial Levee Analysis and develop Levee Analysis and Mapping Plan (Phase 1) | FEMA to collaborate with the LLPT to develop analysis based on Field Reconnaissance findings and Levee Analysis and Mapping Plan. | 6/27/2016- 6/28/2018 |
| Flood Risk Outreach (Phase 2) | LLPT to assess results of the Field Reconnaissance and Perform Levee Analysis tasks. LLPT to work at the local level to disseminate findings that could impact local communities. | 12/2/2015 –TBD |
| Complete Levee Analysis and Mapping Plan; Finalize Levee Analysis and Mapping Procedures mapping (Phase 2) | FEMA to complete detailed analysis based on chosen approach, develop mapping, and finalize Levee Analysis and Mapping Plan; develop final analysis and mapping. | TBD |
| Produce Preliminary Products / Issue Preliminary (Phase 3) | FEMA to develop Preliminary Products (including FIRM database) from revised analysis above if that is the direction from FEMA and LLPT. | TBD |

*All schedules are tentative and will be adjusted at the pace of the LLPT.

# 3 Local Levee Partnership Team

Based on the community meeting associated with the 2010 preliminary FIRM issuance, several stakeholders were identified as members of the LLPT (See Table 4). 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 reach, based on local levee conditions. The stakeholders who participated in the LLPT for this project are listed in Table 5.

**Table 5. Local Levee Partnership Team Participants**

| LLPT Member | Contact Information |
|---|---|
| Bob Bennett | Director of Public Services, Johnson City |
| Kim Cunningham | Mayor's Secretary |
| Cindy Kennerup | Treasurer, Village of Johnson City |
| Mike Sherba | Supervisor of Public Works, Johnson City |
| Frank Evangelisti | Broome County Planning |
| Benjamin Pratt | Susquehanna River Basin Commission |
| Kevin Delaney | New York State Department of Environmental Conservation |

| LLPT Member | Contact Information |
|---|---|
| Dan Fuller | New York State Department of Environmental Conservation |
| Bill Nechamen* | New York State Department of Environmental Conservation<br>*Since this meeting, Bill Nechamen has retired. Brad Wenkowski will assume his roles. |
| Kerrie O'Keeffe | New York State Department of Environmental Conservation |
| Ben Gertain Plowe | New York State Department of Environmental Conservation – Kirkwood |
| Brad Wenskoski** | New York State Department of Environmental Conservation |
| Joann Aufforth | USACE - Baltimore District, PL 84-99 |
| George Bielen | USACE |
| *Joe Reed | USACE - Baltimore District, Levee Safety Program Manager<br>*Since this meeting, Joe Reed has changed jobs. Raymond Tracy will assume his roles. |
| Dave Robbins | USACE - Baltimore District |
| Leon Skinner | USACE - Baltimore District, Construction Representative |
| Raymond Tracy** | USACE - Baltimore District<br>**Took over for Joe Reed when Joe left USACE. |
| Alan Springett | FEMA Region II |
| Seth Lawler | STARR II |
| Srikanth Koka | STARR II |
| Amber Greene | Community Engagement and Risk Communication (CERC) |
| Paige Mandy | Community Engagement and Risk Communication(CERC) |
| Thomas Song | Community Engagement and Risk Communication(CERC) |
| Cara Spidle | Community Engagement and Risk Communication(CERC) |

# 4 Stakeholder Engagement

## 4.1 Stakeholder Engagement Meeting #1 (General Meeting, LLPT 1)

A FEMA-led project team engaged with specific communities in Broome County, levee owners/operators, and other stakeholders during the LLPT Meeting #1 on July 26, 2016 in Binghamton, NY. The overall intent of the meeting was to establish contact, explain the Levee Analysis and Mapping Procedures process, and discuss the application of the Levee Analysis and Mapping Procedures to the levee systems in Broome County.

At the initial LLPT 1 meeting (LLPT 1), representatives from FEMA provided an overview to the invited Levee Analysis and Mapping Procedures communities, answered questions concerning FEMA products, terminology, and procedures, and provided a timeline for the Levee Analysis And

Mapping Procedures projects. FEMA explained in detail the five procedures outlined in the Levee Analysis and Mapping Procedures Final Approach Document and the major distinctions of Levee Analysis and Mapping Procedures in comparison with earlier levee analyses. FEMA and their contractor led a discussion about the applicability of each procedure to the levees.

Representatives from the New York State Department of Environmental Conservation (NYSDEC) outlined current operation and maintenance plans and procedures, covering ownership, inspection, maintenance and coordination with the US Army Corps of Engineers (USACE), and available grant funding for levee related projects. Representatives from USACE provided additional background on the Broome County Levees, and discussed the USACE involvement in the construction, operation and maintenance of the levee systems. (See Appendix A for minutes for the LLPT 1)

## 4.2 Stakeholder Engagement Meeting #2 (Community Meeting, LLPT 1.1)

Following LLPT 1, a follow-up meeting in Village of Johnson City was held (LLPT 1.1) on September 07, 2016. During this meeting, a brief review of levee Analysis and Mapping Procedures was conducted by the FEMA project team, and a discussion pertinent to those sections of levee impacting the Village of Johnson City followed. During this discussion, the LLPT reviewed particulars for the components of the levee systems, history of performance, and changes in the levees and impact areas following the major events of 2006 & 2011. (See Appendix A for minutes for the LLPT 1.1) Srikanth Koka and Seth Lawler of FEMA's contractor team, carried out limited field reconnaissance on July 28, 2016 to examine levee features.

## 4.3 Stakeholder Engagement Meeting # 3 (Community Meeting, LLPT 2)

On February 23, 2017 the LLPT 2 meeting was held to review the first pass analysis and discuss outcomes from the data collection process. During the meeting, the FEMA project team discussed the results of the First Pass Analysis for the Natural Valley Procedure and the Freeboard Deficient Procedure. During the discussion, it was stated that the Sound Reach Procedure was less applicable and Overtopping Deficient Procedure, Freeboard Deficient Procedure, and Overtopping Procedure were potentially applicable. The community planned to make a final decision regarding which procedure to move forward with in the next month. (See Appendix B for minutes for the LLPT 2)

## 4.4 Stakeholder Engagement Meeting #4 (General Meeting, LLPT 2.1)

Following the LLPT 2 meeting, Broome County communities collectively expressed an interest in FEMA performing a first pass analysis using the structural-based inundation procedure to compare with the results from the Natural Valley approach. On May 14, 2018 a general meeting was convened to review the results from the additional Structural-based inundation analysis. At this meeting, Shudipto Rahman, FEMA project monitor provided a summary of the coordination efforts, future mapping activities, and data collected to date.

Seth Lawler and Srikanth Koka presented a high-level overview of the draft results of the structural based inundation analysis for the levee systems. The main points discussed in this overview were:

1. Structural-based analysis results closely mirror the Natural Valley floodplains. The 2-Dimensional modeling analysis was useful in identifying the potential path of a flood wave resulting from a breach event.
2. Individual levee segments in Broome County work together as a system. Any decisions made at individual levee segments should be informed by the connectivity of other segments comprising the leveed area.
3. Due to the shared flood risks that extend beyond political boundaries, the complexity of the flooding sources, and the numerous levee systems in Broome County, communities should work together closely to coordinate efforts.

(See Appendix B for minutes for the LLPT 2.1)

## 4.5 Stakeholder Engagement Meeting # 5 (Community Meeting, LLPT 2.2)

Following the general meeting on May 14, 2018, FEMA conducted a joint meeting with the Village of Johnson City to provide community-specific information, answer questions and discuss in greater detail the flood hazards at levee systems and individual levee segments. During this discussion, results from the freeboard analysis were reviewed and the flood risk shared by both communities were addressed. (See Appendix B for minutes for the LLPT 2.2)

## 4.6 Stakeholder Engagement Meeting # 6 (Community Meeting, LLPT 3)

On June 20, 2018 the LLPT 3 meeting was held to review the first phase of the Levee Analysis and Mapping Procedure. During the meeting, the FEMA project team discussed the results of the first phase and the approximate timeline moving forward. (See Appendix B for minutes for the LLPT 3)

# 5 First Pass Analysis

FEMA developed a First Pass Analysis, which is an approximate analysis using a relatively low level of detail, to approximate the floodplain boundary for each relevant Levee Analysis and Mapping Procedures approach. This informed the discussions in LLPT Meetings 2-2.2.

## 5.1 Natural Valley Procedure

The Natural Valley Procedure allows flow to be conveyed on both sides of a non-accredited levee. Figure 2 illustrates the results of the Natural Valley First Pass Analysis using HEC-RAS 5.0 (1-Dimensional, steady-state flow) with areas in shaded in dark blue indicating communities within the Village of Johnson City. For those levees along tributaries in areas where flooding can occur as a result of backwater or flooding from the tributary itself, both scenarios were modeled. All resultant inundation maps show the dominant flood hazard.

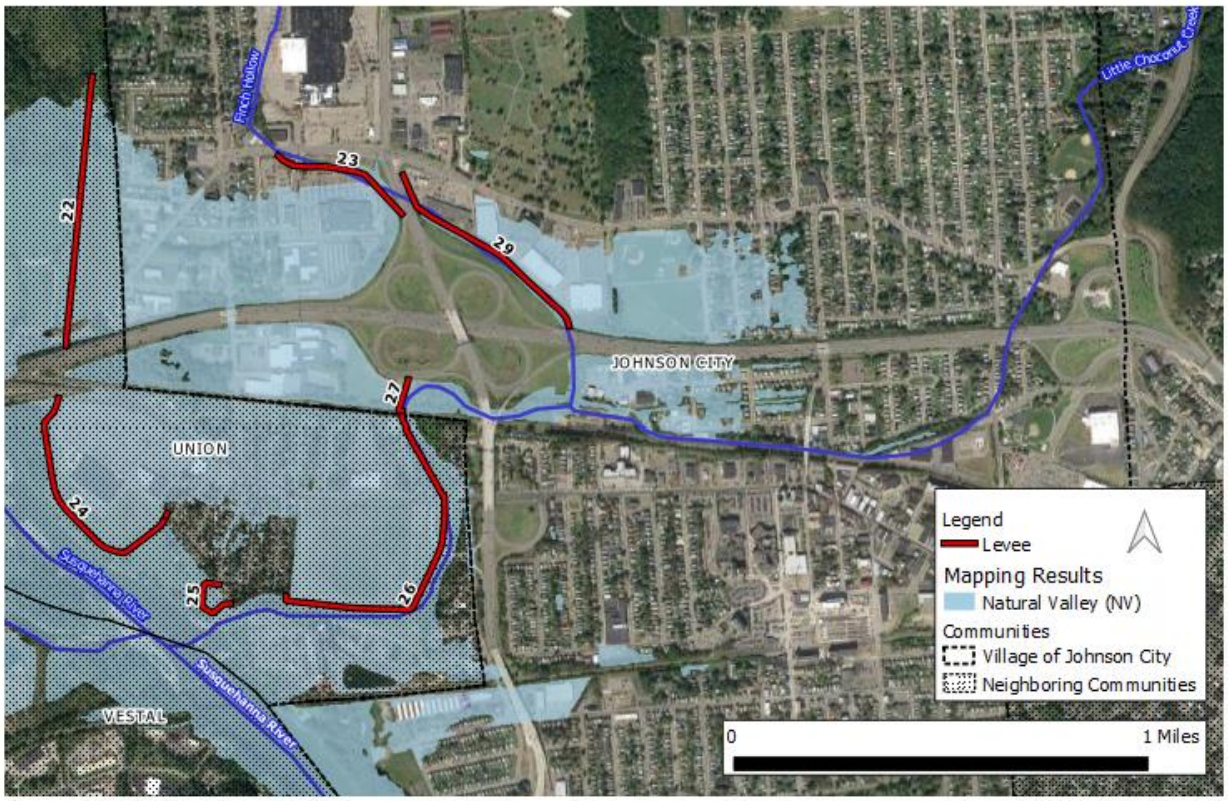



**Figure 2: Natural Valley Procedure Mapping**

## 5.2 Structural-based Inundation

First Pass Analyses (2-dimensional flow) were developed for two levee breaching scenarios using HEC- RAS 5.0. The results of these analyses are mapped Figure 3. The procedural guidance outlined in the Levee Analysis and Mapping Procedure requires multiple breaches be applied to each levee system. When applied to the Village of Johnson City, this procedure results in extents consistent with the Natural Valley Procedure.

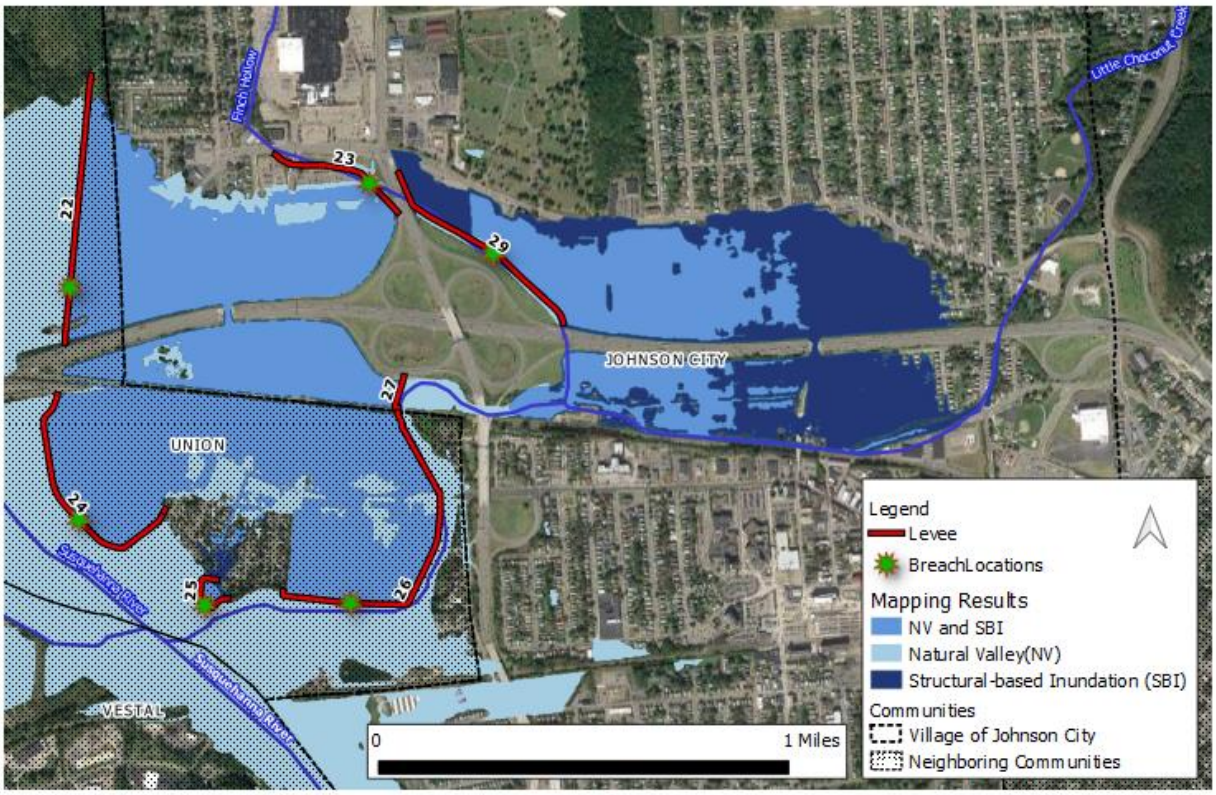



**Figure 3: Structural-based Inundation Procedure Mapping**

## 5.3 Freeboard Deficient Procedures

For the freeboard deficient analysis, points were taken along the levee crests for all sections included in this study. Where possible, elevations were taken directly from the USACE National Levee Database. The top of levee profile was compared to the 44 CFR§65.10 required freeboard profile for each segment of the levee systems covering areas within the Village of Johnson City. The freeboard analyses for the levees on Finch Hollow Creek are presented in Figure 5. The freeboard analysis for the levee on Little Choconut is presented in Figure 6.

## 5.4 Review of First Pass Analyses

Summary results from the first pass analysis are included in Table 6 and Figure 4. (See Appendix B for LLPT 2-2.2 Meeting Notes):

**Table 6. Results from the First Pass Analysis**

| Levee Analysis and Mapping Procedures Levee ID # | Approximate Length of Levee Segment (ft) | Flooding Source(s) | Approximate # Structures Impacted | Comments: Natural Valley Procedure | Comments: Freeboard Analysis | Comments: Structural-based Inundation | Comments: General | USACE Activity/Notes |
|---|---|---|---|---|---|---|---|---|
| **23** | 1,374 | Susquehanna River | 124 | There is impact from Susquehanna River and Finch Hollow Creek, as well as I-86 roadway | There is insufficient freeboard for the majority of the reach. | A breach at any of the individual segments will impact a shared leveed-area, and must be assessed at a system level. | | |
| **27** | 311 | | 13 | There is impact from Susquehanna River and Little Choconut Creek. | The few points available for this very short levee section are just at or below the minimum freeboard, with the exception of points near the bridge at Endwell. | | The National Department of Transportation has identified that FEMA is not allowed to use road systems as restrictions to flow in mapping for flood inundation, unless that particular section of road was designed as a levee. This will cause issues for future modeling - in this case, the railroad and I-86 network. 2. USACE is investigating and reviewing data to better assess how the levees are tied into non-levee embankments | |
| **29** | 2,187 | | 183 | There is impact from Susquehanna River and Finch Hollow Creek, as well as I-86 roadway | The majority of points along the levee section are below the BFE or between the BFE and minimum freeboard | | The segment not included in the USACE NLD. The levee is maintained by the DEC. | |

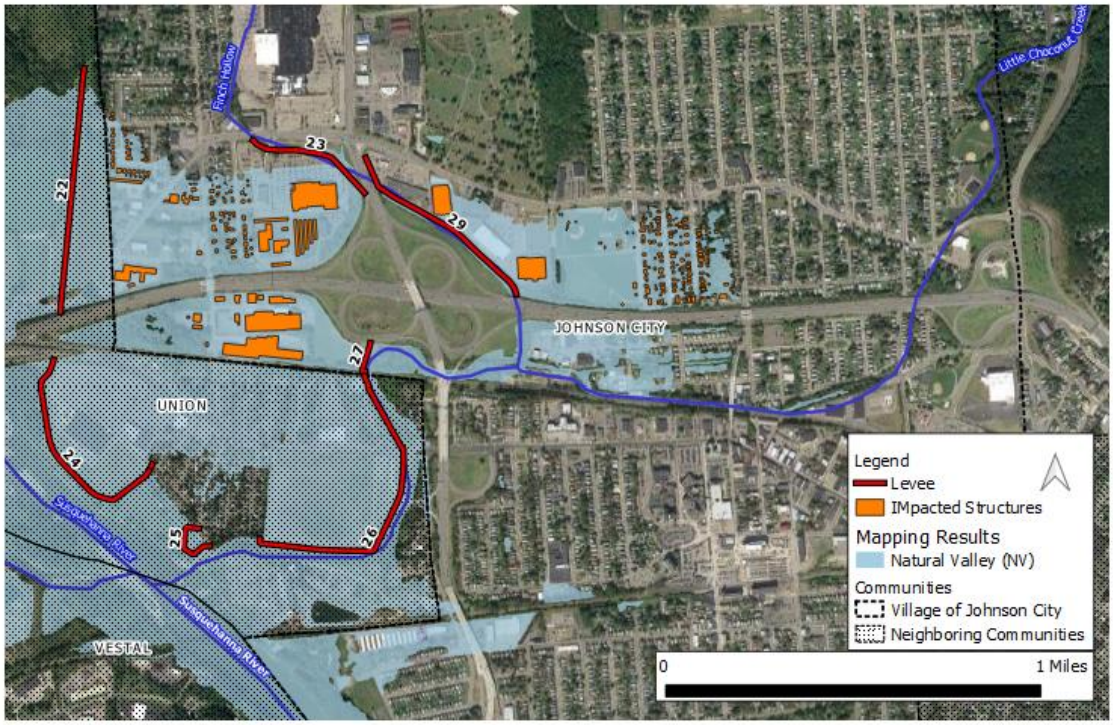
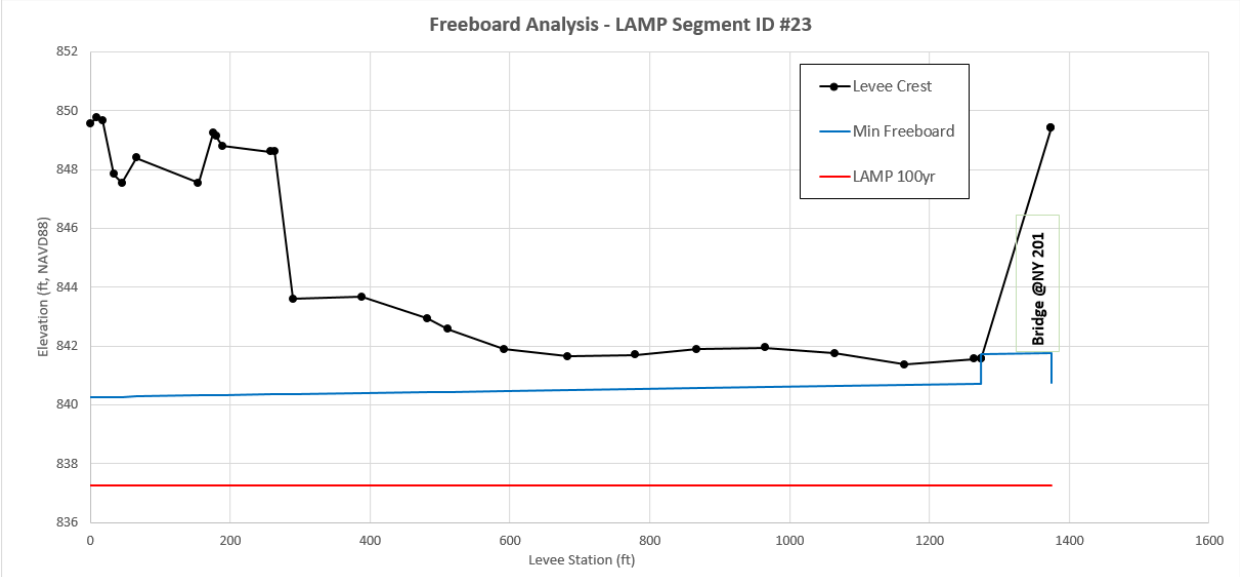



**Figure 4: First Pass results for Village of Johnson City Levees with Structures Impacted from Natural Valley Mapping**

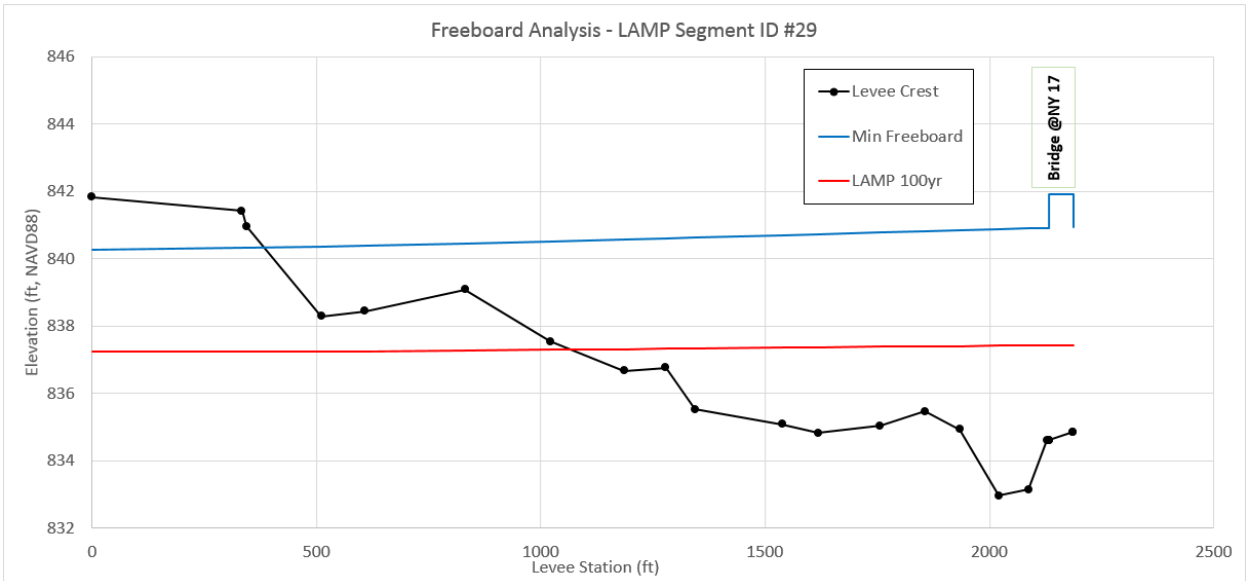




**Figure 5: First Pass results for Finch Hollow Creek - Levee Segment ID #23 and # 29**

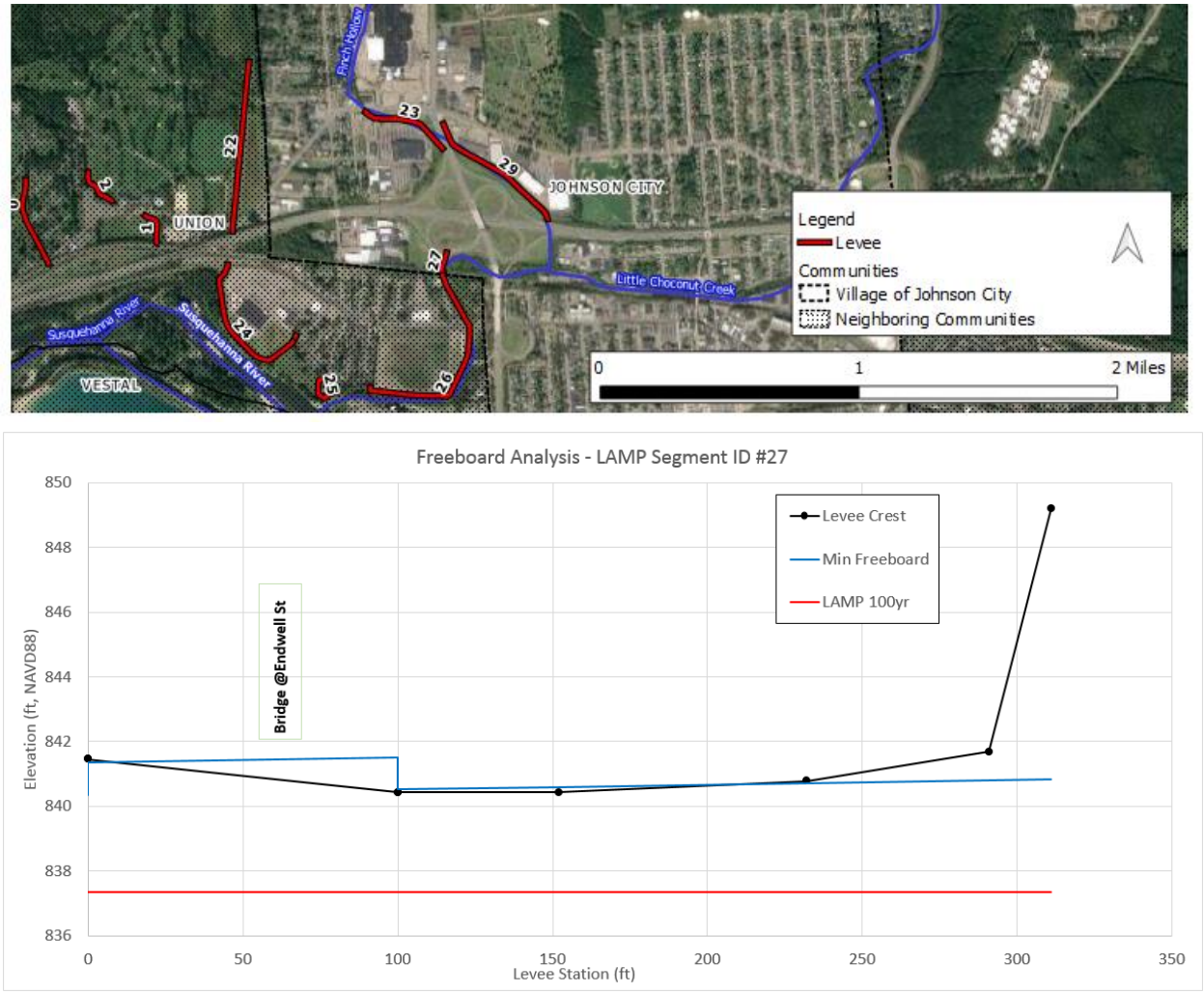



**Figure 6: First Pass results for Little Choconut Creek - Levee Segment ID #27**

# 6 Path Forward

## 6.1 Levee Analysis and Mapping Procedures Phase 2 Analysis

The levees included in this study are shown as accredited on the current FIRMs but have not been accredited as a result of 44 CFR§65.10 review, therefore FEMA will undertake a Levee Analysis and Mapping Procedures Phase 2 and Levee Analysis and Mapping Procedures Phase 3 study to take into account the hazard reduction impacts of the non-accredited levees, when the regulatory flood hazard mapping for this community is updated. Minimum freeboard for accreditation would be two feet with a favorable risk assessment by a federal agency with the authorization to design and construct such structures.

Where feasible, the Levee Analysis and Mapping Procedures Phase 2 analysis will focus on refining community identified procedures. The models and source data will be reviewed and

refined with any updated information (e.g. updated discharges, recent surveyed cross sections, updated land cover data, and topographic data).

A subsequent Levee Analysis and Mapping Procedures Phase 3 study will incorporate the Phase 2 results into the regulatory NFIP products, namely the FIS and FIRM. This will likely become part of the data utilized during a restudy of the county-wide Flood Insurance Study at an as-yet unidentified future time.

## 6.2 Levee Accreditation

The Village of Johnson City has indicated an interest in pursuing accreditation for levees if funding can be obtained to perform the physical improvements and engineering review required. If the systems can be brought into compliance with 44 CFR§65.10, the levees can be shown as accredited in the Broome County FIS and on the FIRM. Should this occur, FEMA would not proceed with the Levee Analysis and Mapping Phase 2 and 3 efforts. If the FIRM and FIS have already been updated by the time of accreditation, FEMA will revise the maps via a Letter of Map Revision or Physical Map Revision.

FEMA's Levee Accreditation Checklist has been included in Appendix C 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 #1-1.1 Information

# Appendix B
# Stakeholder Engagement - LLPT Meeting #2-2.2 Information

# Appendix C
# Levee Accreditation Checklist

# Appendix D
# Modeling and Mapping files