Levee Analysis and Mapping Plan
Cayuga Creek Levee

Town of Cheektowaga,
Erie County, New York

October 2016

FEMA

RiskMAP
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Table of Contents

Tables

Figures

Acronyms

BFE	Base Flood Elevation
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
LAMP	Levee Analysis and Mapping Procedures
LLPT	Local Levee Partnership Team
LOMA	Letter of Map Amendment
LOMR	Letter of Map Revision
NAVD 88	North American Vertical Datum of 1988
NYSDEC	New York State Department of Environmental Conservation
USACE	U.S. Army Corps of Engineers Buffalo District

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 (LAMP) Approach* – LAMP approaches 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).

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 closure 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 D – Area of undetermined but possible flood hazard.

0 Executive Summary

The Federal Emergency Management Agency's (FEMA's) Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM) for the Town of Cheektowaga in Erie County, New York must be revised to reasonably account for the hazard reduction impacts of a non-accredited levee. FEMA's guidance was revised in 2013 to incorporate a new Levee Analysis and Mapping Procedure (LAMP) which provides a suite of flexible procedures to perform flood hazard analysis and mapping (see Section 1).

In December 2015 and February 2016, FEMA Region II partnered with stakeholders in the Town of Cheektowaga to form a collaborative Local Levee Partnership Team (LLPT) and worked to determine potential LAMP approaches for the Cayuga Creek levee system in the Town of Cheektowaga (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 of mapping needs.

The information gained through the extensive coordination of the LLPT is now supplemented by a recently completed "first pass" LAMP analysis (see Section 5). The information collected and the analysis performed allows for the development of this document—a plan outlining potential procedures. This document informs the path forward (See Section 6). FEMA met with the LLPT in February 2016 to present the first pass LAMP analyses and discuss the options for moving forward.

This Levee Analysis and Mapping Plan summarizes the discussions and decisions by FEMA and project stakeholders on how to most appropriately map the flood hazards landward of the Cayuga Creek levee system in the Town of Cheektowaga. First Pass Analyses were assessed for three LAMP approaches: Natural Valley, Freeboard Deficient, and Structural Based Inundation. The Natural Valley approach will be used for Phase 2 of this project.

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 potential flood hazard reduction that non-accredited levee systems provide. This process recognizes that such modeling is never precise.

FEMA and its Production and Technical Services contractor (STARR II) initiated the LAMP process for the levee in the Town of Cheektowaga. Recent technological advances in data collection methods and hydrologic and hydraulic modeling were leveraged as part of this process. LAMP is a more refined approach to mapping flood hazards in areas landward of levee systems than the former approach. The LAMP 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 Cayuga Creek levee system in the Town of Cheektowaga is not accredited. FEMA is using the LAMP process to develop refined flood hazard mapping in areas landward of the levee. This will provide a more realistic representation of levee-related flood hazards in the Town of Cheektowaga.

The LAMP 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 control 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 scope of work, if necessary.
- **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 for local floodplain management purposes.

This report describes the Levee Analysis and Mapping Plan for the Cayuga Creek levee system, a result of the collaboration between FEMA, the Town of Cheektowaga, Erie 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 identification of the preferred LAMP scenario.

2 Levee System Description

2.1 Flood Protection Measures in the Town of Cheektowaga

The Cayuga Creek levee system (see Figure 1) consists of a single reach that cannot be further divided in the Town of Cheektowaga, Erie County, New York. Pertinent data is summarized in Table 1. The system is operated and maintained jointly by the NYSDEC and the Town of Cheektowaga. The number of structures in the levee impact area was approximated at less than ten and mostly, if not all, commercial structures.

Table 1: Cayuga Creek Levee Data

Owner	Town of Cheektowaga
Maintained by	Jointly by Town of Cheektowaga along with NYSDEC
Built	1982 by USACE
Flooding Source	Cayuga Creek
Length	Approximately 690 feet of reinforced concrete inverted T-wall, approximately 525 feet of transverse levee from the north bank extending northerly across the floodplain to high ground on the north side of the creek
Pump Stations	None

	Coordinates		Elevation (NAVD88)	
Levee End-Point	**Longitude**	**Latitude**	**Levee Crest**	**LAMP BFE**
Cayuga Creek, Cheektowaga, New York -Upstream	-78.7522	42.8875	613.5	611.0
Cayuga Creek, Cheektowaga, New York - Downstream	-78.7543	42.8843	607.3	607.0

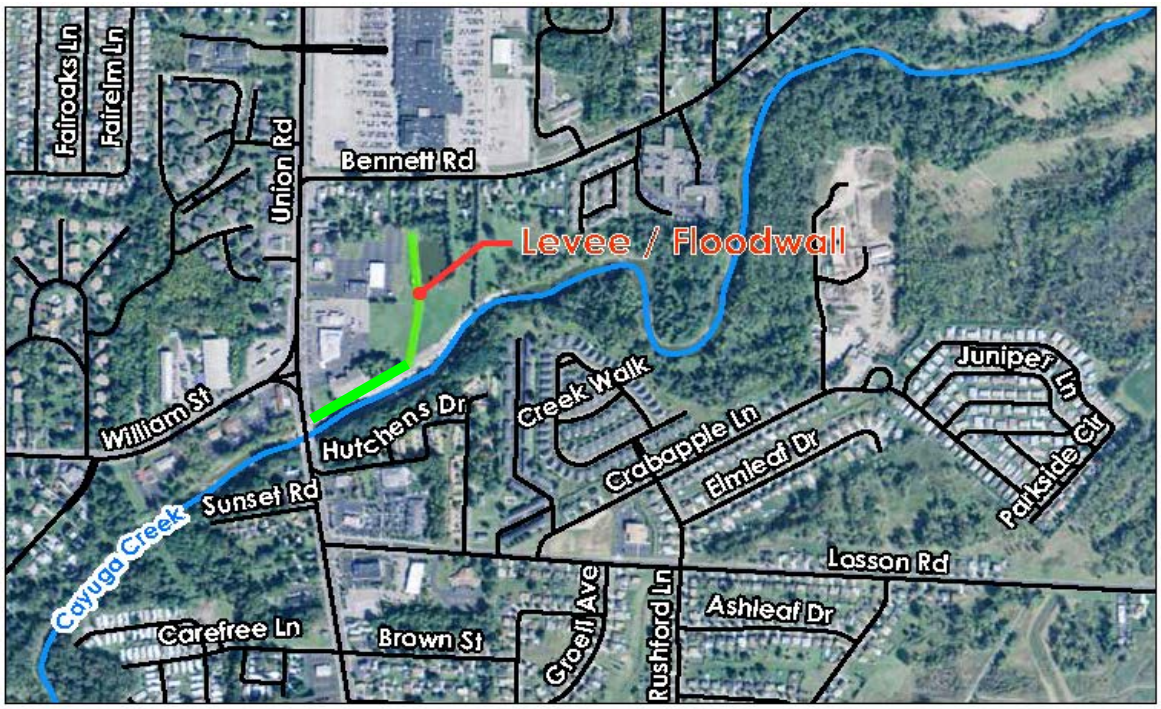


Figure 1: General Location Map

2.2 Pump Stations and Floodgates

All flap and sluice gates were rated as "Acceptable" in the 2014 USACE Levee Inspection Report. No pump stations were identified in the USACE report.

2.3 LAMP 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 System
Erie County	Town of Cheektowaga	Yes	10

Table 3: Community Map History

Community Name	Initial Identification	Flood Hazard Boundary Map Revision Date(s)	FIRM Effective Date	FIRM Revision Date(s)
Town of Cheektowaga	6/16/1978	N/A	3/15/1984	N/A

The effective FIRM for the Town of Cheektowaga depicts the Cayuga Creek levee as providing protection for structures in the levee impact area, and the effective FIS also indicates that the project provides protection. The effective study pre-dates current levee accreditation standards.

A countywide FIRM and FIS were issued in preliminary form for Erie County, New York on December 31, 2009, with a revised preliminary FIRM and FIS issued February 19, 2016. The revised preliminary maps use FEMA's levee "seclusion" mapping practice, meaning that information from the effective FIRMs for the Town of Cheektowaga is shown on the maps in areas affected by the Cayuga Creek levee.

2.4 LAMP Process Tasks

The LAMP process is divided into six distinct tasks: LLPT Compilation, 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.	12/10/2015
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.	December 2015 – February 2016

Task	Details	Tentative Start/End Dates*
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.	TBD
Complete Levee Analysis and Mapping Plan; Finalize LAMP 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 2009 preliminary FIRM issuance, several stakeholders were identified as members of the LLPT. 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, 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
Diane Benczkowski	Town of Cheektowaga 3301 Broadway, Cheektowaga, NY 14227 686-3448; dbenczkowski@tocny.org
Pat Bowen	Town of Cheektowaga 275 Alexander Ave., Cheektowaga, NY 14211 716-897-7288; pbowen@tocny.org
Mike Lumdue	Town of Cheektowaga 3145 Union Rd., Cheektowaga, NY mlumdue@tocny.org
J.T. Glass	Erie County Emergency Services 45 Elm St., Buffalo, NY 14203 716-858-6287; glassj@erie.gov
Mark Lee	Erie County Environment and Planning 95 Franklin St., Rm 1010, Buffalo, NY 14202 716-858-6017; mark.lee@erie.gov
Chris Faley	Office of Representative Higgins 270 Michigan Ave, Buffalo, NY 14203
Tim Walsh	NYSDEC, Western Flood Hub 6274 East Avon-Lima Rd., Avon, NY 14414 583.226.5437; tim.walsh@dec.ny.gov
Bill Nechamen	NYSDEC, Floodplain Management Section 625 Broadway, Albany, NY 12233-3504 518.402.8146; william.nechamen@dec.ny.gov
Kerrie O'Keeffe	NYSDEC 585.226.5464; kerrie.okeefe@dec.ny.gov
Ted Myers	NYSDEC, Region 9-Buffalo 716.851.7088; theodore.myers@dec.ny.gov

Paul Cocca	USACE Buffalo 1776 Niagara St., Buffalo, NY 14207 716.683.4332; paul.a.cocca@usace.mil
Gerald DiPada	USACE 1776 Niagara St., Buffalo, NY 14207 879.4228; gerald.a.dipaola@usace.army.mil
Laura Ortiz	USACE 1776 Niagara St., Buffalo, NY 14207 716.879.4407; laura.v.ortiz@usace.army.mil
Bob Remmers	USACE 1776 Niagara St., Buffalo, NY 716.879.4277; robert.w.remmers@usace.mil
Alan Springett	FEMA Region II 26 Federal Plaza, New York, NY 13820 212.680.8557; alan.springett@fema.dhs.gov
Seth Lawler	STARR II 8401 Arlington Blvd., Fairfax, VA 22031 703.849.0213; slawler@dewberry.com
Vikram Shrivastava*	STARR II 8401 Arlington Blvd., Fairfax, VA 22031
Srikanth Koka	STARR II, Project Manager 8401 Arlington Blvd., Fairfax, VA 22031 703.849.0584; skoka@dewberry.com
Kim Dunn	STARR II, Senior Engineer 8401 Arlington Blvd., Fairfax, VA 22031 703.849.0584; skoka@dewberry.com

* Project Engineer lead transferred from Vikram Srivastava to Srikanth Koka in July 2016.

4 Stakeholder Engagement

4.1 Stakeholder Engagement Meeting #1 (LLPT1)

A FEMA-led project team engaged with the affected community, levee owners/operators, and other stakeholders during LLPT Meeting #1. The overall intent of the meeting was to establish contact, explain the LAMP process, and discuss the application of the LAMP process to the Cayuga Creek levee.

At the first LLPT meeting, FEMA discussed the LAMP process and explained the LAMP procedures to be considered for the non-accredited levee. The LLPT discussed each of the LAMP procedures (Sound Reach, Freeboard Deficient Reach, Overtopping Reach, Structural Inundation, and Natural Valley) and determined which were applicable to the Cayuga Creek levee.

The meeting notes, materials, and attendee list for the 1st LLPT meeting are provided in Appendix A.

FEMA's Production and Technical Services contractor team, STARR II, carried out field reconnaissance on December 14, 2015 to examine the levee features. The intent of the field reconnaissance was to provide a context to the LLPT discussions. Photographs taken during the site visit are included in Appendix C. Engagement Meeting #2 (LLPT2)

4.2 Stakeholder Engagement Meeting #2 (LLPT2)

At the second LLPT meeting, the LLPT members reviewed the first pass analysis information (see Section 5). The LLPT was given an opportunity to review the results and determine if an alternate approach or alternate data should be used.

The LLPT agreed that the Overtopping LAMP procedure did not apply to any levee reach as the levee was not overtopped. Similarly, the Sound Reach LAMP procedure did not apply to any levee reach, as then it could be accredited. Therefore, the possible LAMP procedures for the levee reach were Natural Valley, Freeboard Deficient, and Structural Inundation.

The LLPT members recommended that the LAMP first pass analyses be presented to the Town Council for input on the LAMP methods for the Phase 2 analysis.

FEMA explained that the project information would be captured in a Levee Analysis and Mapping Plan (this document). A draft of this plan is to be distributed to all the LLPT members Winter 2016/2017.

Meeting notes, materials, and attendee list for the 2nd LLPT meeting are provided in Appendix B.

5 First Pass Analysis

FEMA developed a First Pass Analysis, which is a quick analysis with a low level of detail, to approximate the floodplain boundary for each LAMP approach. This informed the discussions in LLPT Meeting 2, during which the LLPT finalized the LAMP procedures to be recommended for refinement in a future LAMP Phase 2 study.

5.1 Natural Valley Procedure

The Natural Valley LAMP Procedure flood hazard mapping 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 (2 dimensional flow). Due to the availability of information, the Natural Valley Procedure will not require the community to expend additional funds.

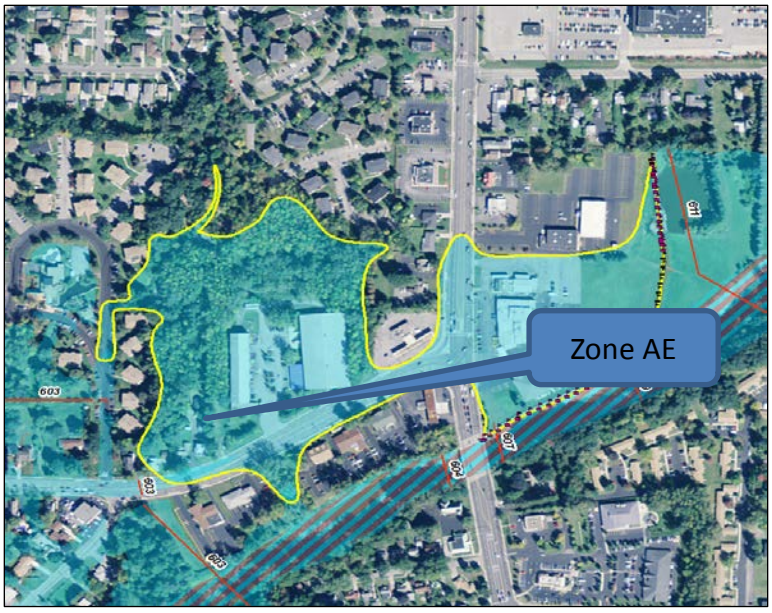


Figure 2: Natural Valley Procedure Mapping

5.2 Freeboard Deficient Procedures

The top of levee profile was compared to the required freeboard profile and the Cayuga Creek Levee System was found to be freeboard deficient. While the levee is higher than the Base Flood Elevation (BFE), it does not meet the freeboard requirement as set forth in 44 CFR §65.10; therefore the Freeboard Deficient LAMP Procedure may be applicable. To adopt the Freeboard Deficient Procedure, the Town would be required to document that all other aspects of 44 CFR §65.10 are met and provide current top of levee survey. This procedure may require the community to expend resources to develop required information.

For this situation, the flood hazards behind the levee reach are mapped with two components: Zone AE for the 1-percent-annual-chance floodplain due to interior drainage and Zone D for the balance of the Natural Valley Floodplain (described in Section 5.1).

The results of the Freeboard Deficient Analysis using HEC-RAS 5.0 (2 dimensional flow) can be seen in Figure 3.

Figure 3: Freeboard Deficient Procedure Mapping

5.3 Structural Based Inundation First Pass Analysis

A First Pass Analysis Structural Inundation Procedure was developed for one levee breaching scenario using HEC-RAS 5.0. A 2D hydraulic analysis was used to model a single breach in the levee. Since there is no history of breaching, or identified structural vulnerabilities, the levee breach was chosen to model the worst-case scenario. The breach location chosen was the location of the maximum difference in the levee toe and the BFE. The first pass analysis found that the structural breaching resulted in a floodplain that was larger than the Natural Valley floodplain.

The results of these analyses are mapped in Figure 4.

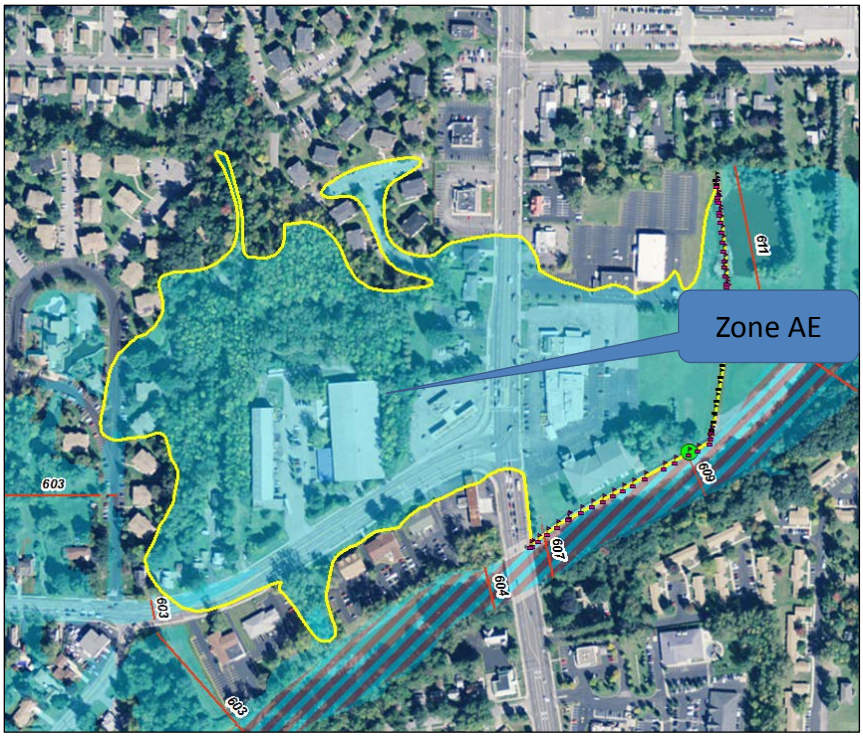


Figure 4: Structural Inundation Procedure Mapping

5.4 Review of First Pass Analyses

After reviewing the results of the First Pass Analyses, the Town of Cheektowaga indicated an initial preference for the Natural Valley Approach based on the following considerations:

- No history of known breaching was discovered
- Between the Natural Valley and Structural Inundation analyses, the latter's floodplain was larger and thus less preferable to the community.
- Choice of the Freeboard Deficient Procedure would result in a high cost to the Town to obtain all documentation and testing to demonstrate meeting all 44 CFR §65.10 criteria except freeboard.

6 Path Forward

6.1 LAMP Phase 2 Analysis

As it appears that the Cayuga Creek levee in the Town of Cheektowaga cannot be accredited at this time, FEMA will undertake a LAMP Phase 2 and LAMP Phase 3 study to take into account the potential hazard reduction impacts of the non-accredited levees.

The LAMP Phase 2 analysis will focus on refining the selected LAMP approach analysis. 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).

The subsequent LAMP Phase 3 study will incorporate the LAMP Phase 2 results into the regulatory NFIP products, namely the FIS and FIRM.

6.2 Levee Accreditation

Due to the small number of structures impacted and commercial nature of the structures, accreditation is not a likely option at this time.

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

LAMP Kick Off Meeting for the Town of Cheektowaga, NY

Meeting Date:

December 11, 2015 (10:00 AM- 12:00 PM) at the Alexander Community Center, 275 Alexander Avenue, Cheektowaga, NY, 14227 (POC: Pat Bowen)

Purpose:

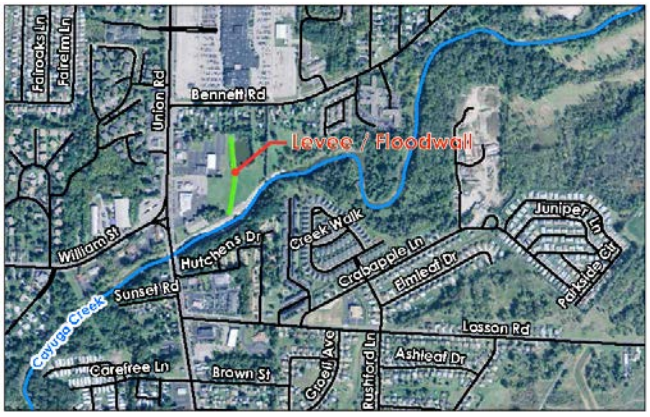
FEMA Region II conducted the first in a series of meetings to discuss Levee Analysis and Mapping Procedures (LAMP) for the levee system in the Town of Cheektowaga. This meeting served to identify local and county officials along with stakeholder that would form a Local Levee Partnership Team (LLPT). This meeting also served to have the newly formed LLPT meet one another and learn about the LAMP process that included the available methods for analysis, existing information about the about the local levee system, and the next steps.

Attendees:

A total of 15 people participated in the meeting (see attached sign in sheet for specifics). There were representatives from the Town of Cheektowaga, Erie County, various field offices/departments of NYSDEC, the USACE Buffalo District, a staffer from Congressman Higgins, and FEMA (with their PTS and CERC contractors).

Summary:

The levee system undergoing LAMP consist of a single reach that cannot be further divided. The system is operated and maintained by the NYSDEC. The number of structures in the levee impact area was approximated at less than 10 and mostly, if not all commercial structures. It was the opinion of the USACE that the levee system could be certified but NYSDEC made it known that they did not have a budget to do it. Because of the small number of interested parties in the levee impact area (most of those structures may be owned by the same person), the certification approach may not make sense. FEMA and the PTS will continue to do data collection and follow up on the items from the meeting. FEMA and CERC will continue to work on messaging and ensure that the LLPT members are engaged.



Discussion Items:

- Mr. Song opened the meeting and welcomed all participants. Mr. Song explained that the meeting was to discuss the levees in Cheektowaga along Cayuga Creek.
- Mr. Thomas then introduced the project team from FEMA's side:
  - FEMA Project Monitor
    - Alan Springett, Engineer, (212) 680-8557, Alan.Springett@fema.dhs.gov
  - Project Manager (FEMA Production Contractor)
    - Vikram Shrivastava (STARR II), (703) 849-0253, VShrivastava@dewberry.com
  - Outreach Lead
    - Thomas Song, 914-343-6696, 646-682-5531, Thomas.Song@mbakerintl.com
  - People around the room introduced themselves and their involvement in this project.
- Mr. Thomas provided a brief overview of Risk Communications
  - Know Your Risk - Do your residents know about their flood risk?
  - Know Your Role - Do your residents know what mitigation actions they should/can take?
  - Take Action - Encourage your residents to take the actions that can build their resiliency to flooding.
- Mr. Springett reviewed the Cayuga Creek levees in Cheektowaga:
  - Levee systems were constructed in the late 1940's along Cayuga Creek in Cheektowaga
  - The flood risks landward of the non-accredited levee systems will be studied with FEMA's new approach to levee mapping, LAMP.
- Mr. Springett then proceeded to provide FEMA's transition from its previous analysis for levees that are not accredited to the new method – LAMP:
  - FEMA's new approach to identifying the flood risk landward of non-accredited levee systems.
  - A collaborative levee evaluation process that works with interactive stakeholder engagement.
  - A levee-specific study to analyze and determine updated Special Flood Hazard Areas landward of the non-accredited levee.
- Mr. Springett next explained that LAMP is a 3 phase process:
  - Phase 1 – Engagement and Planning Process (we are here)
  - Phase 2 – Detailed Flood Hazard Analyses
  - Phase 3 - *Map Update*
- The objectives for LAMP Phase 1 are:
  - Establish a Local Levee Partnership Team (LLPT) to collect local levee data and related levee system information
  - Perform an approximate-level flooding analysis (First Pass Analysis)
  - Prepare the Levee Analysis Mapping Plan
- The LLPT meeting objectives were:
  - Important information and data related to how the levee system will be analyzed and mapped is obtained and considered.
  - LLPT members have an opportunity to explain the unique conditions related to their levee system that will impact the analysis and mapping.
  - LLPT members comment on methods for levee system reaches, analyses, and mapping within the allowable guidelines.
  - A reasonable schedule is developed for obtaining input or additional data.
- Mr. Shrivastava explained that there are five procedures detailed in the LAMP Final Approach Document
  - Sound Reach

- Freeboard Deficient
- Overtopping
- Structural-Based Inundation
- Natural Valley

- Mr. Shrivastava stressed that the major distinction of LAMP with the earlier levee analysis method was the analysis taking into account a levee system being broken up into multiple reaches in order to analyze the flood risk in the vicinity of each reach.
- The five procedures were discussed in detail:
  - Sound Reach
    - Where the Reach meets 44CFR 65.10
  - Freeboard Deficient
    - Reach meets 44CFR 65.10 except freeboard
  - Overtopping
    - Reach meets 44CFR 65.10 levee certification except freeboard
    - Levee designed to be overtopped in 1% storm with no erosion
  - Structural-Based Inundation
    - Levee has history or potential for breaches
  - Natural Valley
    - Modeling of the flood hazards landward of the levee disregarding the impact of the levee
    - Used to determine Zone D in all previous Procedures
- Mr. Shrivastava led a discussion on the applicability of the various procedures to the levees:
  - Levee Certification – POSSIBLE but need funds
  - Sound Reach – NO
    - Sound Reach does not make sense as if will certify then no need to do sound reach
  - Freeboard Deficient – MAYBE
  - Overtopping – NO
    - Levee (north south which ties into floodwall with notch) is earthen and may erode if overtopped.
  - Structural Based – NO
    - No history of breaching or known vulnerabilities
  - Natural Valley – YES
- Mr. Song provided an overview of the timeline of the project.
- Mr. Song alerted the meeting participants that a revised preliminary Flood Insurance Rate Map (FIRMs) would be issued in the near future. This FIRM update would "exclude" the area behind these specific levees along Cayuga Creek. These FIRMs will reflect the current effective information until a time in the future when the LAMP study results will be used to update this area.
-
- This ended the format presentation part of the meeting. The following items were discussed:
  - Single reach – cannot further divide
  - NYSDEC / USACE has as-built information which Bob at USACE will provide to STARR II
  - USACE also has interior drainage analysis which Bob at USACE will provide to STARR II
  - Bob asked for natural valley floodplain data for this levee.
  - 5 commercial structures in natural valley floodplain
  - Certification
    - Range of costs - $50K - $500K

- NYSDEC (levee sponsor) does not have funds for certification. To fund certification of one levee would mean certification of all levees across state. No budget for this.

- Questions
  - LAMP Data Needs: There was a question on the data required for the LAMP analyses. Mr. Shrivastava responded that the data needed would depend on the LAMP Approach (Sounds, Freeboard Deficient, Overtopping, or Structural Inundation) which was appropriate for the levee in question. FEMA already has sufficient information for the Natural Valley Analysis.
  - Sound Reach vs. Levee Certification: There was a question on the difference between the LAMP Sound Reach approach and levee certification. Mr. Shrivastava explained that in both cases the floodplain due to interior drainage was mapped as a Zone AE, AH, and AO. In the case of Sound Reach, the residual risk floodplain (mapped using natural valley) is mapped as a Zone D. But in the case of a certified levee, the residual risk floodplain is mapped as a Shaded Zone X.
  - Scajaquada Creek Levees: The Town of Cheektowaga asked if LAMP would also be done for the levees along Scajaquada Creek. Mr. Springett responded that at this time FEMA was not undertaking a LAMP study for this flooding source but that he would look into this. A review of the proposed preliminary information found that the flow was contained by the "levee" along Scajaquada Creek with the exception of a few small areas where the flow spilled out. At that time it was concluded that the "spill out" areas were probably due to LiDAR cleanup and subsequent floodplain redelineation. It is recommended that the Town of Cheektowaga bring this to the attention of the Erie Co. PMR team following the preliminary issuance. Having the as-builts for the structure would be useful for such discussions with the PMR team.
  - Community Review of LAMP Results: There was question about the opportunity that the Town would have to review the LAMP results. Mr. Shrivastava explained that this was the first of three meetings. The intent of the meetings was to develop a LAMP Plan which would recommend a LAMP Approach to be applied in detail in a future LAMP Phase 2 analysis. Throughout the process the communities and the USACE would be involved in draft results, modeling methodology discussions etc.
  - DEC funds for Levee Certification: One of the communities asked if the Levee Sponsor (NYSDEC) would be willing to fund the levee certification effort. The NYSDEC representative responded that if NYDEC were to fund the certification of one levee it would have to do so for all levees in the state which it does not have budget for. Therefore, unfortunately NYSDEC could not fund the levee certification effort.
  - Private vs. USACE Levee Certification: For levee certification by an engineer not associated with a federal agency that certifies levees the levee certification submittal must include all items of 44 CRF 65.10 including engineer certification. As the USACE uses a risk based analysis for levee certification the freeboard requirement is relaxed.
  - Zone D Discussion: There was a question on what Zone D is and what its requirements are. Mr. Nechamen explained that Zone D denotes areas where there are possible but undetermined flood hazards. As a result there are no building requirements for Zone D areas. But as Zone Ds have undetermined flood hazards the insurance rates are similar to those for Zone As.

CHEEKTOWAGA, ERIE COUNTY LEVEE PARTNERSHIP MEETING SIGN-IN SHEET

FEMA

Local Levee Partnership Team Meeting

Date: 12/11/15 **Time:** 10:00 AM

Location: Alexandria Community Center,
275 Alexander Ave
Cheektowaga, NY 14211

Name	Community/Firm	Address	Phone	Fax	Email
DIANE BENCZKOWSKI	TOWN OF CHEEKTOWAGA	3301 BROADWAY CHEEK, NY 14227	686-3448		DBENCZKOWSKI@TOCNY.ORG
Mark Lee	Erie County Environment and Planning	95 Franklin St., Rm. 1010 Buffalo, NY 14202	716-858-6014	858-7248	mark.lee@erie.gov
Chris Fahey	Rep Higgins	726 Exchange Steet Buf 14210	852-3500		Chris.fahey@mail.house.gov
Ted Myers	NYSDEC Region 9	270 Michigan Ave Buffalo, NY 14203	716-851-7070		Theodore.Myers@dec.ny.gov

PRIVACY ACT STATEMENT **(5 U.S.C. 552(a) Privacy Act)**

a. **AUTHORITY:** 5 U.S.C. 301 Departmental Regulations;14 U.S.C.2; 14 U.S.C.5 (88); National Environmental Protection Act (NEPA), 42 U.S.C. 4321; 44U.S.C.3101

b. **PURPOSE:** To obtain personal Information for the purpose of compiling mailing lists and to document public comments as required by the NEPA. NEPA requires public involvement in agency decision-making processes. Decisional documents as well as comment mechanisms must be made available to the public.

c. **ROUTINE USES:** To the Department of Homeland Security, U. S. Coast Guard, President of the Council on Environmental Quality, Environmental Protection Agency, and other authorized federal, state, or local governments who are authorized to develop and enforce environmental standards.

d. **DISCLOSURE:** Disclosure of your name, street address, or other contact information is voluntary; however, if information is not provided, we may not be able to provide copies of decisional documents and to retrieve additional comments related to environmental impact actions or decisions.

e. **PHOTOGRAPHS:** In the event that photographs are taken, you acknowledge that FEMA and RAMPP have permission to use that photograph.

CHEEKTOWAGA, ERIE COUNTY LEVEE PARTNERSHIP MEETING SIGN-IN SHEET

FEMA

Name	Community/Firm	Address	Phone	Fax	Email
Kerrie O'Keeffe	NYS DEC Flood Hub	6274 East Avon Lima Rd Avon NY	585 226 5465		Kerrie.OKeeffe@dec.ny.gov
Gerald D. Paoka	USACE BUFFALO	1776 NIAGARA ST. BUFFALO, NY 14207	(716) 879-4228		gerald.a.dipaola @usace.army.mil
J.T. Glass	Erie County Emergency Srvcs	45 ELM ST. BUFFALO, NY 14203	858.6187		glassj@erie.gov
Bill Nechamen	NYSDEC	625 Broadway Albany NY 12233	518 402-8146		William.nechamen@ dec.ny.gov
Bob Remmers	USACE	1776 Niagara St. Buffalo, NY 14207	716-879-4279		robert.w.remmerse usace.army.mil
Mike Lunde	Hwy TOC	3145 Union Rd Cheektowaga	686-3450		mlunde@TOCNY.org
Vikram Shrivastava	STANTEC	8401 Arlington Blvd. Fairfax, VA 22031	703-849-0253		vshrivastava@dewberry.com

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CHEEKTOWAGA, ERIE COUNTY
LEVEE PARTNERSHIP
MEETING
SIGN-IN SHEET

FEMA

Name	Community/Firm	Address	Phone	Fax	Email
Tim WASH	NYSDEC FLOOD HUB	6274 E AVON-LIMA AVON, NY 14414	585 226 5437		Tim.Wa/sh@ DEC.NY.gov
Alan Springett	FIRM	26 Federal Plaza New York, NY 10278	212-680-8557		Alan.Springett@ fema.dhs.gov
Seth Lawler	Dewberry	Fairfax VA	703-849 0213		slawler@ dewberry.com
PAT BOWEN	TOWN OF CHEEKTOWAGA	275 ALEXANDER AVE. CHEEKTOWAGA NY 14211	716-897-7288		PBOWEN@TOCNY.ORG
LAURA ORTIZ	USACE	1776 Niagara Buffalo	716-879 4407		laura.v.ortiz @usace.army.mil

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FEMA

Levee Analysis and Mapping Procedures (LAMP) for Non-accredited Levees

Town of Cheektowaga, Erie County, NY
December 11, 2015

RiskMAP
Increasing Resilience Together

Agenda

- Introductions
- Review of the area impacted by the local levee system
- Overview of the Levee Analysis and Mapping Procedure (LAMP) process
- Outline the initial LAMP study methods for the local levee system
- Review of the information for the local levee system
  - Applicability of LAMP Procedures based on levee data
  - Data needed for LAMP Procedures
- LAMP Path Forward

Introductions & Contact Information

- FEMA Project Monitor
  - Alan Springett, Engineer

    (212) 680-8557

    Alan.Springett@fema.dhs.gov
- Project Manager
  - Vikram Shrivastava (STARR II)

    (703) 849-0253

    VShrivastava@dewberry.com
- Outreach Lead
  - Thomas Song

    914-343-6696, 646-682-5531

    Thomas.Song@mbakerintl.com

Risk Communications

KNOW YOUR RISK

Do your residents know about their flood risk?

KNOW YOUR ROLE

Do your residents know what mitigation actions they should/can take?

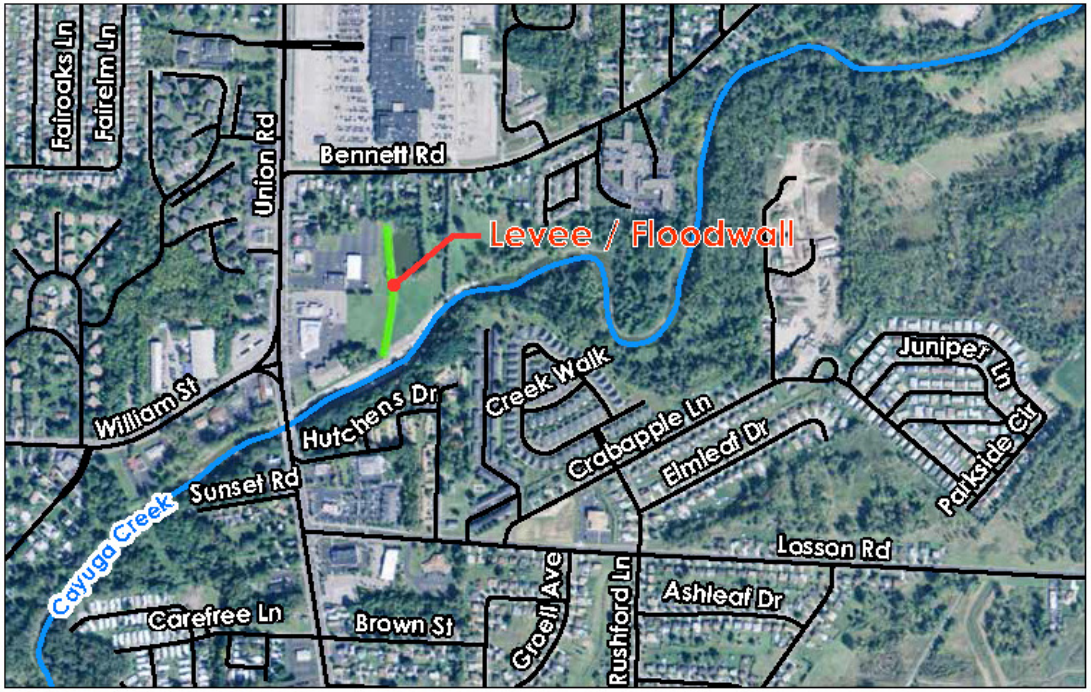
TAKE ACTION

Encourage your residents to take the actions that can build their resiliency to flooding.

Review of the area impacted by the local levee system

Review of the Local Levee System

- Levee and floodwall system constructed in the early 1980's along Cayuga Creek in Town of Cheektowaga
- The flood risks landward of the non-accredited levee system will be studied with FEMA's new approach to levee mapping, LAMP.



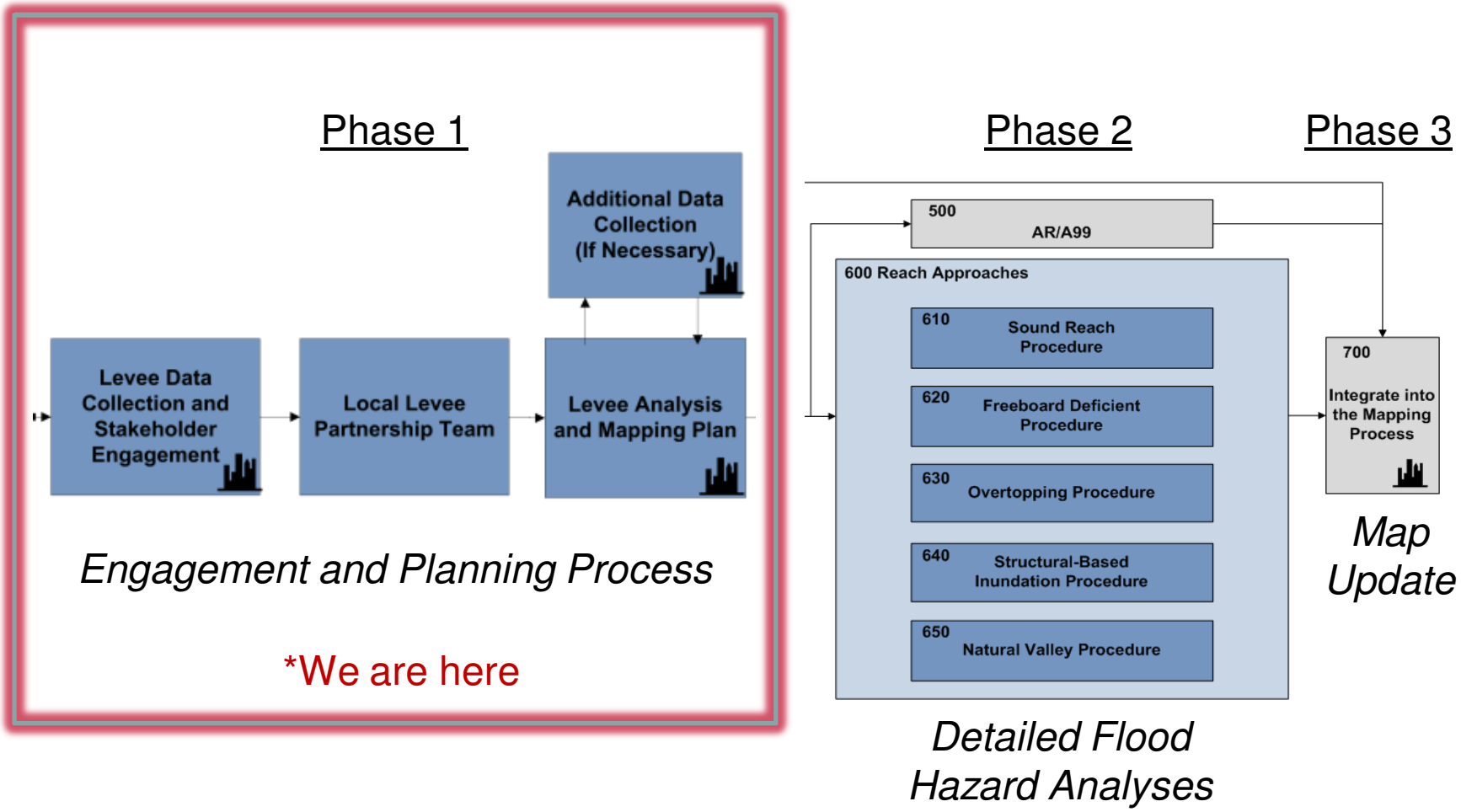
Overview of the Levee Analysis and Mapping Procedure (LAMP) process

Levee Analysis and Mapping Process (LAMP) Approach

LAMP is

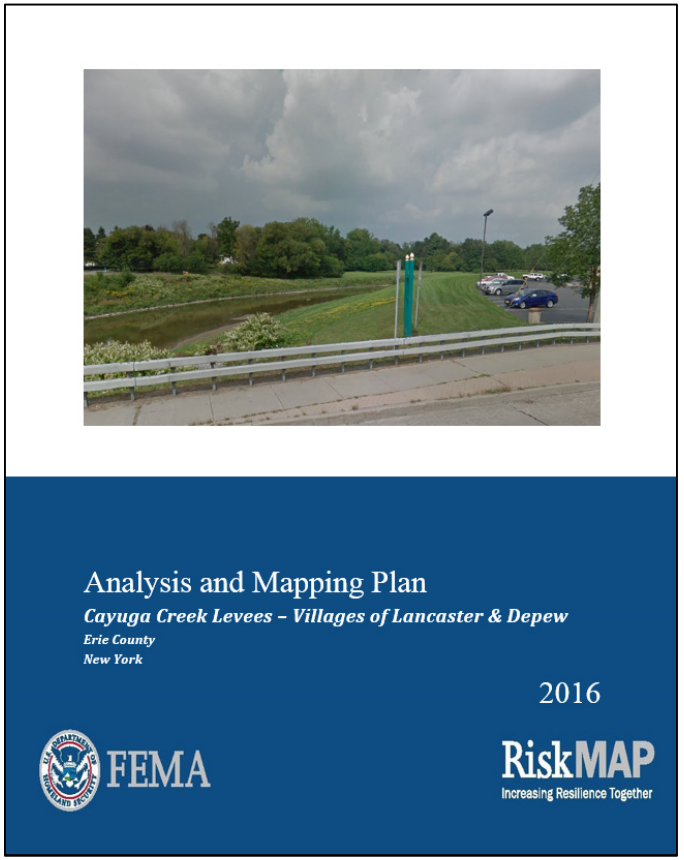
- FEMA's new approach to identifying the flood risk landward of non-accredited levee systems.
- A collaborative levee evaluation process that works with interactive stakeholder engagement.
- A levee-specific study to analyze and determine updated Special Flood Hazard Areas landward of the non-accredited levee.

Levee Analysis and Mapping Process (LAMP) Process



Levee Analysis and Mapping Process (LAMP) – Phase 1

- LAMP Phase 1 Objectives
  - Establish a Local Levee Partnership Team (LLPT) to collect local levee data and related levee system information
  - Perform an approximate-level flooding analysis (First Pass Analysis)
  - Prepare the Levee Analysis and Mapping Plan



Local Levee Partnership Team *(LLPT)*

- Meeting-Specific Objectives:
  - Important information and data related to how the levee system will be analyzed and mapped is obtained and considered.
  - LLPT members have an opportunity to explain the unique conditions related to their levee system that will impact the analysis and mapping.
  - LLPT members comment on methods for levee system reaches, analyses, and mapping within the allowable guidelines.
  - A reasonable schedule is developed for obtaining input or additional data.

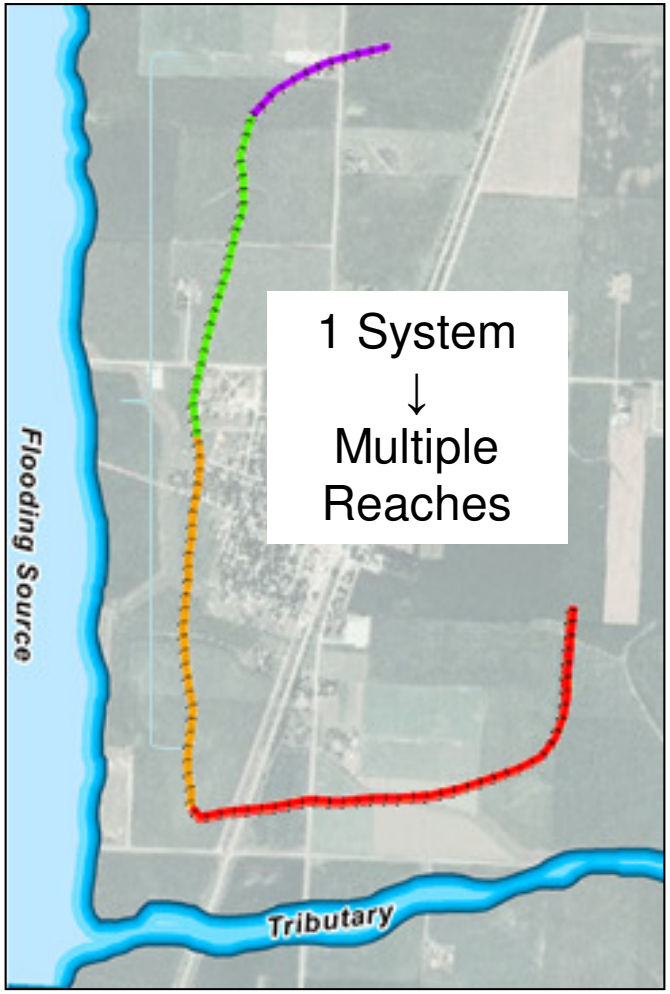
Outline the initial LAMP study methods for the local levee system

LAMP Analyses & Methodology

There are five procedures detailed in the LAMP Final Approach Document.

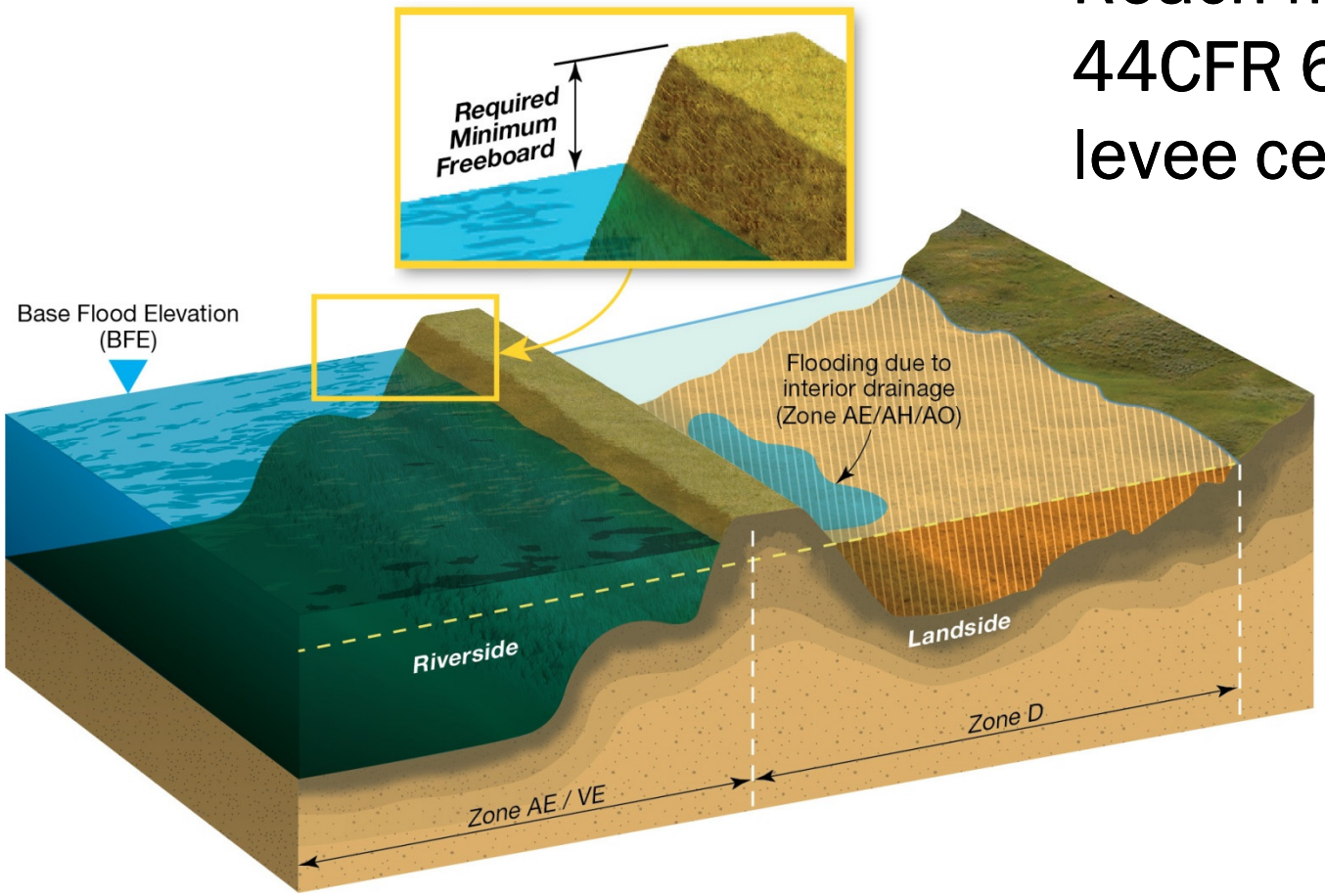
- Sound Reach
- Freeboard Deficient
- Overtopping
- Structural-Based Inundation
- Natural Valley

A levee system can be broken up into multiple reaches in order to analyze the flood risk in its vicinity.

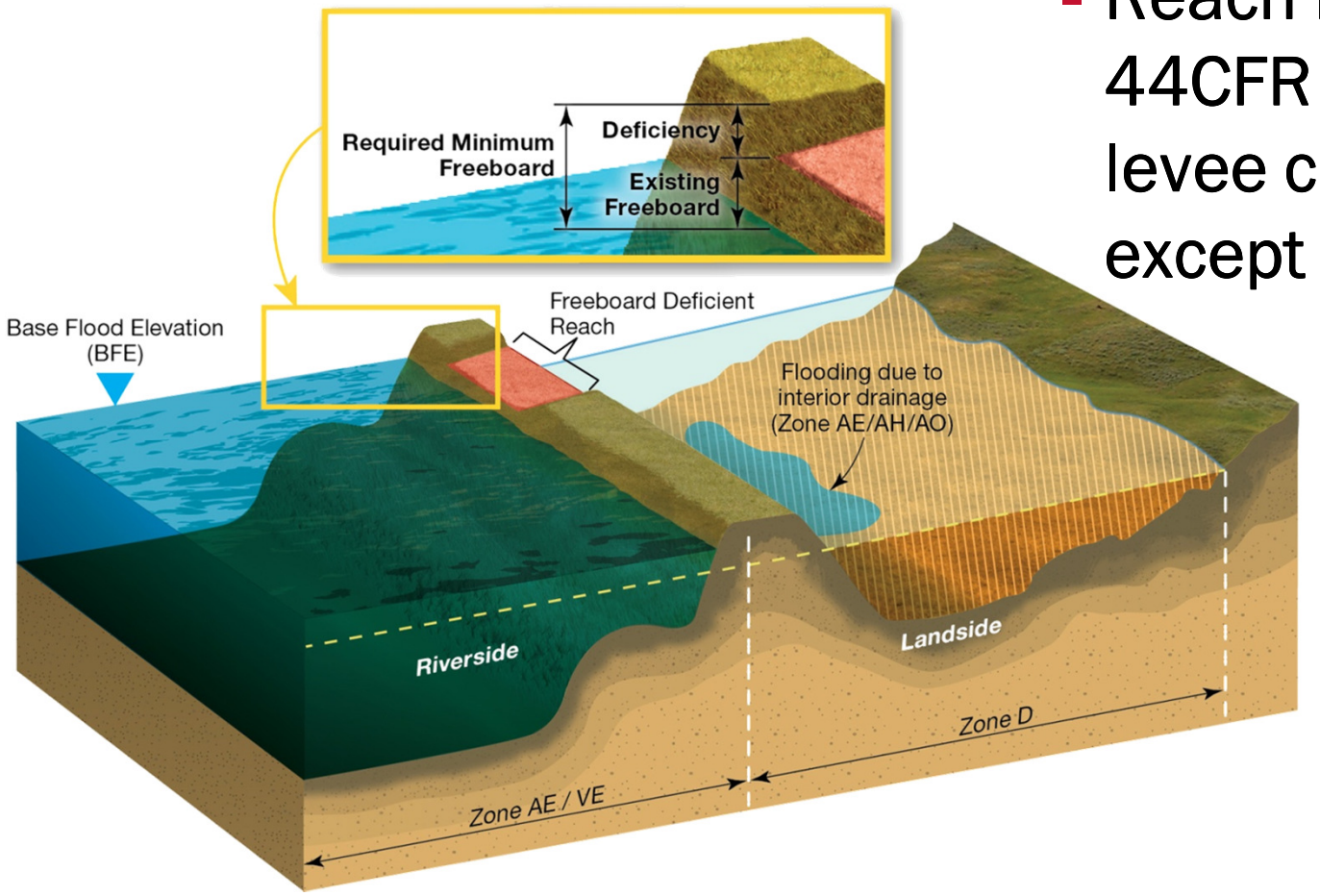


Sound Reach Procedure

- Reach meets 44CFR 65.10 levee certification

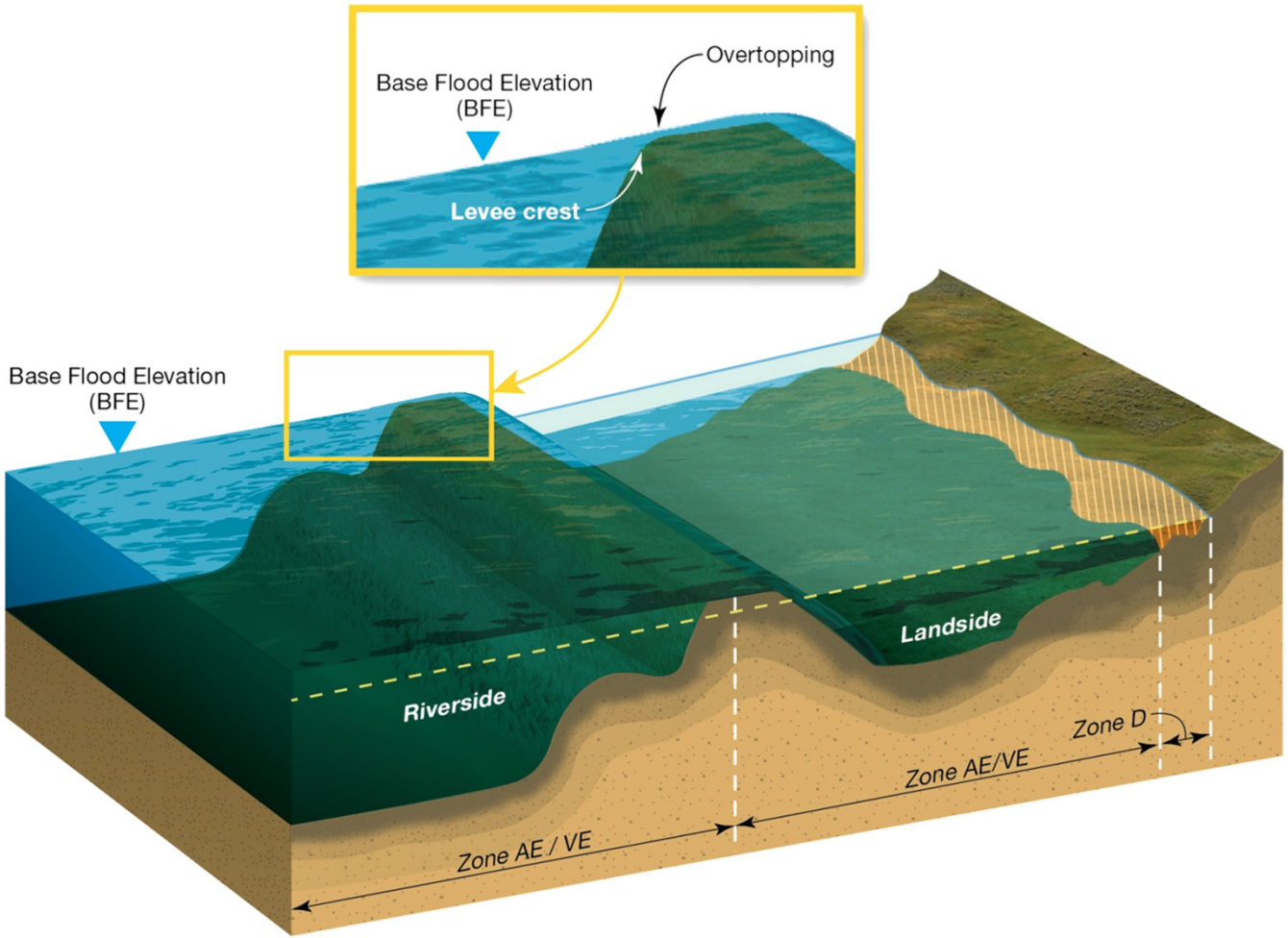


Freeboard Deficient Procedure



- Reach meets 44CFR 65.10 levee certification except freeboard

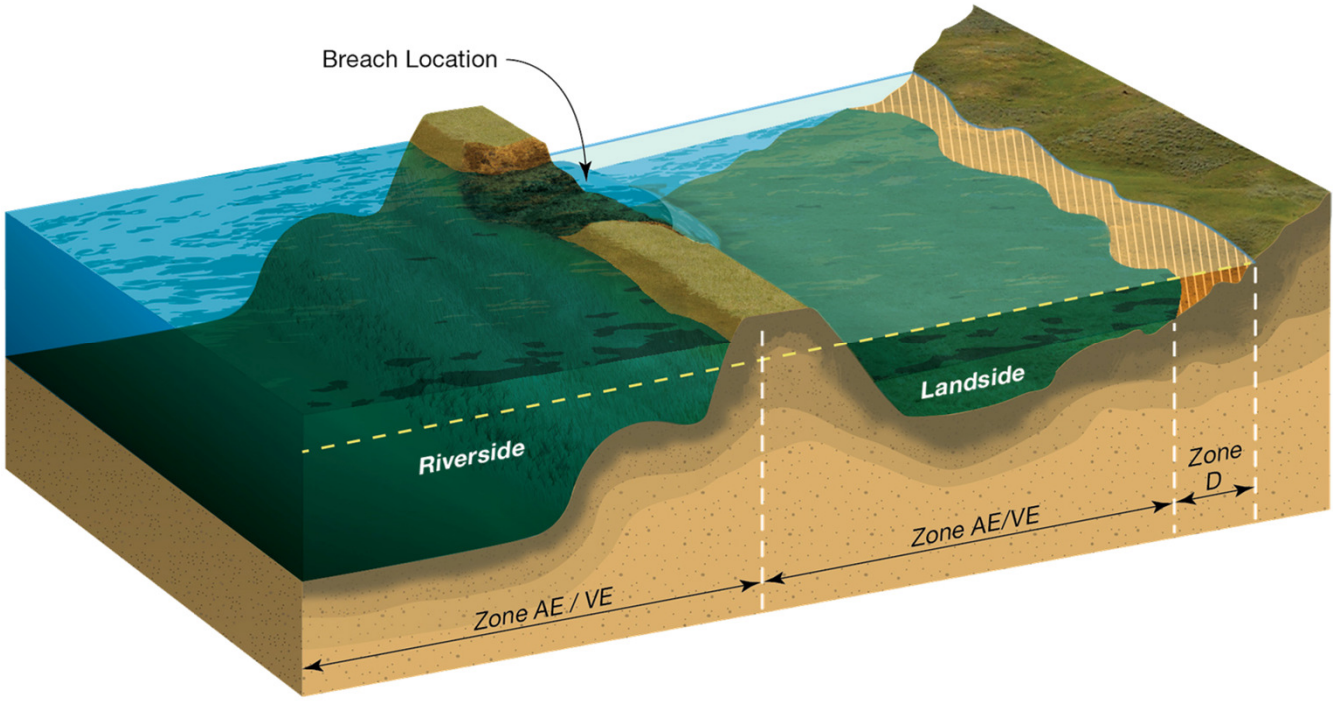
Overtopping Procedure



- Reach meets 44CFR 65.10 levee certification except freeboard
- Levee designed to be overtopped in 1% storm with no erosion

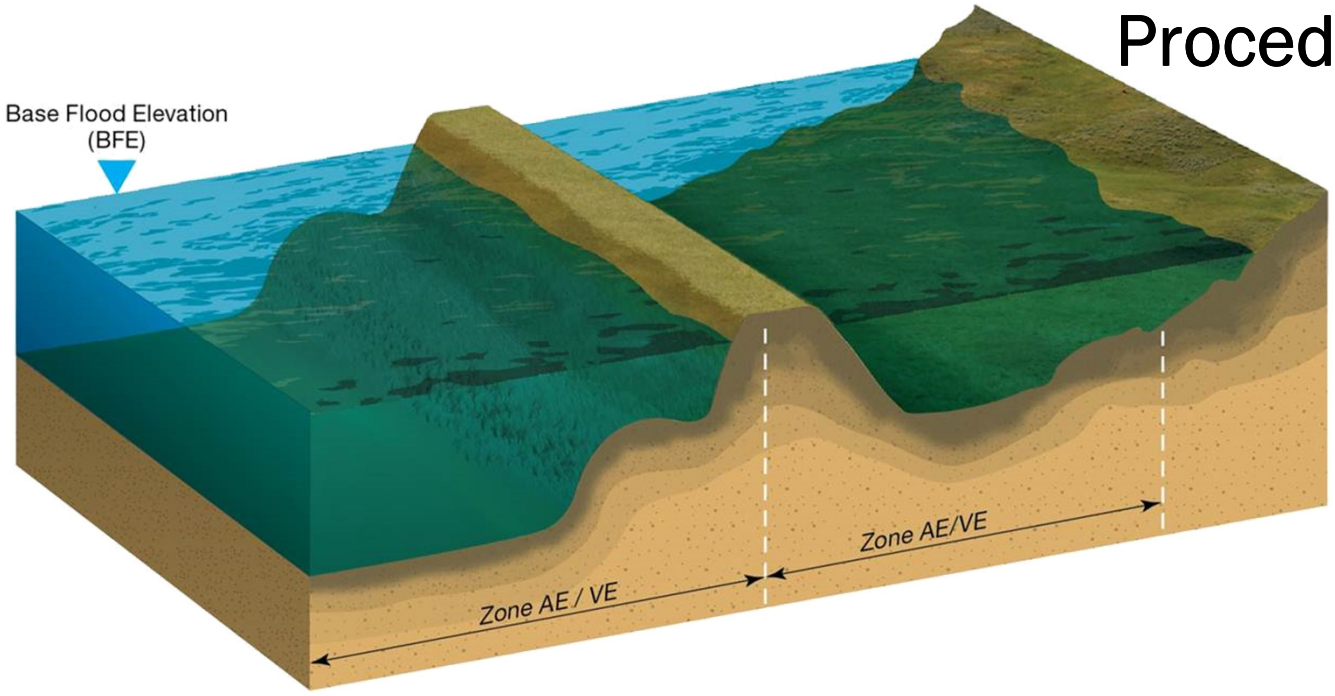
Structural-Based Inundation Procedure

- Levee has history or potential for breaches



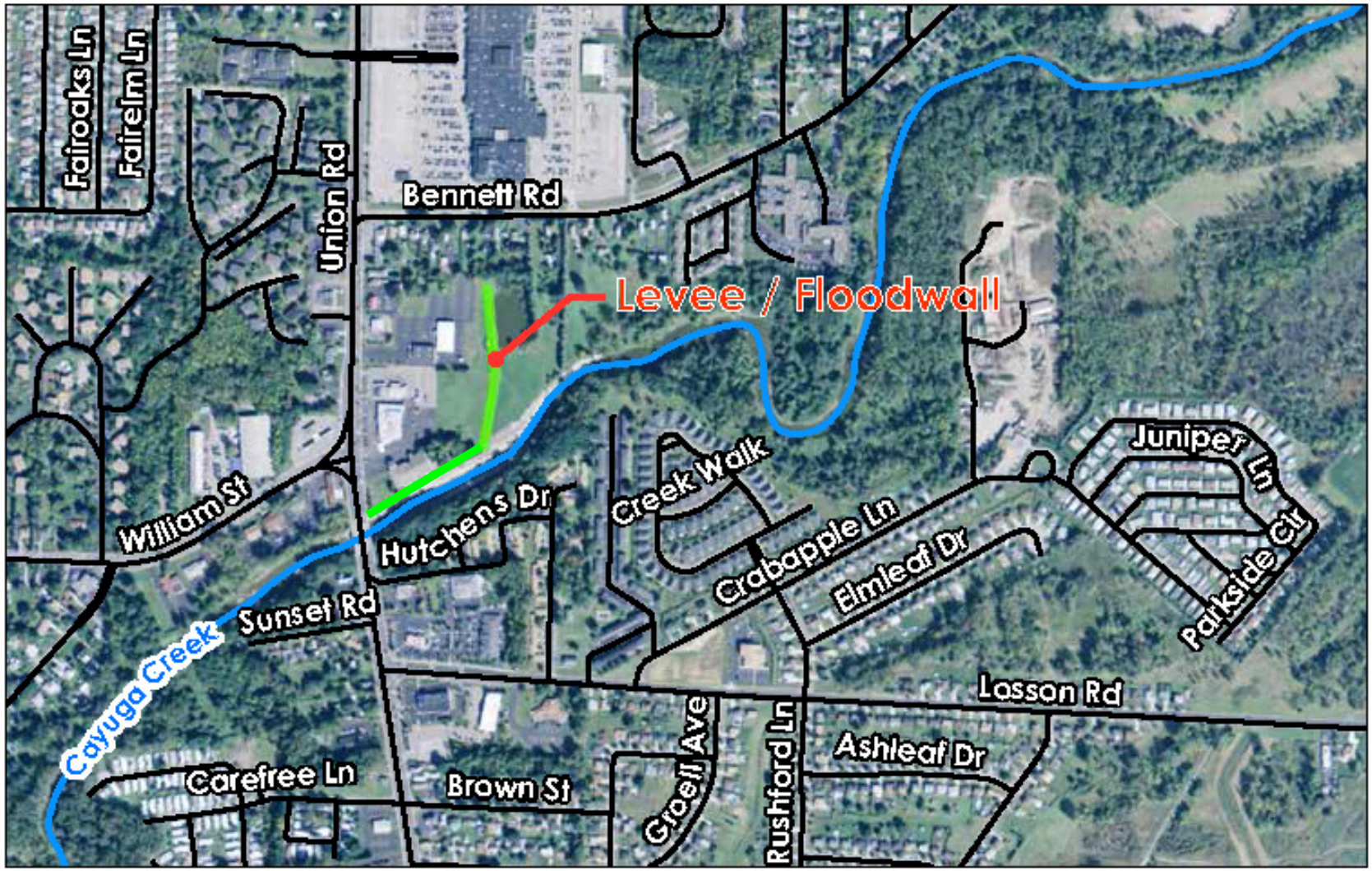
Natural Valley Procedure

- Used to determine Zone D in all previous Procedures



Review of the information for the local levee system

Application of LAMP to Levees in Cheektowaga



Application of LAMP to Levees in Cheektowaga

- LLPT discussions on applicable LAMP Procedure
  - Sound Reach Procedure
    - Does any "reach" of the levee system meet all 44CFR 65.10 levee certification requirements except that it is attached to "reaches" that cannot be certified
  - Freeboard Deficient Procedure
    - Does any "reach" of the levee system meet all 44CFR 65.10 levee certification requirements except freeboard
  - Overtopping Procedure
    - Is any "reach" a floodwall or levee designed to be overtopped in 1% storm?
  - Structural Based Inundation Procedure
    - Is there historical evidence that this levee has been breached in the past?
    - Is there evidence that finds this levee system vulnerable to breaching?
  - Natural Valley Procedure
    - Mapping landward of the levee without taking the levee into consideration

Application of LAMP to Levees in Cheektowaga

- Additional data needs for applicable LAMP Procedures
  - Sound Reach Procedure
    - If applicable, data needs are …
  - Freeboard Deficient Procedure
    - If applicable, data needs are …
  - Overtopping Procedure
    - If applicable, data needs are …
  - Structural Based Inundation Procedure
    - If applicable, data needs are …
  - Natural Valley Procedure
    - FEMA has sufficient information for this procedure

LAMP Path Forward

LAMP Path Forward

- LAMP - Phase 1

1st LLPT Meeting

(We are here)

Apply initial LAMP Procedures and develop First Pass Analyses

2nd LLPT Meeting

Review First Pass Analysis and finalize which Procedure(s) will be applied in future Phase 2 Detailed Analysis (if applicable)

Prepare a LAMP Plan document that summarizes LLPT discussions; First Pass Analyses; and recommended LAMP Procedure to be applied in Phase 2

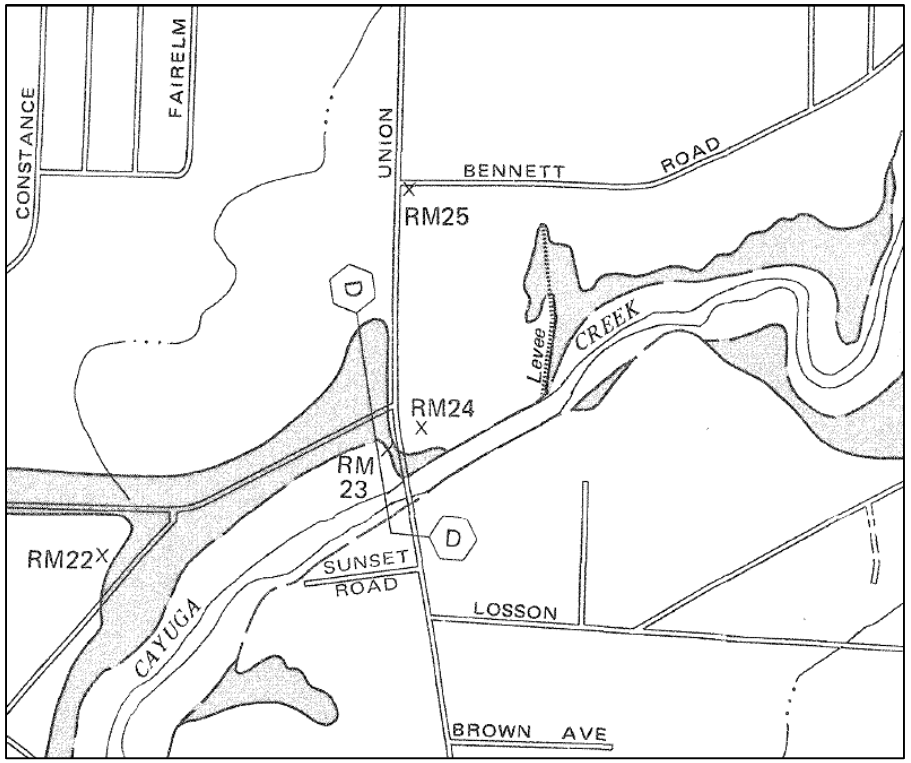
3rd LLPT Meeting (virtual)

Draft LAMP Plan will be shared with all LLPT members

Dec 2015 → Feb 2016

Concurrent Map Revision

- LAMP Study focuses on determining flood risk related to the Cayuga Creek levee.
- Concurrent Flood Insurance Rate Map (FIRM) update underway



FEMA

Know, plan for, mitigate against and communicate about the risks in your community.

Key Considerations for Selecting Technical Procedures

- Levee system characteristics
- Data availability
- Reasons 44CFR65.10 cannot be met
- Length/size of the levee system and/or reach
- Levee profile vs. BFEs
- Levee Reach discussions
- Levee performance history
- Accreditation status of levee system on current NFIP maps
- Flooding characteristics
- Contributing drainage area
- Duration of flooding
- Terrain of protected area
- Level of risk in leveed area
- Community/levee owner willingness to contribute data or analyses
- Original design and as-built plans
- O&M report, inspections, tests
- Current models
- Current survey data
- Geotechnical analyses

Appendix B
Stakeholder Engagement - LLPT Meeting #2 Information

CHEEKTOWAGA, ERIE COUNTY
LEVEE PARTNERSHIP
MEETING
SIGN-IN SHEET

FEMA

Local Levee Partnership Team Meeting

Date: 2/10/16 **Time:** 10:00 AM

Location: Alexandria Community Center,
275 Alexander Ave
Cheektowaga, NY 14211

Name	Community/Firm	Address	Phone	Fax	Email
EARL LODER	T/CHEEKTOWAGA	2600 HARLEM RD	716 683-4303	716 893-0835	ELODER@TOCNY.ORG
Gerry DiPaola	USACE	1776 NIAGARA ST. BUFFALO, NY 14207	(716) 879-4228	—	geraldia.dipaola@usace.army.mil
Kerrie O'Keeffe	NYS DEC Flood Hub	6274 East Avon Lima Rd, Avon NY	585 226-5465		Kerrie.OKeeffe@dec.ny.gov
Mary Binder	Flood Hub	6274 E. Avon Lima Avon. NY 14414	585-226-5447	—	mary.binder@dec.ny.gov

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CHEEKTOWAGA, ERIE COUNTY LEVEE PARTNERSHIP MEETING SIGN-IN SHEET

FEMA

Name	Community/Firm	Address	Phone	Fax	Email
Laura Ortiz	USACE	1776 Niagara St Buffalo NY	716-879 4469		laura.v.ortiz @usace.army.mil
THEODORE MYERS	NYS DEC Region 9/Buffalo	270 Michigan Ave. Buffalo, NY 14203	716 851-7088		theodore.myers @ dec.ny.gov
PAT BOWEN	CHEEK.	275 ALEXANDER CHK. NY 14211	716 847-7238		PBOWEN@TOWNY.ORG
Bob Remmers	USACE	1776 Niagara St Buffalo, NY 14207	(716) 879 -4277		robert.w.remmers @usace.army.mil
Alan Springett	FEMA	26 Federal Plaza New York, NY 10278	212-680 8557		Alan.Springett@ fema.dhs.gov
Seth Lawler	Dewberry	8401 Arlington BLVD Fairfax, VA 22031	703-849-0213		slawler@dewberry.com
Dale					

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CHEEKTOWAGA, ERIE COUNTY LEVEE PARTNERSHIP MEETING SIGN-IN SHEET

FEMA

Name	Community/Firm	Address	Phone	Fax	Email
Brian Rose	Erie Co. Dept of Public Works				
V. Ikram Shrivastava	STARR II		703-845-0775		vshrivastava@dewberry.com

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LAMP LLPT Meeting #2 for the Town of Cheektowaga, NY

Meeting Date:

February 10, 2016 (10:00 AM- 12:00 PM) at the Alexander Community Center, 275 Alexander Avenue, Cheektowaga, NY, 14227 (POC: Pat Bowen)

Purpose:

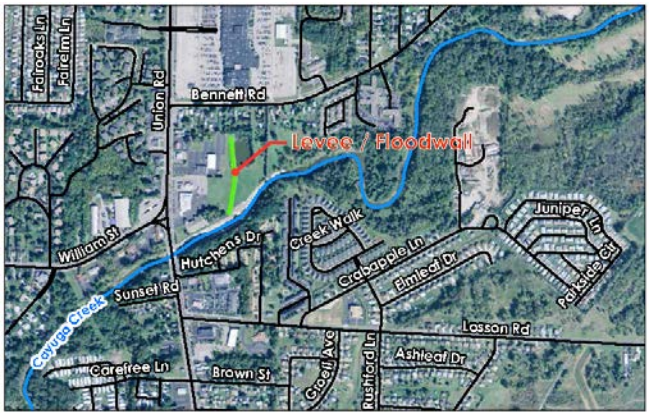
FEMA Region II conducted the first in a series of meetings to discuss Levee Analysis and Mapping Procedures (LAMP) for the levee system in the Town of Cheektowaga. This meeting served to present first pass analyses for the various LAMP Procedures and discuss the appropriate LAMP Procedure for refinement in a future LAMP Phase 2 study.

Attendees:

A total of 13 people participated in the meeting (see attached sign in sheet for specifics). There were representatives from the Town of Cheektowaga, Erie County, various field offices/departments of NYSDEC, the USACE Buffalo District, , and FEMA (with the PTS contractors).

Summary:

The levee system undergoing LAMP consist of a single reach that cannot be further divided. The system is operated and maintained by the NYSDEC. The number of structures in the levee impact area was approximated at less than 10 and mostly, if not all commercial structures. A quick review was provided on the LAMP process and procedures used to map the flood hazards behind unaccredited levees. Based on the available information the applicable LAMP procedures were identified. The LLPT reviewed the resulting flood hazards from the first pass analyses for the applicable LAMP Procedures. The Town of Cheektowaga representatives were in agreement that the Natural Valley Procedure was the most appropriate at this time for this levee.



Discussion Items:

- Mr. Song opened the meeting and welcomed all participants. Mr. Song explained that the meeting was to discuss the levees in Cheektowaga along Cayuga Creek.
- Mr. Thomas then introduced the project team from FEMA's side:
  - FEMA Project Monitor
    - Alan Springett, Engineer, (212) 680-8557, Alan.Springett@fema.dhs.gov
  - Project Manager (FEMA Production Contractor)
    - Vikram Shrivastava (STARR II), (703) 849-0253, VShrivastava@dewberry.com
  - Outreach Lead
    - Thomas Song, 914-343-6696, 646-682-5531, Thomas.Song@mbakerintl.com
  - People around the room introduced themselves and their involvement in this project.
-

Discussion Items:

- Mr. Springett opened the meeting and welcomed all participants. Mr. Springett explained that the meeting was to discuss the levee in Cheektowaga along Cayuga Creek.
- Mr. Springett then introduced the project team from FEMA's side:
  - FEMA Project Monitor
    - Alan Springett, Engineer, (212) 680-8557, Alan.Springett@fema.dhs.gov
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  - Outreach Lead
    - Thomas Song, 914-343-6696, 646-682-5531, Thomas.Song@mbakerintl.com
  - People around the room introduced themselves and their involvement in this project.
- Mr. Springett reviewed the Cayuga Creek levee in Cheektowaga:
  - The levee system was constructed in the late 1980's along Cayuga Creek in Cheektowaga
  - The flood risks landward of the non-accredited levee system are being studied with FEMA's new approach to levee mapping, LAMP.
- Mr. Springett provided an high level overview of the LAMP Process
  - Phase 1: Engagement and Planning which includes
    - Levee Data Collection and Stakeholder Engagement
    - Local levee Partnership Team
    - Additional Data Collection (if necessary)
    - Levee Analysis and Mapping Plan
  - Phase 2: Detailed Flood Hazard Analysis which includes
    - AR/A99 Analyses for levees under construction which will be accredited (which does not apply to the levee in Cheektowaga)
    - LAMP Procedures for non-accredited levees
  - Phase 3: Map Update
- Mr. Springett then provided an high level overview of the five LAMP Procedures:
  - Natural Valley
  - Structural-Based Inundation
  - Overtopping
  - Freeboard Deficient
  - Sound Reach
- Mr. Springett further explained that some levee systems can be broken up into multiple reaches in order to analyze the flood risk in their vicinity. This is not the case with the levee in Cheektowaga as it is a single reach.

- Mr. Shrivastava then reviewed the various LAMP Procedures and their applicability to the levees in Cheektowaga:
  - Natural Valley Procedure (Applicable)
  - Structural Based Inundation Procedure (Potentially Applicable). However, levee does not have known vulnerabilities or history of breaching
  - Overtopping Procedure (Not Applicable). As the top of the levee is above the Base Flood Elevations (BFEs)
  - Freeboard Deficient Procedure (Potentially Applicable). Will require documentation that levee meets 44CFR65.10 except for freeboard
  - Sound Reach Procedure (Not Applicable). As the levee is a single reach if the single reach meets 44CFR65.10 then the levee would be accredited (which it is not due to the lack of freeboard at the notched weir in the floodwall).
- During the above discussion exhibits with the results of the first pass analyses were presented.
  - Natural Valley Procedure where the 2D hydraulic analysis allows flow conveyance behind the levee. The resulting flood hazards if this procedure were chosen would be Zone AEs with BFEs.
  - Structural Inundation Procedure where 2D hydraulic analyses were used to model a single breach in the levee. The levee breach was chosen to model the worst case scenario with the breach location chosen where there was a maximum difference in the levee toe and the BFE. The first pass analysis found that the structural breaching resulted in a floodplain that was larger than the Natural Valley floodplain.
  - Freeboard Deficient Reach Procedure where the runoff (interior drainage) from the area draining to the levee was computed and modeled using 2D hydraulic analysis. For the first pass analysis no pumps were modeled and the USACE representative confirmed that there are no pumps for the interior drainage of this levee. The results found that the interior drainage floodplain is limited to the small area in the south by the levee. Where the Natural Valley flood hazards were wider than the Freeboard Deficient Reach flood hazards the area would be mapped as a Zone D. Mr. Springett stated he was working with FEMA HQ to allow Letter of Map Amendments (LOMAs) for the Zone D areas based on the Natural Valley Procedure 2D first pass analyses.
- The LLPT then compared the differences in flood hazards from the LAMP first pass analyses.
- Mr. Shrivastava asked if the information presented so far allowed the LLPT members to shortlist one or more of the LAMP Procedures to be recommended for refinement in a future LAMP Phase 2 study. The Town of Cheektowaga representatives were in agreement that the Natural Valley Procedure was the most appropriate at this time for this levee. The rationale behind this was
  - Between Natural Valley and Structural Inundation, the latter's floodplain was larger and thus less preferable.
  - Choice of the Freeboard Deficient Procedure would result in a high cost to the Town to obtain all documentation and testing to demonstrate meeting all 44CFR65.10 criteria except freeboard.
- With the recommendation that the Natural Valley Procedure was most appropriate, discussion focused on the need for a LAMP Phase 2 study. The LLPT agreed that a Phase 2 study was not needed. Therefore, FEMA will provide a "Natural Valley letter" to Town of Cheektowaga which if returned with Town Supervisor approval will result in a FEMA initiated LOMR to incorporate the Natural Valley results into the ongoing Erie County FIRM update via a LOMR.
- Mr. Shrivastava then provided an update on the upcoming Erie County (All Jurisdictions) revised preliminary FIRMs and FIS issuance. He explained that the revised preliminary was scheduled for issuance in late February. This revised preliminary would not update the flood hazards behind the

Cheektowaga levee. The flood hazards behind these levees would be mapped as they are on the current effective FIRM (i.e. with no Special Flood Hazard Areas).

- Action Items
  - Vikram (PTS Contractor):
    - Send exhibits with the first pass analyses results to all LLPT members Phase 2 study.
    - Work with Pat Bowen (Cheektowaga FPA) and determine if a presentation by FEMA to the Town Council is required to accept the Natural Valley mapping.

FEMA

Levee Analysis and Mapping Procedures (LAMP) for Non-accredited Levees

Town of Cheektowaga, Erie County, NY

February 10, 2016

RiskMAP
Increasing Resilience Together

Agenda

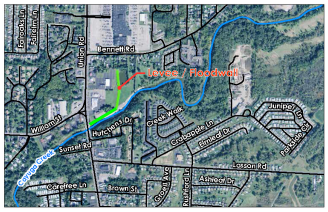
- Introductions
- Review of LLPT Meeting #1
- First Pass Analysis Results
- Finalize LAMP study methods for Phase 2 Analysis
- LAMP Path Forward
- Review of First Pass Analysis Workmaps

Introductions & Contact Information

- **FEMA Project Monitor**
  - Alan Springett, Engineer
    (212) 680-8557
    Alan.Springett@fema.dhs.gov
- **Project Manager**
  - Vikram Shrivastava (STARR II)
    (703) 849-0253
    VShrivastava@dewberry.com
- **Outreach Lead**
  - Thomas Song
    914-343-6696, 646-682-5531
    Thomas.Song@mbakerintl.com

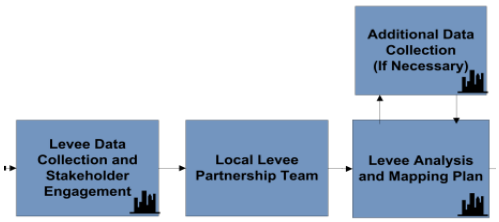
Review of the Local Levee System

- Levee and floodwall system constructed in the early 1980's along Cayuga Creek in Town of Cheektowaga
- The flood risks landward of the non-accredited levee system will be studied with FEMA's new approach to levee mapping, LAMP.



Levee Analysis and Mapping Process (LAMP) Process

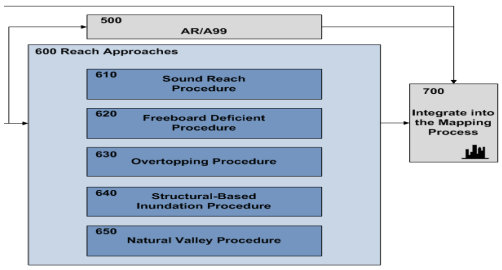
PHASE I: Engagement and Planning Process



Current phase

Levee Analysis and Mapping Process (LAMP) Process

Phase 2: Detailed Flood Hazard Analyses
Phase 3: Map Update

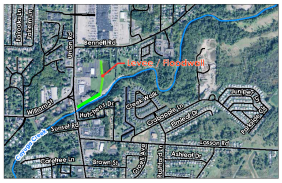


LAMP Analyses & Methodology

There are five procedures detailed in the LAMP Final Approach Document.

- Natural Valley
- Structural-Based Inundation
- Overtopping
- Freeboard Deficient
- Sound Reach

Some levee systems can be broken into multiple reaches in order to analyze the flood risk in their vicinity.



FEMA 7 RiskMAP

Application of LAMP to Levees in Cheektowaga

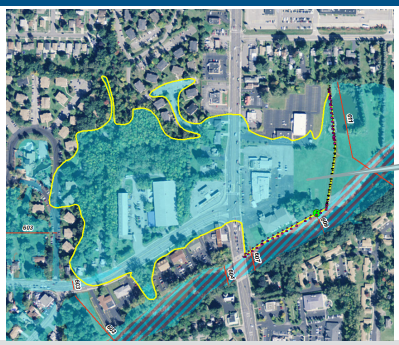
- **LAMP Procedures are**
  - Natural Valley Procedure (Applicable)
  - Structural Based Inundation Procedure (Potentially Applicable)
    - Levee does not have known vulnerabilities or history of breaching
  - Overtopping Procedure (Not Applicable)
    - BFEs are lower than top of levee / floodwall
  - Freeboard Deficient Procedure (Potentially Applicable)
    - Will require documentation that levee meets 44CFR65.10 except for freeboard
  - Sound Reach Procedure (Not Applicable)
    - Insufficient freeboard

FEMA 8 RiskMAP

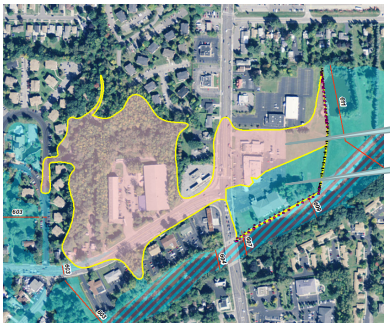
First Pass Analysis Natural Valley Procedure

FEMA 9 RiskMAP

First Pass Analysis Structural Based Inundation

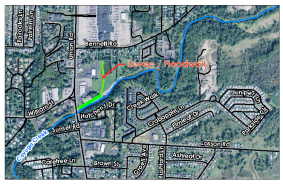


First Pass Analysis Freeboard Deficient



Finalize LAMP study methods for Phase 2 Analysis

- **LAMP Procedures are**
  - Natural Valley Procedure
  - Structural Based Inundation Procedure
  - Overtopping Procedure
  - Freeboard Deficient Procedure
  - Sound Reach Procedure



LAMP Path Forward

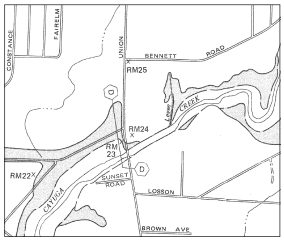
- **LAMP PHASE 1**

DECEMBER 2015 → **March 2016**

1st LLPT Meeting	Apply initial LAMP	2nd LLPT Meeting	Prepare LAMP plan document	3rd LLPT Meeting
	Procedures and develop First Pass Analyses	Review First Pass Analysis and finalize which Procedure(s) will be applied in future Phase 2 Detailed Analysis (if applicable)	Summarizes LLPT discussions; First Pass Analyses; and recommended LAMP Procedure to be applied in Phase 2	Draft LAMP Plan will be shared with all LLPT members

Concurrent Map Revision

- LAMP Study focuses on determining flood risk related to the Cayuga Creek levee.
- Concurrent Flood Insurance Rate Map (FIRM) update underway with "seclusion"



Review of First Pass Analysis


FEMA
Know, plan for, mitigate against and communicate about the risks in your community.
FEMA
16
RiskMAP

Appendix C
Site Photographs

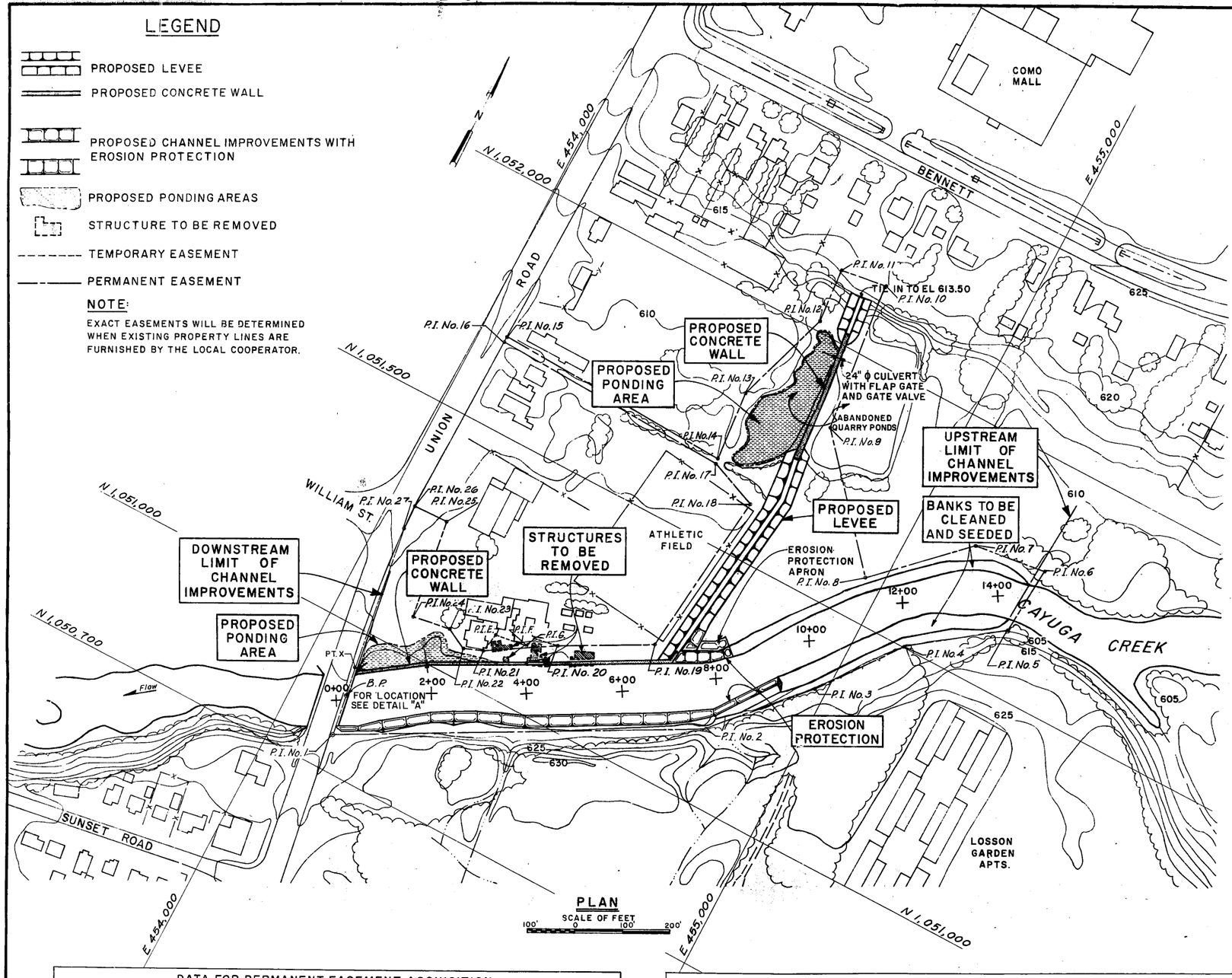
Appendix D
USACE Levee Documentation

LEGEND

- PROPOSED LEVEE
- PROPOSED CONCRETE WALL
- PROPOSED CHANNEL IMPROVEMENTS WITH EROSION PROTECTION
- PROPOSED PONDING AREAS
- STRUCTURE TO BE REMOVED
- TEMPORARY EASEMENT
- PERMANENT EASEMENT

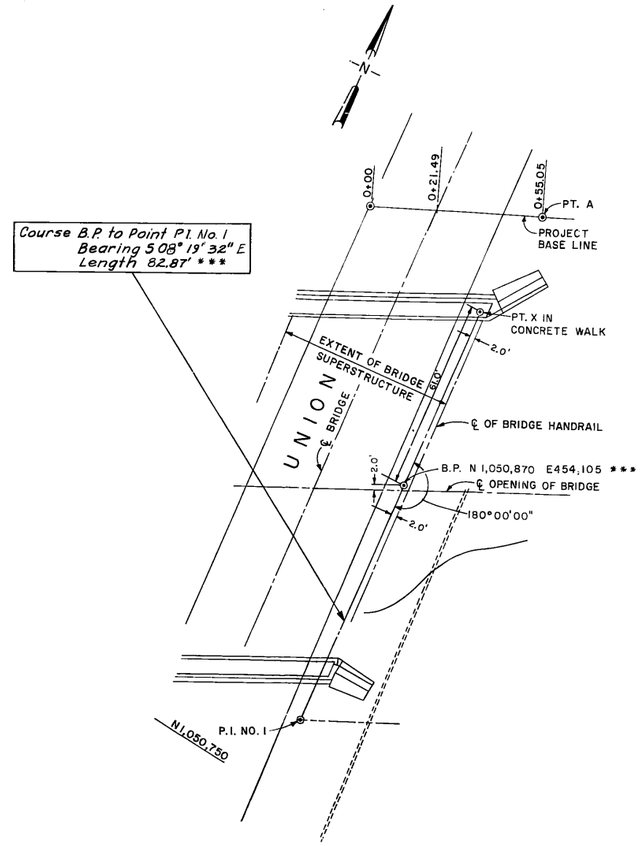
NOTE:

EXACT EASEMENTS WILL BE DETERMINED WHEN EXISTING PROPERTY LINES ARE FURNISHED BY THE LOCAL COOPERATOR.



PLAN

SCALE OF FEET 100' 0 100' 200'



DETAIL "A"

SCALE OF FEET 20' 0 20' 40'

DATA FOR PERMANENT EASEMENT ACQUISITION

Point	Coordinates*** North	Coordinates*** East	Course	Distance	Bearing	Remarks
P.I. No. 1	1,050,788	454,117	P.I.s No. 1 to No. 2	782.08'	N 60° 50' 45" E	** *
P.I. No. 2	1,051,169	454,800	P.I.s No. 2 to No. 3	244.18'	N 42° 30' 38" E	**
P.I. No. 3	1,051,349	454,965	P.I.s No. 3 to No. 4	207.80'	N 36° 58' 49" E	
P.I. No. 4	1,051,515	455,090	P.I.s No. 4 to No. 5	221.60'	N 53° 26' 25" E	
P.I. No. 5	1,051,647	455,268	P.I.s No. 5 to No. 6	146.34'	N 03° 55' 06" E	*
P.I. No. 6	1,051,793	455,278	P.I.s No. 6 to No. 7	154.43'	S 82° 11' 05" W	*
P.I. No. 7	1,051,772	455,125	P.I.s No. 7 to No. 8	245.42'	S 46° 09' 20" W	*
P.I. No. 8	1,051,602	454,948	P.I.s No. 8 to No. 9	322.80'	N 40° 21' 04" W	*
P.I. No. 9	1,051,848	454,739	P.I.s No. 9 to No. 10	318.28'	N 06° 51' 25" W	*
P.I. No. 10	1,052,164	454,701	P.I.s No. 10 to No. 11	99.72'	S 83° 05' 20" W	*
P.I. No. 11	1,052,152	454,602	P.I.s No. 11 to No. 12	119.82'	S 06° 42' 35" E	*
P.I. No. 12	1,052,033	454,616	P.I.s No. 12 to No. 13	216.67'	S 19° 41' 22" W	
P.I. No. 13	1,051,829	454,543	P.I.s No. 13 to No. 14	149.75'	S 05° 44' 55" E	
P.I. No. 14	1,051,680	454,558	P.I.s No. 14 to No. 15	511.35'	N 87° 52' 14" W	
P.I. No. 15	1,051,699	454,047	P.I.s No. 15 to No. 16	10.00'	S 00° 00' 00" E	
P.I. No. 16	1,051,689	454,047	P.I.s No. 16 to No. 17	511.35'	S 87° 52' 14" E	
P.I. No. 17	1,051,670	454,558	P.I.s No. 17 to No. 18	115.32'	S 68° 06' 23" E	*
P.I. No. 18	1,051,627	454,665	P.I.s No. 18 to No. 19	354.74'	S 07° 07' 30" W	*
P.I. No. 19	1,051,275	454,621	P.I.s No. 19 to No. 20	203.30'	S 60° 32' 05" W	*
P.I. No. 20	1,051,175	454,444	P.I.s No. 20 to No. 21	155.05'	S 59° 47' 48" W	*

DATA FOR PERMANENT EASEMENT ACQUISITION

Point	Coordinates*** North	Coordinates*** East	Course	Distance	Bearing	Remarks
P.I. No. 21	1,051,097	454,310	P.I.s No. 21 to No. 22	43.83'	S 62° 51' 01" W	*
P.I. No. 22	1,051,077	454,271	P.I.s No. 22 to No. 23	51.00'	N 61° 53' 39" W	
P.I. No. 23	1,051,101	454,226	P.I.s No. 23 to No. 24	80.23'	S 79° 57' 02" W	
P.I. No. 24	1,051,087	454,147	P.I.s No. 24 to No. 25	211.44'	N 08° 42' 18" W	
P.I. No. 25	1,051,296	454,115	P.I.s No. 25 to No. 26	73.03'	S 88° 25' 50" W	
P.I. No. 26	1,051,294	454,042	P.I.s No. 26 to No. 27	51.16'	S 04° 29' 05" E	
P.I. No. 27	1,051,243	454,046	P.I.s No. 27 to No. 1	462.45'	S 07° 57' 18" E	**

DATA FOR TEMPORARY EASEMENT ACQUISITION

Point	Coordinates*** North	Coordinates*** East	Course	Distance	Bearing	Remarks
P.I. 20	1,051,175	454,444	P.I.'s No. 20 to No. 21	155.05'	S 59° 47' 48" W	*
P.I. 21	1,051,097	454,310	P.I.'s No. 21 to E	38.33'	N 15° 07' 26" E	*
P.I.E.	1,051,134	454,320	P.I.'s E to F	67.60'	N 82° 20' 58" E	*
P.I.F.	1,051,143	454,387	P.I.'s F to G	27.31'	N 23° 44' 58" E	*
P.I.G.	1,051,168	454,398	P.I.'s G to No. 20	46.53'	N 81° 20' 51" E	*

* Revised June 19, 1980
** Revised Oct. 16, 1980
*** Revised June 4, 1981

NOTES:

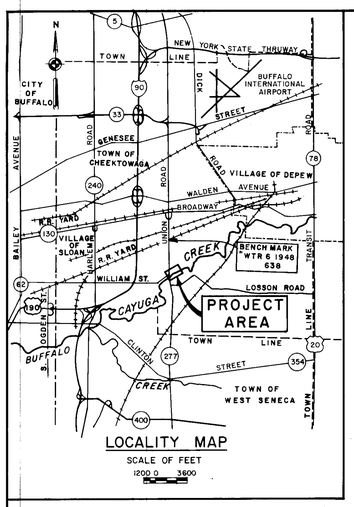
1. THE COORDINATE GRID SYSTEM WAS OBTAINED FROM THE TAX MAP, TOWN OF CHEEKTOWAGA, ERIE COUNTY, SHEET 113.16 AND WAS ADJUSTED TO REFLECT FIELD MEASUREMENTS.
2. STATION CHE WEB 2, N1,045,518.45; E 454,095.26 WAS OBTAINED FROM ERIE COUNTY GEODETIC SURVEY MONUMENT DATA.

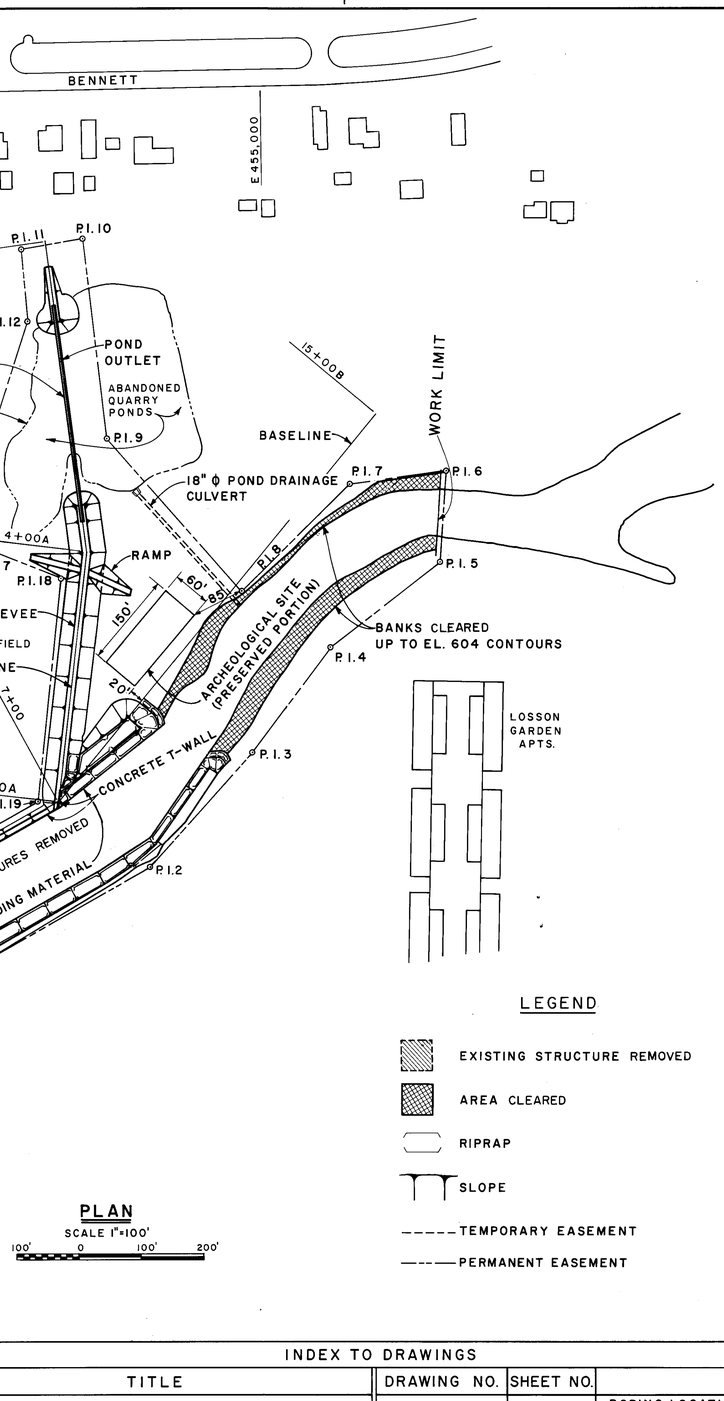
CAYUGA CREEK, CHEEKTOWAGA, NEW YORK
LOCAL FLOOD PROTECTION

EASEMENT REQUIREMENTS PLAN

U. S. ARMY ENGINEER DISTRICT BUFFALO

78-CAS-2/1

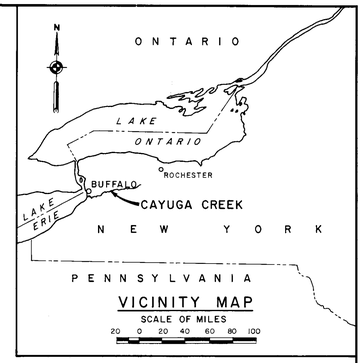




PLAN
SCALE 1"=100'
100' 0 100' 200'

LEGEND

- EXISTING STRUCTURE REMOVED
- AREA CLEARED
- RIPRAP
- SLOPE
- ----- TEMPORARY EASEMENT
- ——— PERMANENT EASEMENT



GENERAL NOTES:

1. BENCH MARK, "WTR 6 1948 638" IS A U.S.C. & G.S. BRONZE DISC LOCATED ABOUT 0.9 MILE NORTH OF THE BRIDGE OVER CAYUGA CREEK AND ABOUT 0.5 MILE SOUTH OF THE BROADWAY (RT. 130) BRIDGE OVER UNION ROAD. DISC IS POSITIONED IN TOP OF SOUTHWEST CONCRETE WINGWALL OF RAILROAD VIADUCT, 6 FEET SOUTH OF SOUTH RAIL OF TRACK, ABOUT 0.1 FOOT LOWER THAN TOP OF RAIL. ELEVATION IS 638.39 FEET.

2. FIELD NOTES ARE FILED AS CAYUGA-13 AND CAYUGA-14 IN THE BUFFALO DISTRICT OFFICE. CAYUGA-13 PROVIDES TEMPORARY BENCH MARKS NEAR THE PROJECT AREA WITH A LEVEL RUN FROM THE ABOVE BENCH MARK:

"TOP HYDRANT" - HIGHEST POINT ON FIRE HYDRANT ON SERVICE STATION PROPERTY AT SOUTHWEST CORNER OF WILLIAM ST. AND UNION ROAD. ELEVATION - 607.68.

"BOLT" - CROSS CUT ON EASTERLY BOLT OF BELL HOUSING OF ABOVE FIRE HYDRANT. ELEVATION - 607.20.

CAYUGA-13 ESTABLISHES THE BASELINE BETWEEN UNION ROAD BRIDGE AND STA. 7+40.4, AND PROVIDES CROSS SECTIONAL OFFSETS AND ELEVATIONS ALONG THIS BASELINE. CAYUGA-14 PROVIDES TEMPORARY BENCH MARKS IN PROJECT AREA WITH A LEVEL RUN FROM "BOLT":

"SPIKE" - TOP OF SPIKE, 1.0 FOOT ABOVE GROUND, IN NORTH FACE OF 24-INCH RED MAPLE TREE, LOCATED AT SOUTHWEST CORNER OF ATHLETIC FIELD, ELEVATION - 607.98.

"POLE" - TOP OF SAWED-OFF POWER POLE ABOUT 3 FEET HIGH, LOCATED AT NORTHEAST CORNER OF ATHLETIC FIELD. ELEVATION - 609.87.

CAYUGA-14 EXTENDS CROSS SECTIONS WITH ADDITIONAL OFFSETS AND ELEVATIONS BETWEEN STA. 0+50 AND STA. 6+50, ESTABLISHES BASELINE EXTENSIONS, STA. 7+00 TO STA. 14+50 AND STA. 0+00A TO STA. 9+50A, AND PROVIDES CROSS SECTIONAL OFFSETS AND ELEVATIONS ALONG THESE EXTENSIONS.

3. SURVEY DATA FOR THE PERMANENT AND TEMPORARY EASEMENT LINES CAN BE OBTAINED FROM THE BUFFALO DISTRICT OFFICE.

4. BEFORE DIGGING OR DRILLING, CALL "UNDERGROUND UTILITIES LOCATING SERVICE" 716-893-1133.

5. INFORMATION AS TO TYPE AND LOCATION OF UNDERGROUND UTILITIES MAY NOT BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES NECESSARY TO AVOID DAMAGE THERETO.

6. LOGS OF SUBSURFACE EXPLORATIONS AND SOIL PROFILES ARE SHOWN ON SHEETS 11 THROUGH 13.

7. FOR RIPRAP DETAILS, SEE SHEET 10.

AS CONSTRUCTED

SUBMITTED: CHIEF, CONSTRUCTION-OPERATIONS DIVISION

APPROVED: COL., C.E., DISTRICT ENGINEER

INDEX TO DRAWINGS

DRAWING NO.	SHEET NO.	TITLE
81-CCP-1/1	1	GENERAL PLAN OF IMPROVEMENTS
81-CCP-1/2	2	PLAN AND DETAILS - STA. 0+00 TO STA. 6+00
81-CCP-1/3	3	PLAN AND DETAILS - STA. 6+00 TO STA. 10+00 STA. 0+00A TO STA. 2+50A
81-CCP-1/4	4	PLAN AND DETAILS - STA. 10+00 TO STA. 15+00
81-CCP-1/5	5	PLAN AND DETAILS- STA. 2+50A TO STA. 9+50A
81-CCP-1/6	6	T-WALL PLAN, PROFILE AND DETAILS- UNION ROAD BRIDGE TO STA. 2+62
81-CCP-1/7	7	T-WALL PLAN, PROFILE AND DETAILS- STA. 2+62 TO STA. 5+12
81-CCP-1/8	8	T-WALL PLAN, PROFILE AND DETAILS- STA. 5+12 TO STA. 0+30A
81-CCP-1/9	9	GRAVITY WALL PLAN, PROFILE AND DETAILS
81-CCP-1/10	10	MISCELLANEOUS DETAILS
81-CCP-1/11	11	BORING LOCATIONS AND GEOLOGIC SECTION - BASELINE STATION 1+15
81-CCP-1/12	12	GEOLOGIC SECTIONS-BASELINE STATIONS 7+00,10+10,13+15
81-CCP-1/13	13	GEOLOGIC SECTION - BASELINE STATION 8+25 AND GEOLOGIC PROFILE
81-CCP-1/14	14	CROSS SECTIONS- STA. 0+55.05 TO STA. 3+50
81-CCP-1/15	15	CROSS SECTIONS- STA. 4+00 TO STA. 7+00
81-CCP-1/16	16	CROSS SECTIONS- STA. 7+50 TO STA. 14+50
81-CCP-1/17	17	CROSS SECTIONS- STA. 0+00A TO STA. 4+50A
81-CCP-1/18	18	CROSS SECTIONS- STA. 5+00A TO STA. 9+00A
81-CCP-1/19	19	PROJECT SIGN

REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: M.W.H.
DESIGNED BY: J.K.K. & P.J.K.
CHECKED BY: A.J.A.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COL., C.E., DISTRICT ENGINEER
DATE: 8/12/81

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

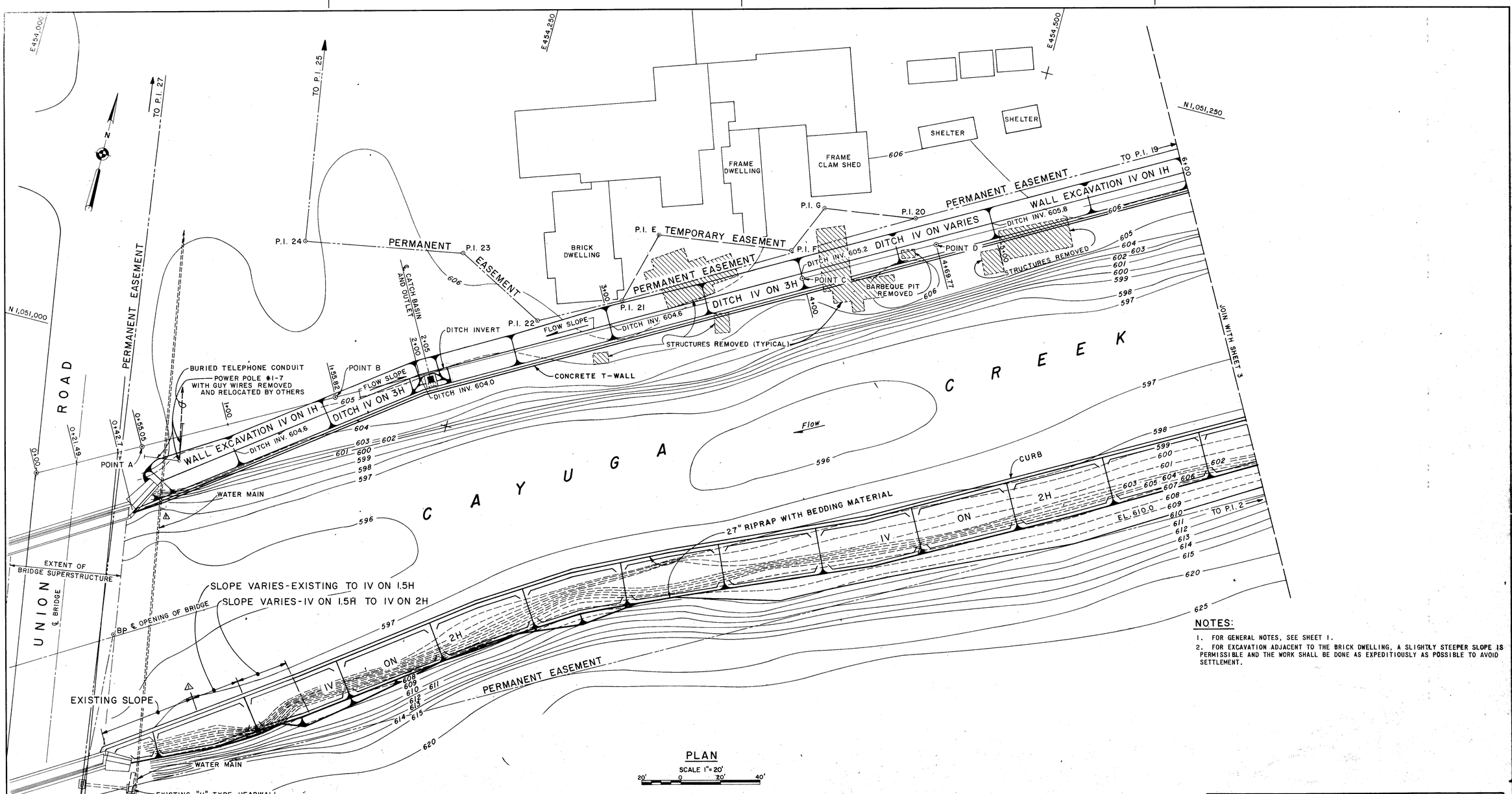
GENERAL PLAN OF IMPROVEMENTS

SCALE: AS SHOWN

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

DRAWING NUMBER 81-CCP-1/1

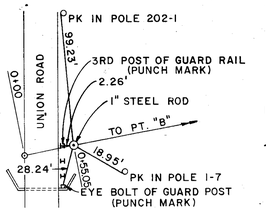
SHEET 1 OF 19



PLAN

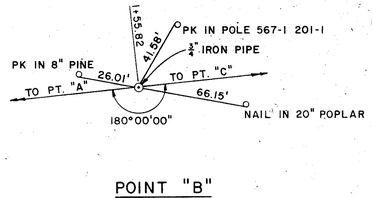
SCALE 1"= 20'

20' 0 20' 40'



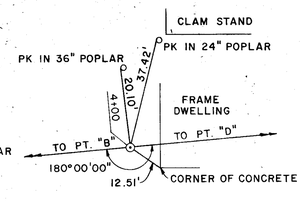
POINT "A"

NOT TO SCALE



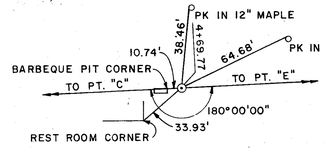
POINT "B"

NOT TO SCALE



POINT "C"

NOT TO SCALE



POINT "D"

NOT TO SCALE

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR EXCAVATION ADJACENT TO THE BRICK DWELLING, A SLIGHTLY STEEPER SLOPE IS PERMISSIBLE AND THE WORK SHALL BE DONE AS EXPEDITIOUSLY AS POSSIBLE TO AVOID SETTLEMENT.

AS CONSTRUCTED

SUBMITTED: CHIEF, CONSTRUCTION-OPERATIONS DIVISION

APPROVED: COL, C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY
1	3/5/82	MODIFICATION NO. 2	

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: J. R. A.
DESIGNED BY: P. J. K.
CHECKED BY: A. J. A.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COL, C. E. DISTRICT ENGINEER
DATE:

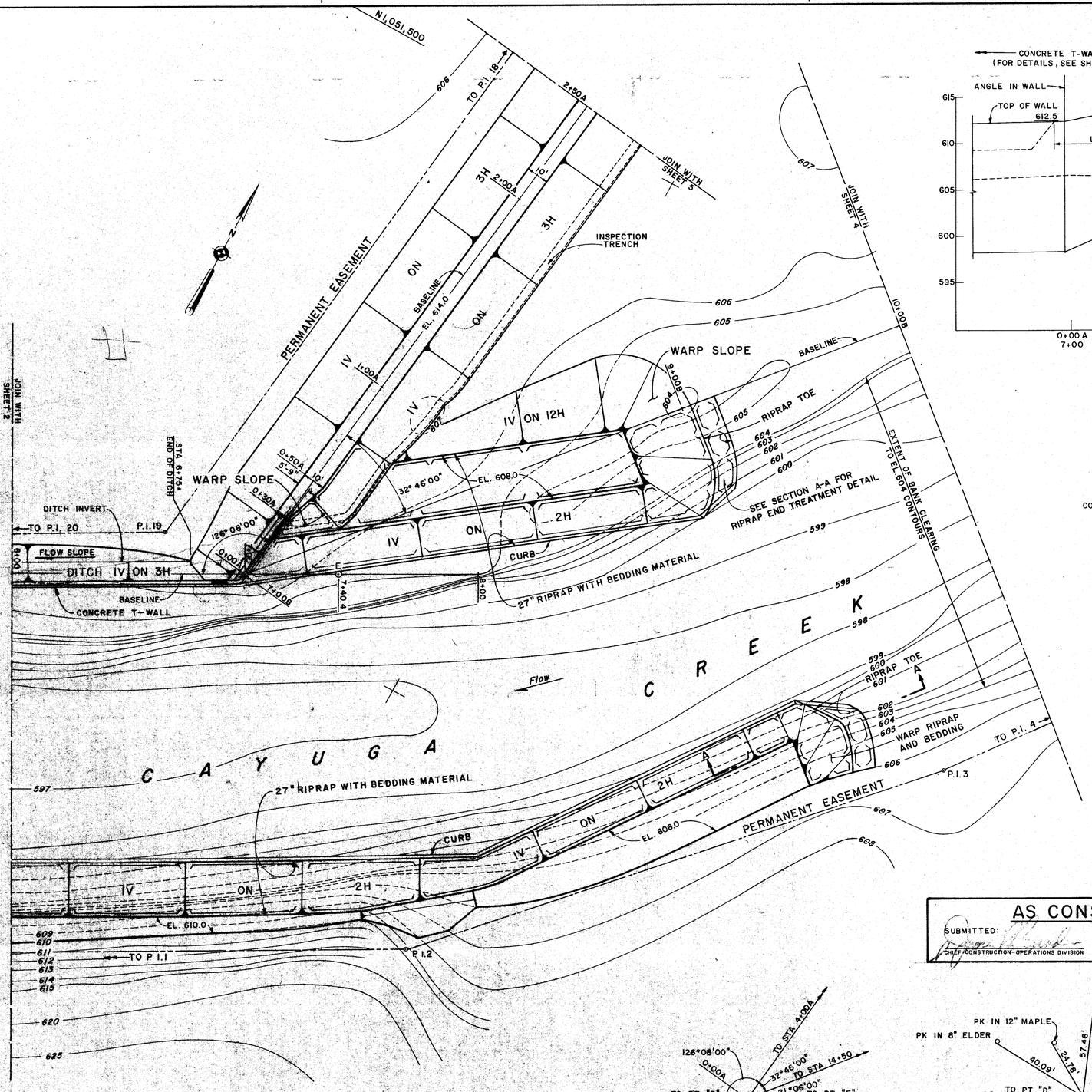
CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

PLAN AND DETAILS
STA. 0+00 TO STA. 6+00

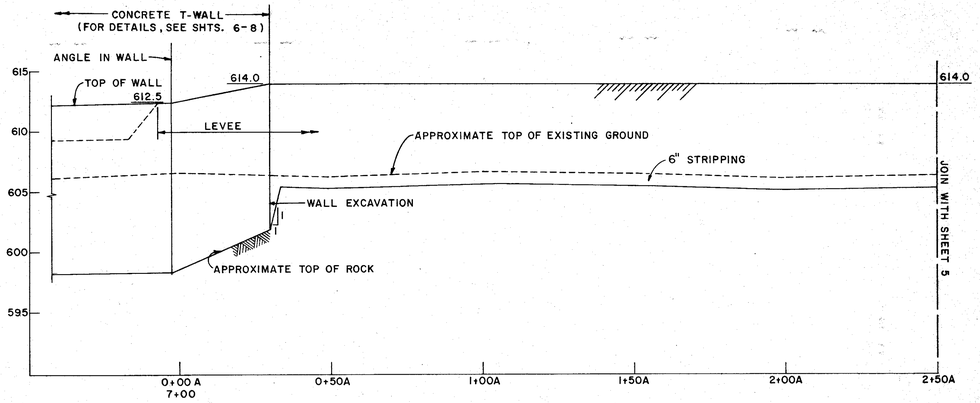
SCALE: AS SHOWN

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

DRAWING NUMBER
81-CCP-1/2
SHEET 2 OF 19

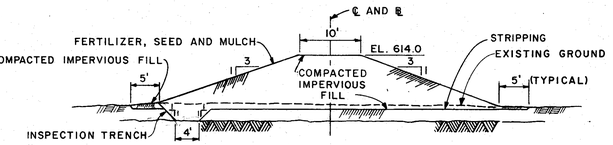


PLAN
SCALE 1"=20'
20' 0 20' 40'



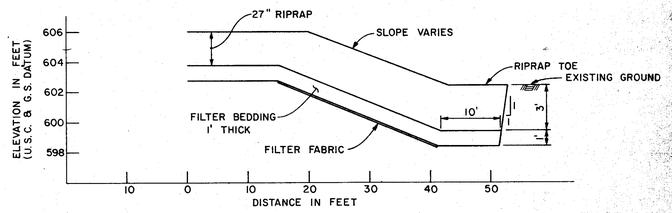
LEVEE CENTERLINE PROFILE

SCALE 1"=5'
VERTICAL 5' 0 5' 10'
SCALE 1"=20'
HORIZONTAL 20' 0 20' 40'



TYPICAL SECTION TRANSVERSE LEVEE

SCALE 1"=10'
10' 0 10' 20'

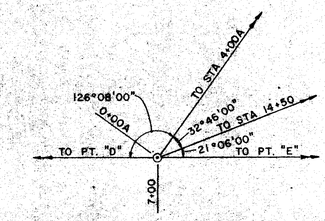


SECTION A-A
(RIPRAP END TREATMENT DETAIL)

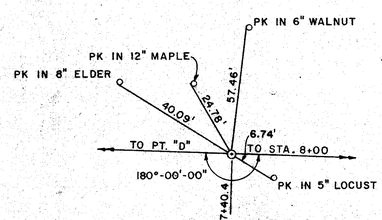
AS CONSTRUCTED

SUBMITTED: _____ CHIEF, CONSTRUCTION-OPERATIONS DIVISION

APPROVED: _____ COL., C.E. DISTRICT ENGINEER



INTERSECTION OF BASELINES
NOT TO SCALE



POINT "E"
NOT TO SCALE

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. INSPECTION TRENCH ALONG THE LEVEE SHALL BE TO: (1) A DEPTH OF 6 FEET, (2) BEDROCK OR, (3) 2 FEET BELOW WATERTABLE, WHICHEVER IS LESS.

REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: J. R. A.
DESIGNED BY: P. J. K.
CHECKED BY: A. J. A.
SUBMITTED BY: _____ CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION

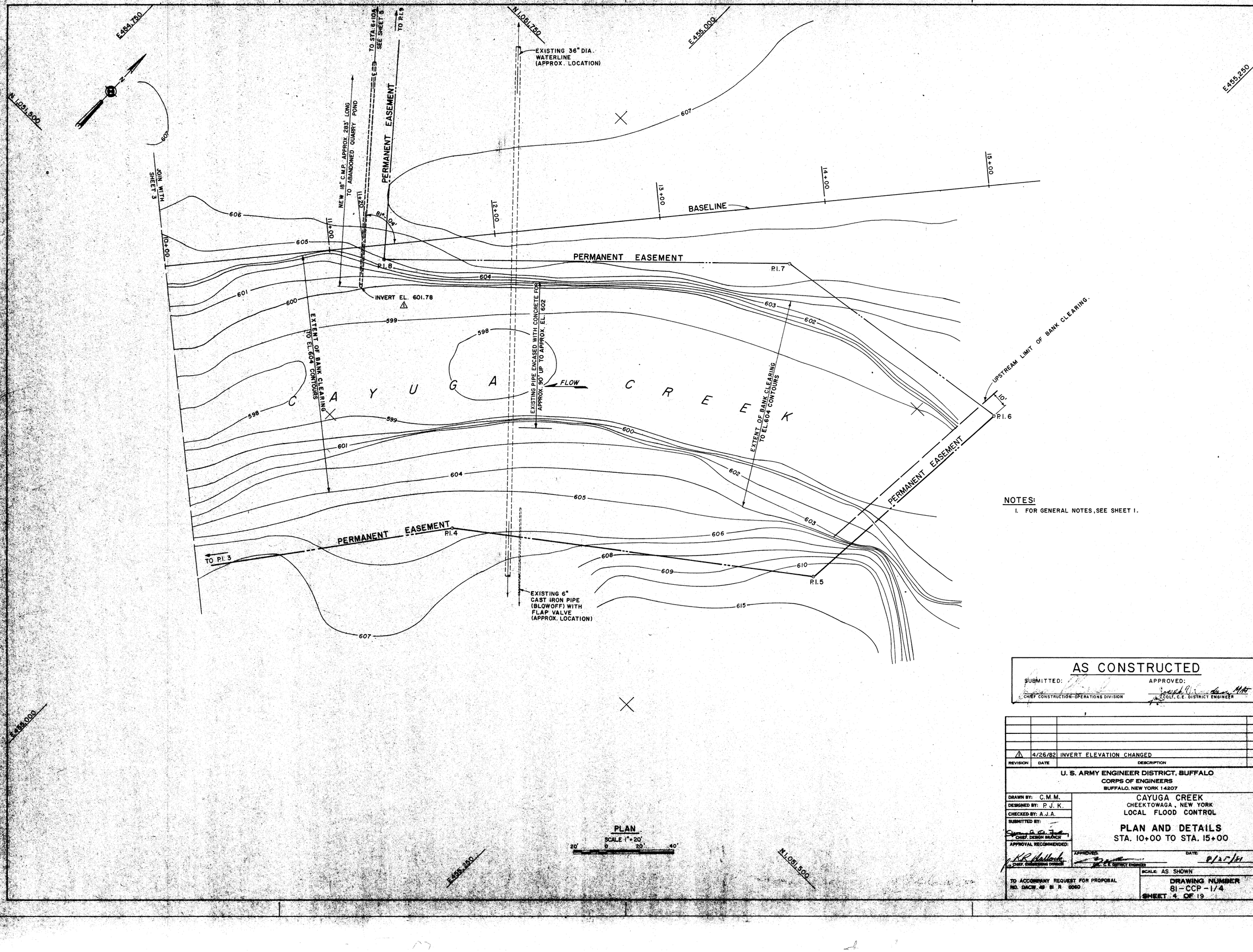
CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL
PLAN AND DETAILS
STA 6+00 TO STA. 10+00
STA. 0+00A TO STA. 2+50A

APPROVED: _____ COL., C.E. DISTRICT ENGINEER
DATE: 6/25/81

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49-81-R-0060

SCALE: AS SHOWN

DRAWING NUMBER
81-CCP-1/3
SHEET 3 OF 19



NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.

PLAN
SCALE 1" = 20'
20' 0 20' 40'

AS CONSTRUCTED

SUBMITTED: _____ CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: _____ COLE, C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY
1	4/26/82	INVERT ELEVATION CHANGED	

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: C.M.M.
DESIGNED BY: P.J.K.
CHECKED BY: A.J.A.
SUBMITTED BY: _____ CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

PLAN AND DETAILS
STA. 10+00 TO STA. 15+00

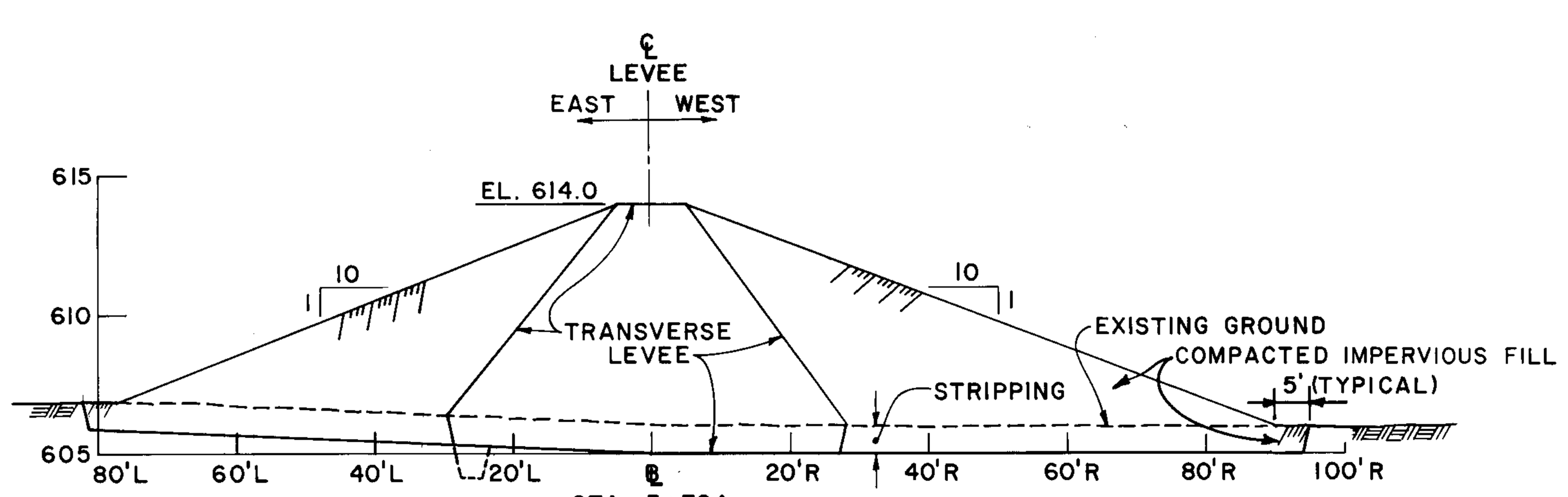
APPROVED: _____ DATE: 8/25/81
COL., C.E. DISTRICT ENGINEER

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW-49-81-R-0060

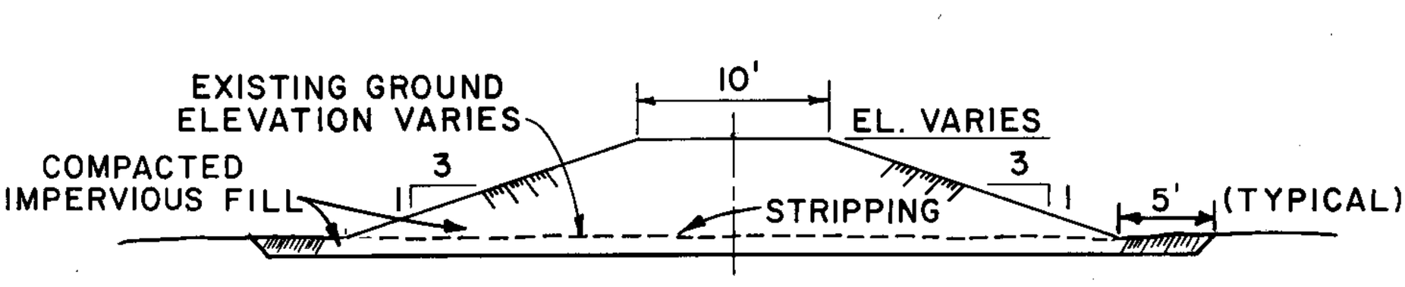
SCALE: AS SHOWN

DRAWING NUMBER 81-CCP-1/4

SHEET 4 OF 19



RAMP CENTERLINE PROFILE



RAMP - TYPICAL CROSS SECTION

SCALE 1"=10'

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.

AS CONSTRUCTED

SUBMITTED: CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: COL., C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY
1	4/26/82	INVERT ELEVATION CHANGED	

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: J.R.A.
DESIGNED BY: P.J.K. & J.K.K.
CHECKED BY: A.J.A.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION

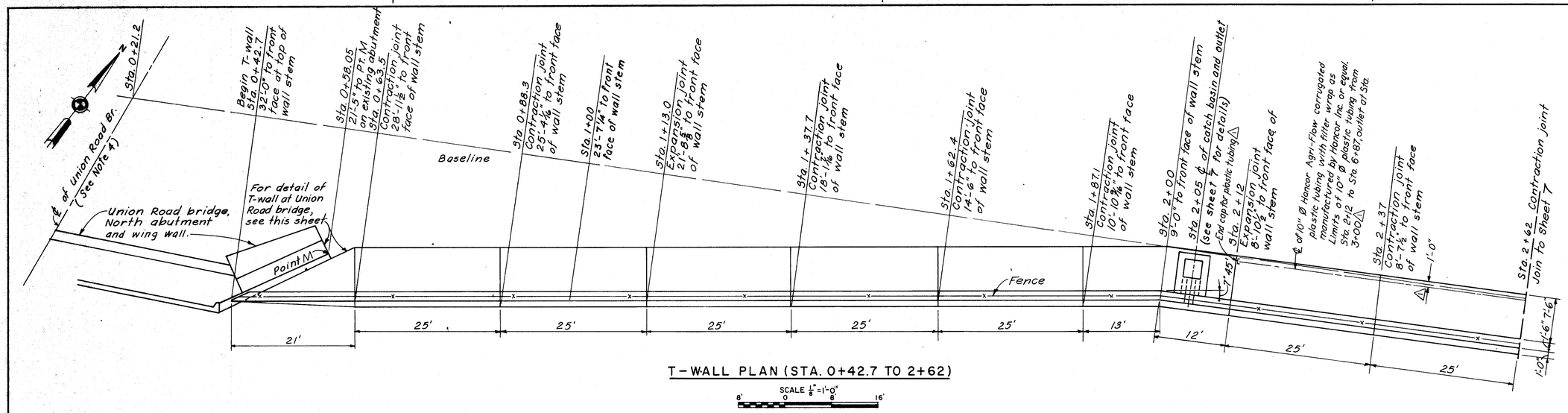
CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

PLAN AND DETAILS
STA. 2+50A TO STA. 9+50A

APPROVED: COL., C.E. DISTRICT ENGINEER
DATE: 8/25/81

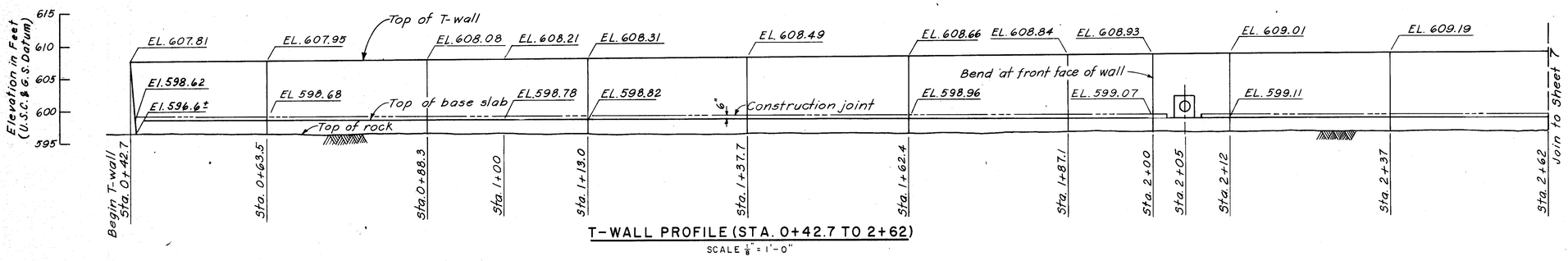
TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

SCALE: AS SHOWN
DRAWING NUMBER 81-CCP-1/5
SHEET 5 OF 19



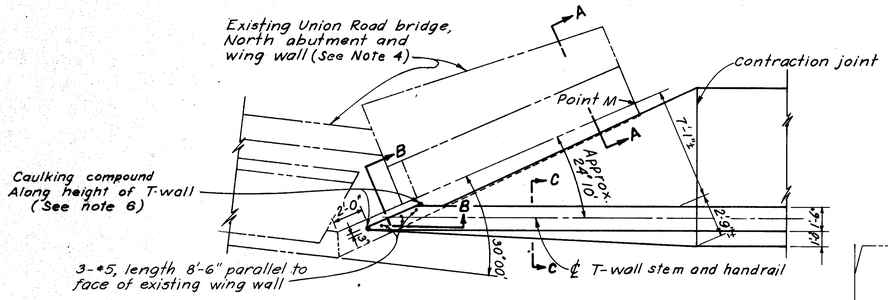
T-WALL PLAN (STA. 0+42.7 TO 2+62)

SCALE ⅛"=1'-0"



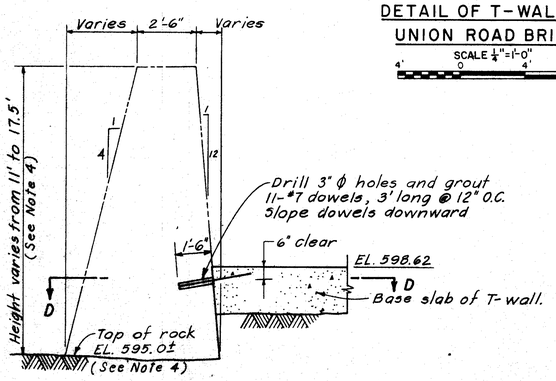
T-WALL PROFILE (STA. 0+42.7 TO 2+62)

SCALE ⅛" = 1'-0"



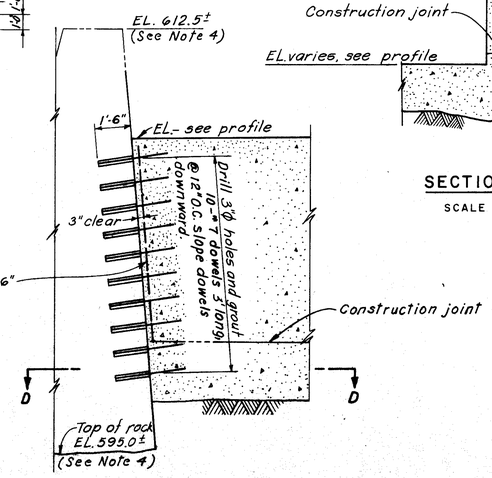
DETAIL OF T-WALL AT UNION ROAD BRIDGE

SCALE ¼"=1'-0"



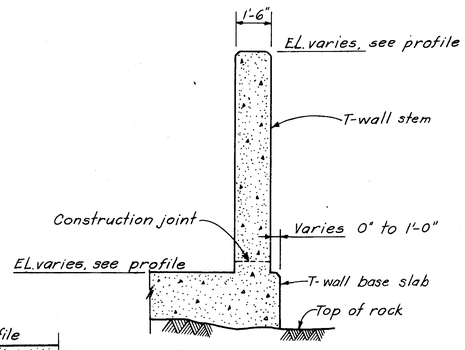
SECTION A-A

SCALE ¼"=1'-0"



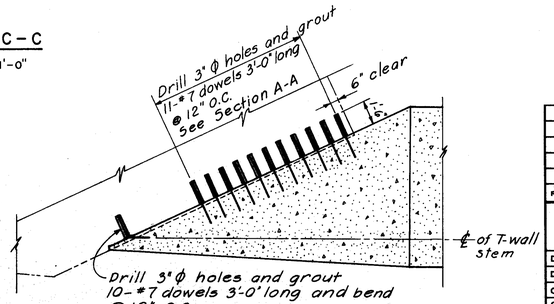
SECTION B-B

SCALE ⅜"=1'-0"



SECTION C-C

SCALE ⅜"=1'-0"



SECTION D-D

SCALE ¼"=1'-0"

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR T-WALL REINFORCEMENT DETAILS, SEE SHEET 8.
3. CHAIN LINK FENCE IS NOT SHOWN ON WALL PROFILE. FOR DETAILS, SEE SHEET 10.
4. DETAILS PERTAINING TO THE UNION ROAD BRIDGE WERE OBTAINED FROM DRAWINGS PROVIDED BY THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION.
5. FOR EXPANSION AND CONTRACTION JOINT DETAILS, SEE SHEET 10.
6. CAULKING COMPOUND TO BE "THOROCALK" AS MANUFACTURED BY STANDARD DRY WALL PRODUCTS OR EQUAL, APPLIED ACCORDING TO MANUFACTURER'S INSTRUCTIONS.

AS CONSTRUCTED

SUBMITTED: CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: COL., C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY
1	7/17/81	Install tee wall subdrainage	VT

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: M. W. H.
DESIGNED BY: J. K. K. & P. J. K.
CHECKED BY: A. J. A.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: ENGINEERING DIVISION
APPROVED: COL., C.E. DISTRICT ENGINEER
DATE: 8/25/81

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

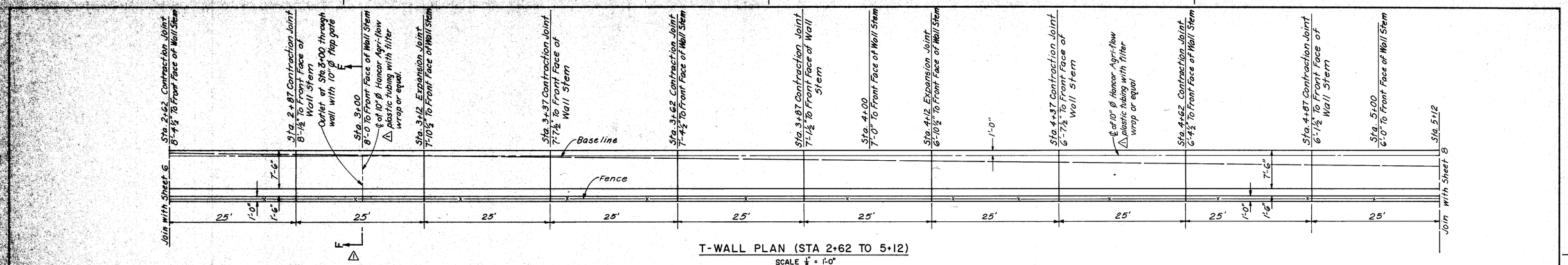
T-WALL PLAN, PROFILE AND DETAILS UNION ROAD BRIDGE TO STA. 2+62

SCALE: AS SHOWN

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

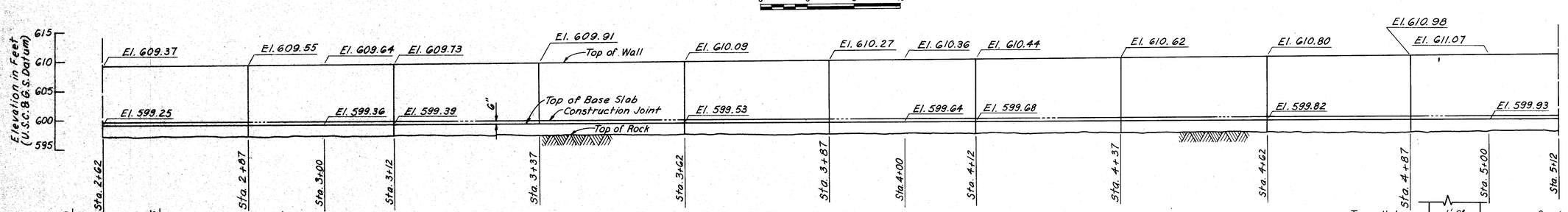
DRAWING NUMBER 81-CCP-1/6

SHEET 6 OF 19



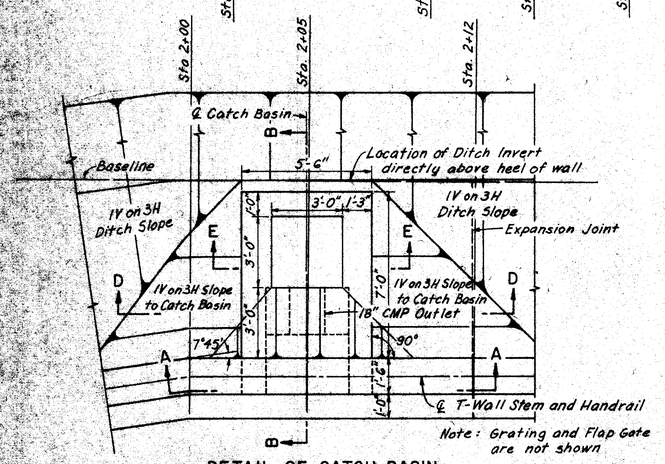
T-WALL PLAN (STA 2+62 TO 5+12)

SCALE 1" = 1'-0"



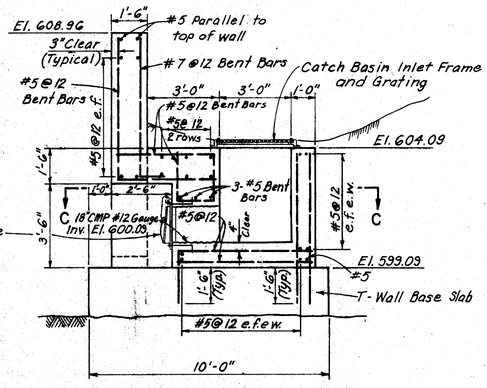
T-WALL PROFILE (STA 2+62 TO 5+12)

SCALE 1" = 1'-0"



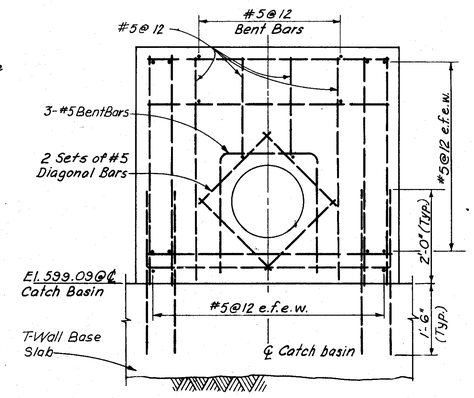
DETAIL OF CATCH BASIN AND 18" OUTLET PIPE @ STA 2+05

SCALE 3/8" = 1'-0"



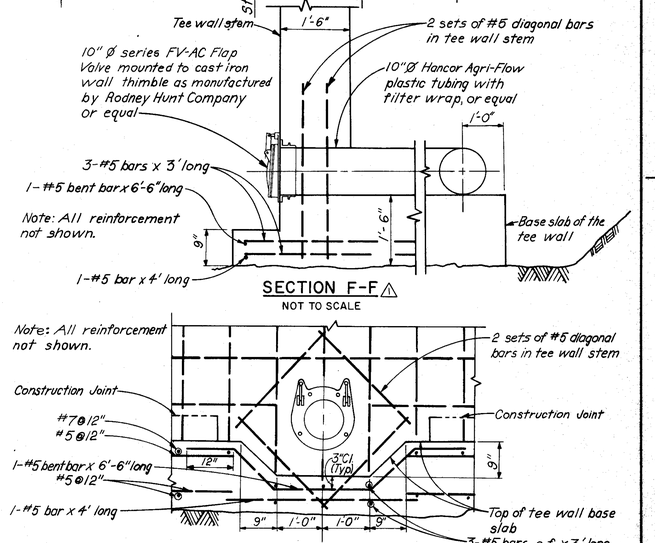
SECTION B-B

SCALE 3/8" = 1'-0"



SECTION D-D

SCALE 3/4" = 1'-0"

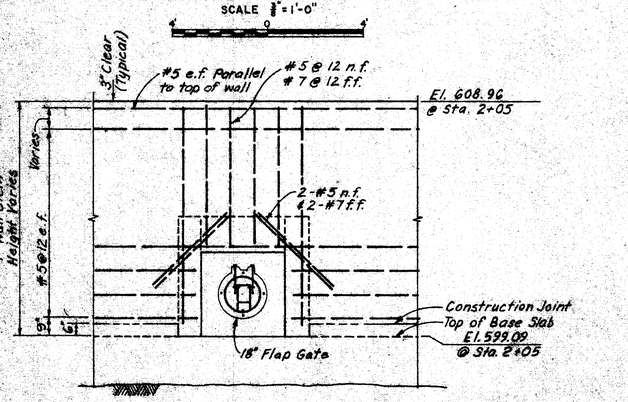


SECTION F-F ⚠

NOT TO SCALE

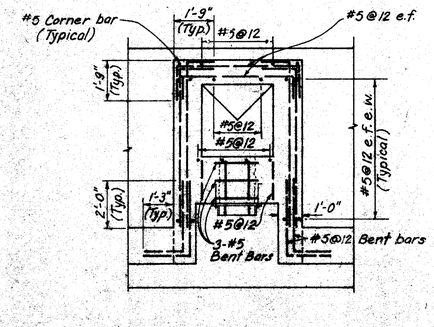
DETAIL AT STA. 3+00 ⚠

SCALE 3/4" = 1'-0"



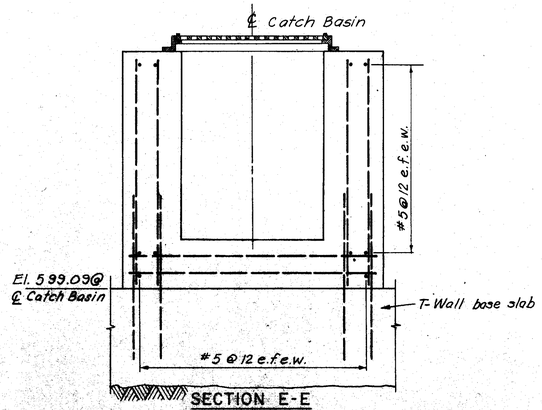
SECTION A-A

SCALE 3/8" = 1'-0"



SECTION C-C

SCALE 3/4" = 1'-0"



SECTION E-E

SCALE 3/4" = 1'-0"

NOTES

1. For General Notes, See Sheet 1.
2. For T-wall reinforcement Details, See Sheet 8
3. Chain link fencing not shown on profile, For Details, See Sheet 10.
4. For Expansion and Contraction Joint Details, See Sheet 10.

AS CONSTRUCTED
SUBMITTED: Chief, Construction-Operations Division
APPROVED: Col., C.E., District Engineer

REVISION	DATE	DESCRIPTION	BY
⚠	7/17/81	Install tee wall subdrainage	JRA

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: J. R. A.
DESIGNED BY: J.K.K. & R.J.K.
CHECKED BY: A.J.A.
SUBMITTED BY: Chief, Design Branch
APPROVAL RECOMMENDED: Chief, Engineering Division

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

T-WALL PLAN, PROFILE AND DETAILS
STA 2+62 TO STA 5+12

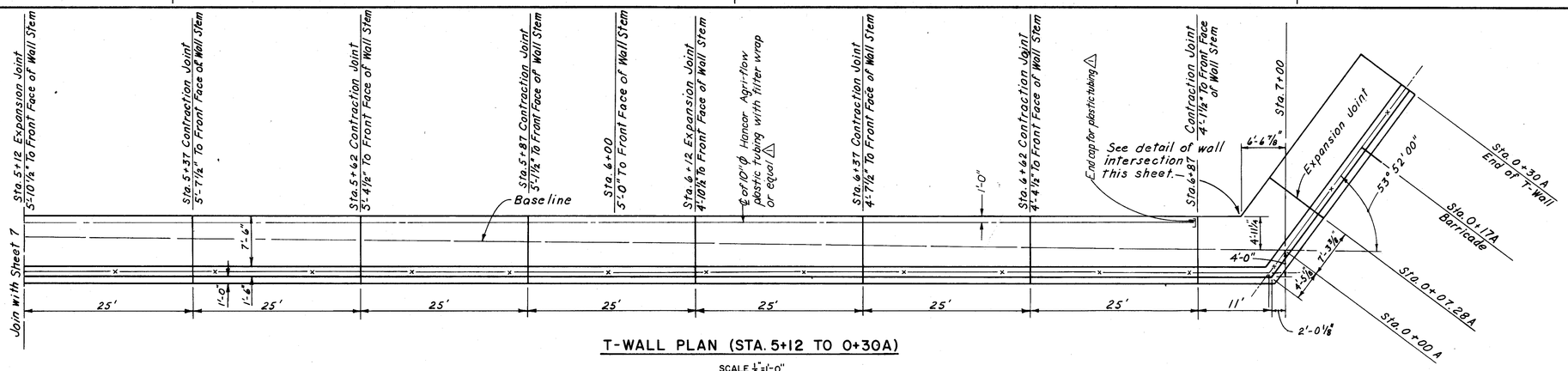
APPROVED: Col., C.E. District Engineer
DATE: 8/25/81

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

SCALE: AS SHOWN

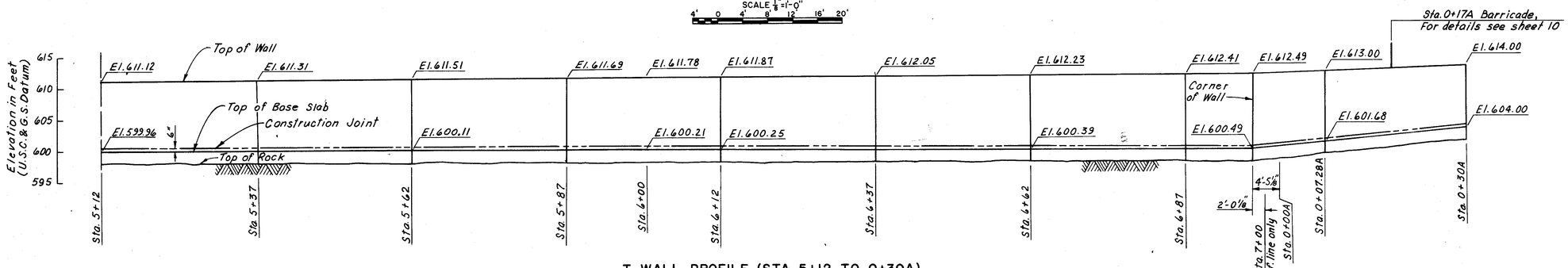
DRAWING NUMBER 81-CCP-1/7

SHEET 7 OF 19



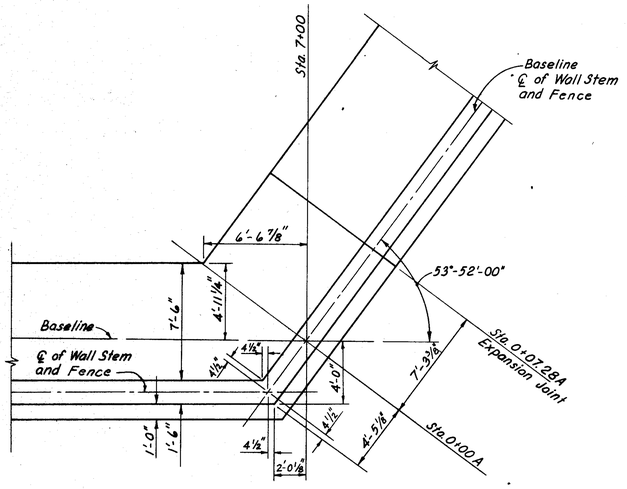
T-WALL PLAN (STA. 5+12 TO 0+30A)

SCALE ⅛"=1'-0"



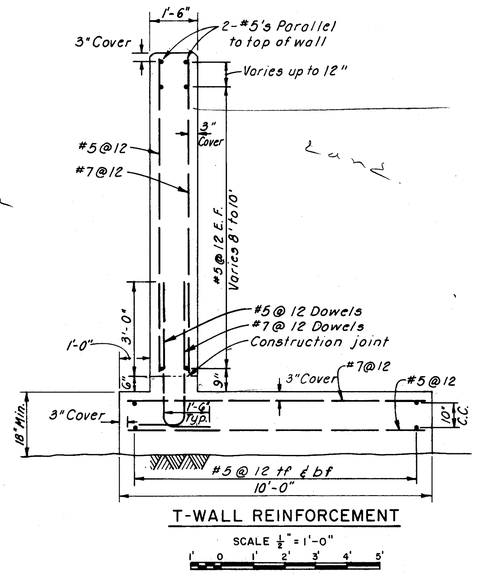
T-WALL PROFILE (STA. 5+12 TO 0+30A)

SCALE ⅛"=1'-0"



DETAIL OF WALL INTERSECTION

SCALE ¼" = 1'-0"



T-WALL REINFORCEMENT

SCALE ½" = 1'-0"

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR T-WALL REINFORCEMENT, SEE THIS SHEET.
3. CHAIN LINK FENCE IS NOT SHOWN ON WALL PROFILE. FOR DETAILS, SEE SHEET 10.
4. FOR EXPANSION AND CONTRACTION JOINT DETAILS, SEE SHEET 10.

AS CONSTRUCTED

SUBMITTED: CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: COL., C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY
△	7/17/81	Install tee wall subdrainage	DGY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: R.F.N.
DESIGNED BY: P.J.K., J.K.K.
CHECKED BY: A.J.A.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

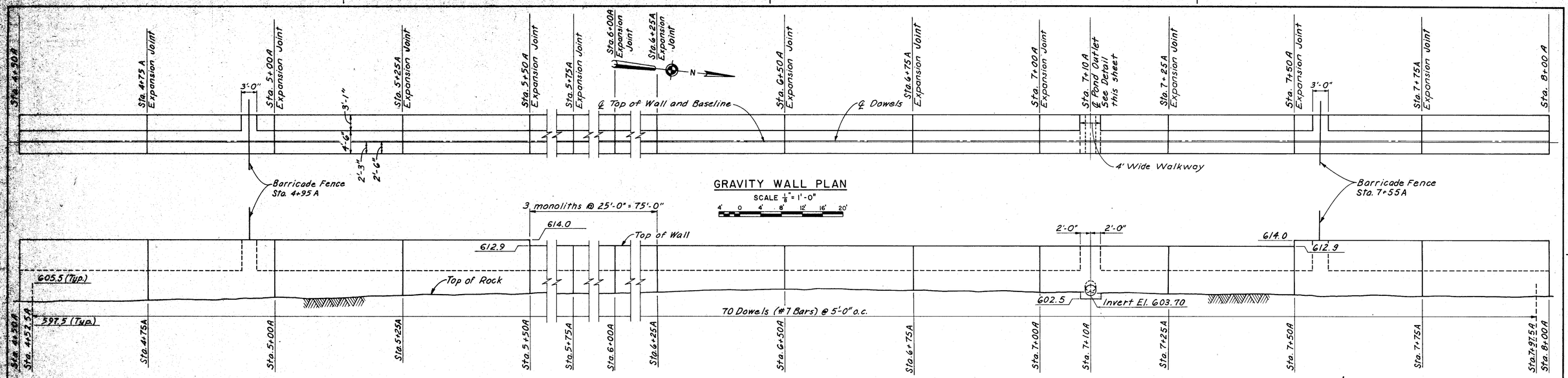
T-WALL PLAN, PROFILE AND DETAILS
STA. 5+12 TO STA. 0+30A

APPROVED: C.E. DISTRICT ENGINEER
DATE: 6/25/81

SCALE: AS SHOWN

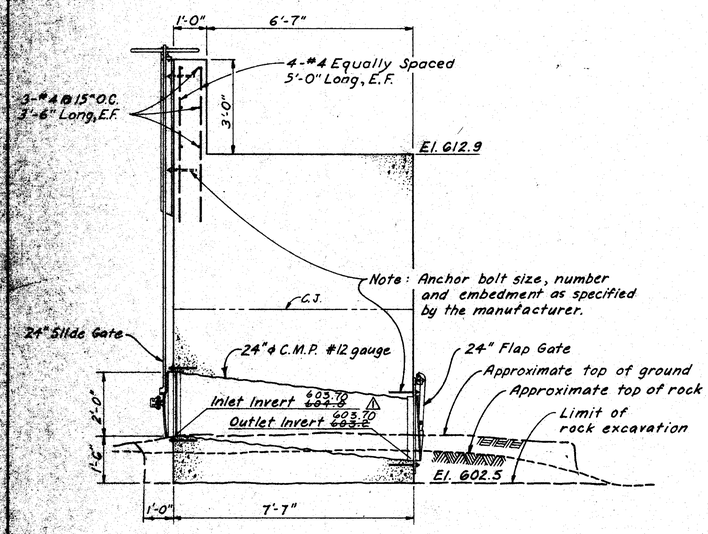
TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0050

DRAWING NUMBER 81-CCP-1/8
SHEET 8 OF 19



GRAVITY WALL PLAN

SCALE 1/8" = 1'-0"

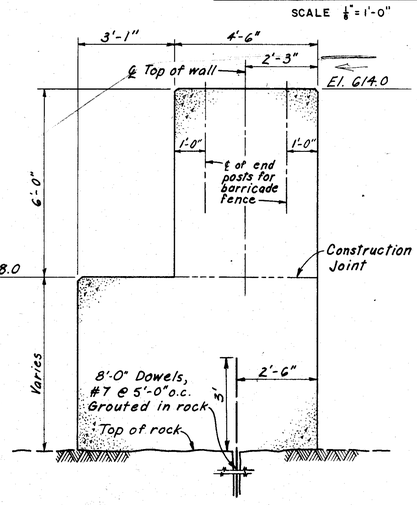


SECTION A-A

SCALE 1/2" = 1'-0"

GRAVITY WALL PROFILE

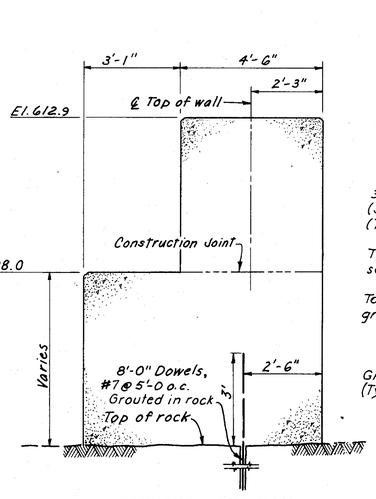
SCALE 1/8" = 1'-0"



TYPICAL SECTION

STA. 4+50A TO 5+50A
STA. 7+50A TO 8+00A

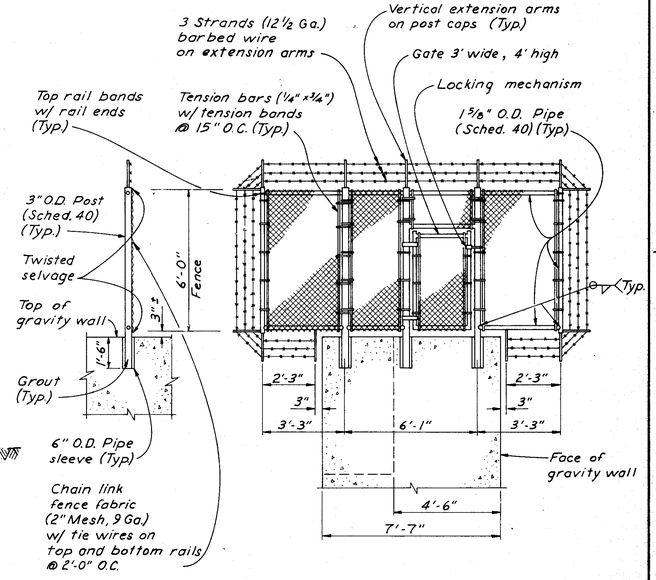
SCALE 1/2" = 1'-0"



TYPICAL SECTION

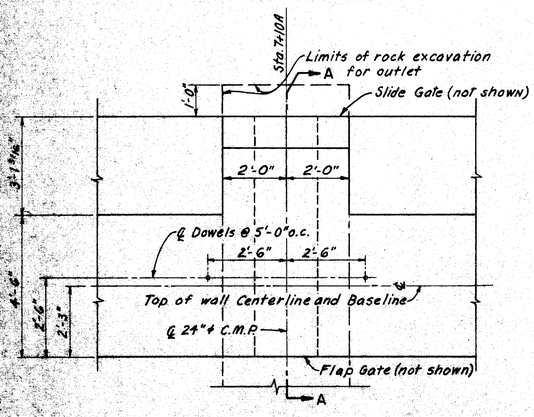
STA. 5+50A TO 7+07A
STA. 7+13A TO 7+50A

SCALE 1/2" = 1'-0"



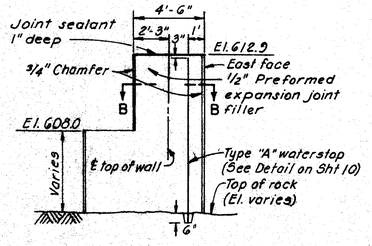
TYPICAL BARRICADE FENCE DETAIL ON GRAVITY WALL

NOT TO SCALE



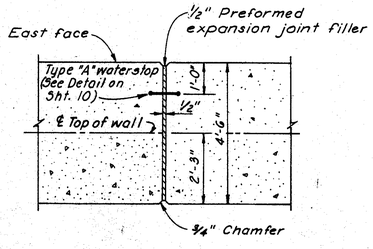
DETAIL OF GRAVITY WALL @ POND OUTLET

SCALE 1/2" = 1'-0"



GRAVITY WALL EXPANSION JOINT

SCALE 1/2" = 1'-0"



SECTION B-B

EXPANSION JOINT

NOT TO SCALE

JOINT DETAILS

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. A POLYESTER RESIN CARTRIDGE SYSTEM, LIKE CELTITE 3512 OR AN APPROVED EQUAL, MAY BE SUBSTITUTED FOR THE NONSHRINK GROUT SPECIFIED IN PAR. 12 OF SECTION 3A OF THE SPECIFICATIONS. THE SIZE OF THE DRILL HOLE FOR THE "7 DOWELS SHALL BE CHANGED TO COMPLY WITH MANUFACTURER'S RECOMMENDATIONS REGARDING THE POLYESTER RESIN PRODUCT.
3. ALL EXPOSED NEW CONCRETE EDGES SHALL BE CHAMFERED 3/4" UNLESS OTHERWISE SHOWN OR SPECIFIED.
4. BARRICADE FENCE TO BE LOCATED AT STA. 4+95A AND AT STA. 7+55A ON GRAVITY WALL.
5. EPOXY GROUT MAY BE SUBSTITUTED FOR THE NONSHRINK GROUT SPECIFIED IN PAR. 12 OF SECTION 3A OF THE SPECIFICATIONS.

AS CONSTRUCTED

SUBMITTED: CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: COL. C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY
1	4/26/82	INVERT ELEVATION CHANGED.	

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: J. R. A.
DESIGNED BY: J.K.K. & P.J.K.
CHECKED BY: A.J.A.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

GRAVITY WALL PLAN
PROFILE AND DETAILS

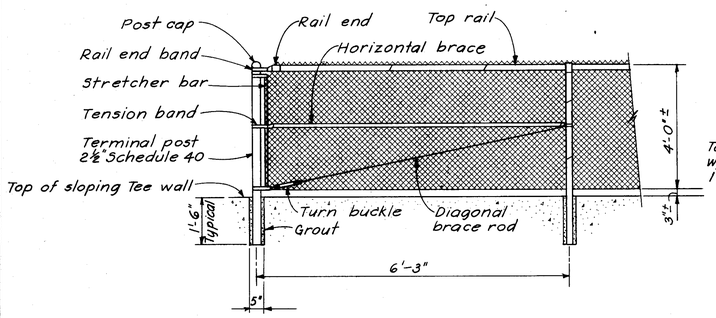
APPROVED: COL. C.E. DISTRICT ENGINEER
DATE: 4/25/81

SCALE: AS SHOWN

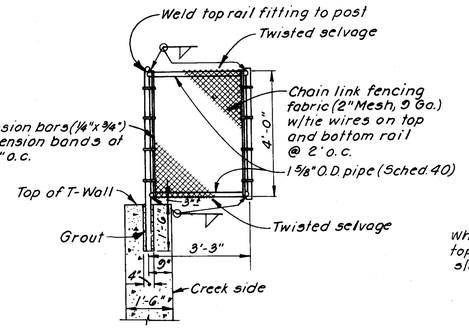
TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

DRAWING NUMBER 81-CCP-1/9

SHEET 9 OF 19



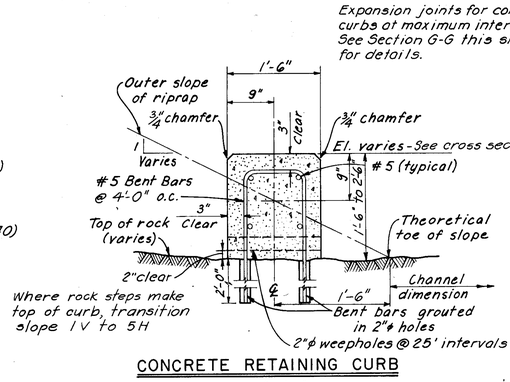
TERMINAL SECTION



BARRICADE ON T-WALL

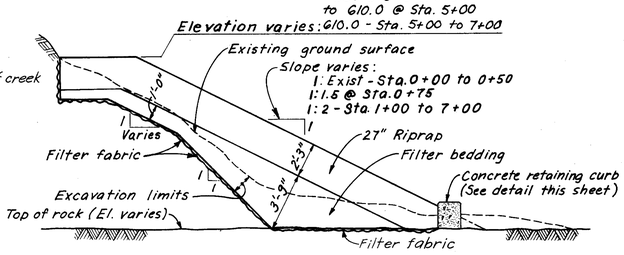
(STA. 0+17A)

NOT TO SCALE

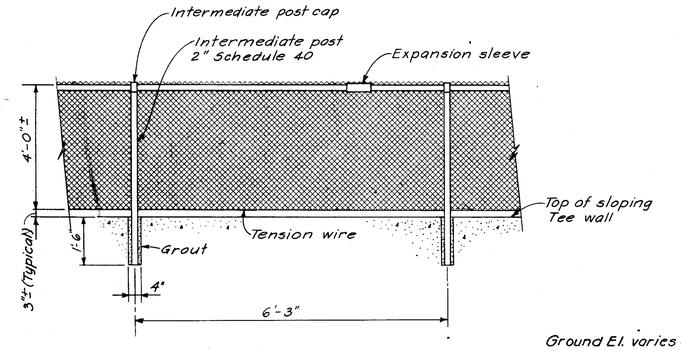


CONCRETE RETAINING CURB

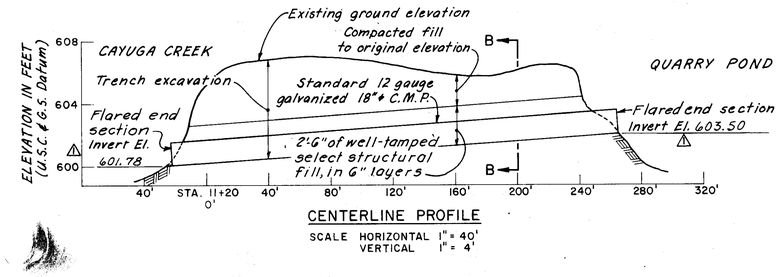
SCALE 1"= 1'-0"



VARIOUS LOCATIONS
BETWEEN STA. 0+00 AND 7+00
(SEE PLAN AND CROSS SECTIONS)

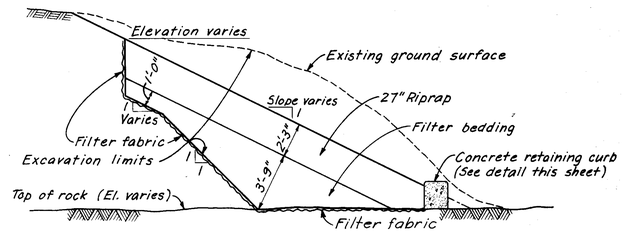


INTERMEDIATE SECTION

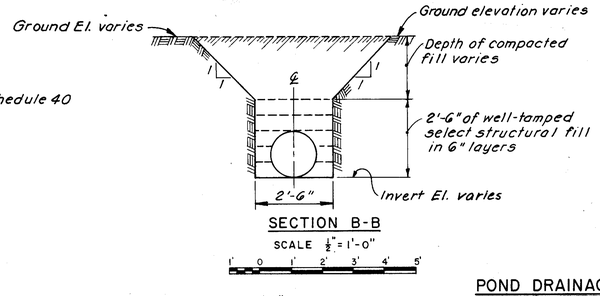


CENTERLINE PROFILE

SCALE HORIZONTAL 1"= 40'
VERTICAL 1"= 4'

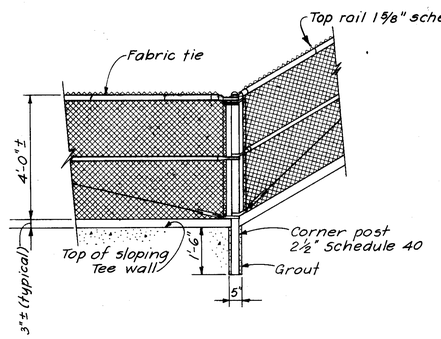


VARIOUS LOCATIONS
BETWEEN STA. 0+00 AND 7+00
(SEE PLAN AND CROSS SECTIONS)



SECTION B-B

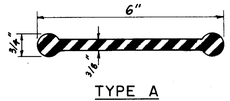
SCALE ½"= 1'-0"



CORNER SECTION

FENCE

Not to scale



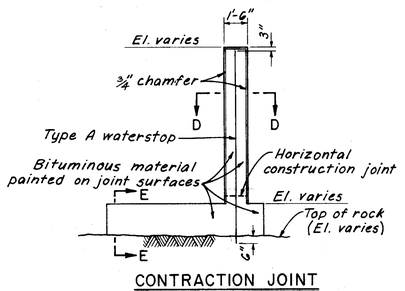
TYPE A

(VINYLEX CAT. NO. D6-38 OR EQUAL)

PVC WATERSTOP

SCALE 6"= 1'-0"

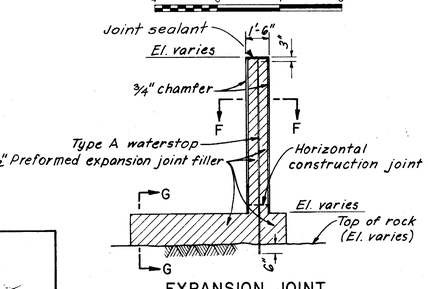
3" 0 3" 6"



CONTRACTION JOINT

SCALE ¼"= 1'-0"

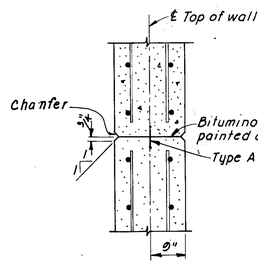
4' 0 4' 8'



EXPANSION JOINT

SCALE ¼"= 1'-0"

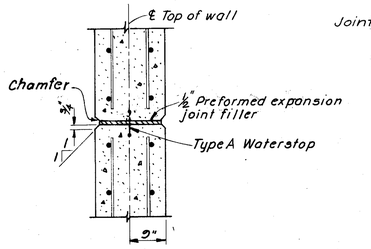
POND DRAINAGE CULVERT



SECTION D-D

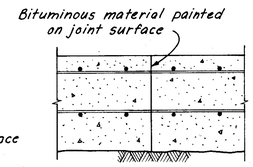
SCALE ¾"= 1'-0"

1' 0 1' 2' 3'



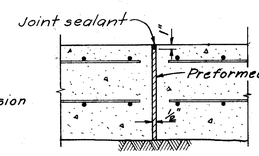
SECTION F-F

SCALE ¾"= 1'-0"



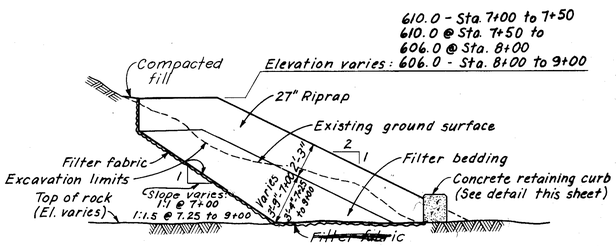
SECTION E-E

SCALE ¾"= 1'-0"



SECTION G-G

SCALE ¾"= 1'-0"



VARIOUS LOCATIONS
BETWEEN STA. 7+00 AND 9+00
(SEE PLAN AND CROSS SECTIONS)

LEFT BANK SLOPE PROTECTION

SCALE ¼"= 1'-0"

NOTES:

1. For General Notes, see Sheet 1.
2. For locations of handrails, contraction joints, and expansion joints, see Sheets 6 to 8.
3. For location of pond drainage culvert, see Sheets 1, 4 and 5.
4. Use "Gardox" liquid neoprene joint sealant as manufactured by W.R. Meadows Inc. or equal.

AS CONSTRUCTED

SUBMITTED: _____ CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: _____ COL., C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY
1	4/26/82	INVERT ELEVATION CHANGED.	

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: J.R.A.
DESIGNED BY: J.K.K. & P.J.K.
CHECKED BY: A.J.A.
SUBMITTED: _____ CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION
APPROVED: _____ DATE: 8/25/82 CDR., C.E. DISTRICT ENGINEER

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

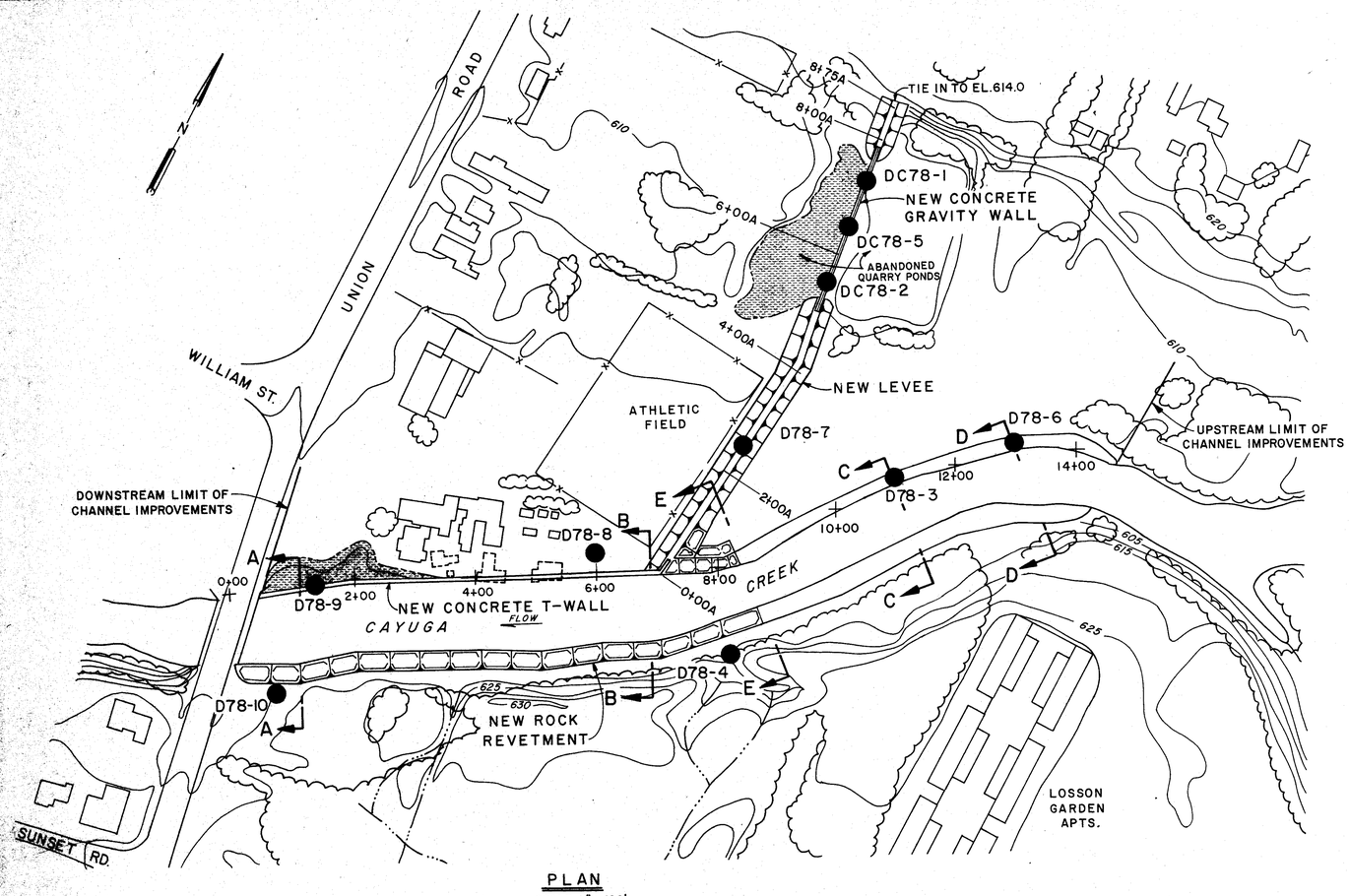
MISCELLANEOUS DETAILS

SCALE: AS SHOWN

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

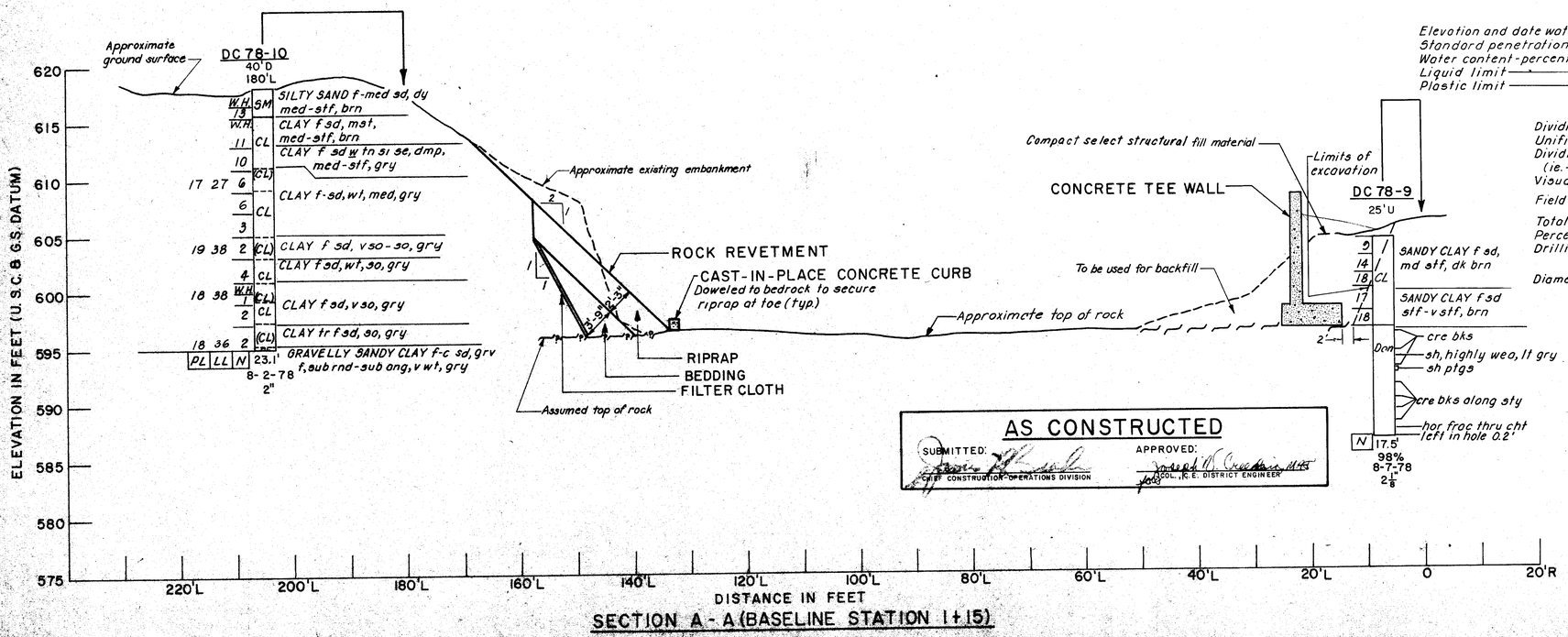
DRAWING NUMBER 81-CCP-1/10

SHEET 10 OF 19



PLAN

SCALE 1" = 100'



SECTION A - A (BASELINE STATION 1+15)

AS CONSTRUCTED

SUBMITTED: CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: COL., C.E. DISTRICT ENGINEER

ABBREVIATIONS

ang - angular
ar - argillaceous
bdd - bed
bbd - broken by drilling
blk - black
brn - brown
bkn - broken
bks - breaks
c - coarse
calc - calcareous
cre - core
crs - coarse
cht - chert
cl(y) - clay(ey)
dk - dark
dmp - damp
den - dense
dy - dry
Don - ONONDAGA LIMESTONE
f - fine
fos - fossil
frac - fracture
frag - fragmented
gr - grain
grv - gravel
grl - granular
gry - gray
ha - high angle
hd - hard
hor - horizontal
jt - joint
la - low angle
lit - little
ls - limestone
lt - light
lo - loose
L.C. - lost core
med - medium
mst - moist
mtl - material
nod - nodules
num - numerous
op - open
org - organic
pl - plastic
ptg(s) - parting(s)
rnd - round
rts - roots
rk - rock
se - seams
sd(y) - sand(y)
sh(y) - shale(y)
si(y) - silt(y)
slcs - siliceous
so - soft
som - some
st - stained
stf - stiff
sty - stylolitic
sub - subangular
tht - throughout
tr - trace
thk - thick
tn - thin
v - very
vert - vertical
w - water
w - with
wea - weathered
w.h. - weight of hammer
wt - wet

TERMS FOR RELATIVE DENSITY AND CONSISTENCY

RELATIVE DENSITY OF SAND		STRENGTH OF CLAY	
PENETRATION RESISTANCE, N (BLOWS/FT.)	RELATIVE DENSITY	PENETRATION RESISTANCE, N (BLOWS/FT.)	CONSISTENCY
0 - 4	VERY LOOSE	<2	VERY SOFT
4 - 10	LOOSE	2 - 4	SOFT
10 - 30	MEDIUM DENSE	4 - 8	MEDIUM
30 - 50	DENSE	8 - 15	STIFF
>50	VERY DENSE	15 - 30	VERY STIFF
		>30	HARD

N - STANDARD PENETRATION TEST

SAMPLER: 2" O.D. (1 3/8" I.D.) SPLIT SPOON

HAMMER: 140#, FALL: 30"

FROM: TERZAGHI AND PECK, 1948.

NOTES:

1. FOR GEOLOGIC SECTIONS AND PROFILES, SEE ALSO SHEETS 12 AND 13.

UNIFIED SOIL CLASSIFICATION SYSTEM

- GW - WELL GRADED GRAVELS, GRAVEL SAND MIXTURES, LITTLE OR NO FINES
- GP - POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OR NO FINES.
- GM - SILTY GRAVELS, GRAVEL SAND SILT MIXTURES.
- GC - CLAYEY GRAVELS, GRAVEL SAND CLAY MIXTURES.
- SW - WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES.
- SP - POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES.
- SM - SILTY SANDS, SAND SILT MIXTURE
- SC - CLAYEY SANDS, SAND CLAY MIXTURES.
- ML - INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
- CL - INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS.
- OL - ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
- MH - INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS.
- CH - INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
- OH - ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS.
- PT - PEAT AND OTHER HIGHLY ORGANIC SOILS.

CLASSIFICATION FROM ACTUAL LABORATORY TESTS WHERE LL AND PL ARE SHOWN.

DUAL CLASSIFICATION, WHERE USED IS IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

FOR DETAILS ON THE UNIFIED SOIL CLASSIFICATION SYSTEM, SEE WATERWAYS EXPERIMENT STATION TECHNICAL MEMORANDUM NO. 3-357 DATED MARCH 1953 AND REVISED IN 1960.

Don - ONONDAGA LIMESTONE, THIN TO THICK BEDDED, DOLOMITIC, CHERTY WITH MASSIVE ZONES, LIGHT TO BLUISH GRAY CHERT, NUMEROUS SHALE PARTINGS AND STYLOLITES, GENERALLY MEDIUM TO LIGHT GRAY, MODERATELY HARD, VERY FINE CRYSTALLINE.

LEGEND FOR BORINGS

Boring number and designation — DC 78-12

- Drive Sample
- Rock core
- Year of boring
- Boring number
- Range (Upstream or downstream of section) — 15'u
- Offset (Left or Right of baseline) — 65'R

PL | LL | w | N

- Elevation and date water level observed — 11-18-78
- Standard penetration test (Blows/ft.) — 12
- Water content-percent — 44.1
- Liquid limit — 52
- Plastic limit — 23

CL / SM / CH — Material Classification from visual and laboratory description as appropriate

CH - CLAY tr f sd, so-med, sot, brn

Dividing line between classifications

(CL) — Unified Soil Classification determined in laboratory

Dividing line between methods of classification (ie.-based on testing or visual)

CL / fc — Visual classification / Field classification

CL - SANDY CLAY hd, dmp, brn

- Total depth of exploration — 63.7'
- Percent core recovered in bedrock — 77%
- Drilling completion date — 9-30-78
- Diameter of sample — 3" SOILS; 2 1/8" BEDROCK

REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: J.R.A.
DESIGNED BY: J.A.G., J.K.K.
CHECKED BY: T.A.W.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

BORING LOCATIONS AND GEOLOGIC SECTION BASELINE STATION 1+15

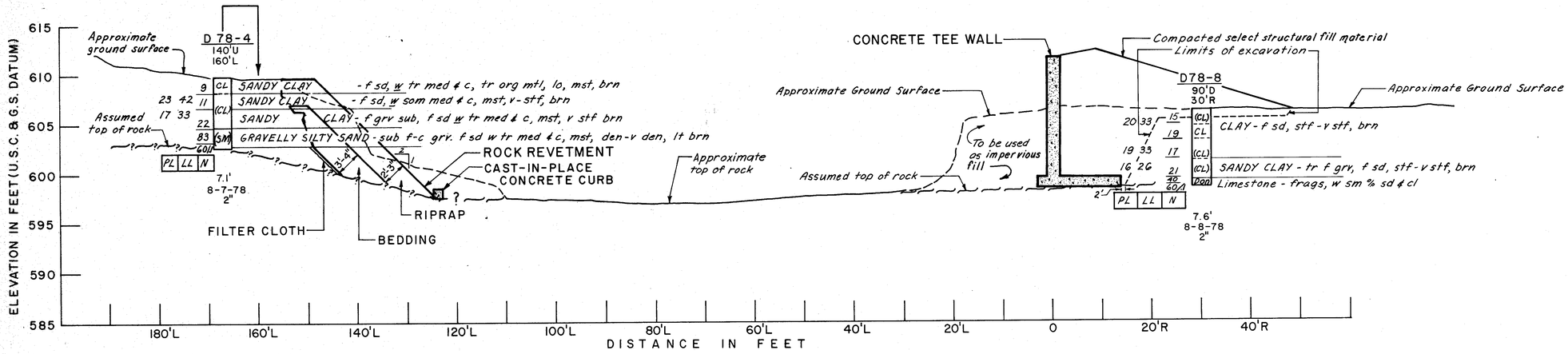
APPROVED: CDR., C. E. DISTRICT ENGINEER
DATE: 3/30/81

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

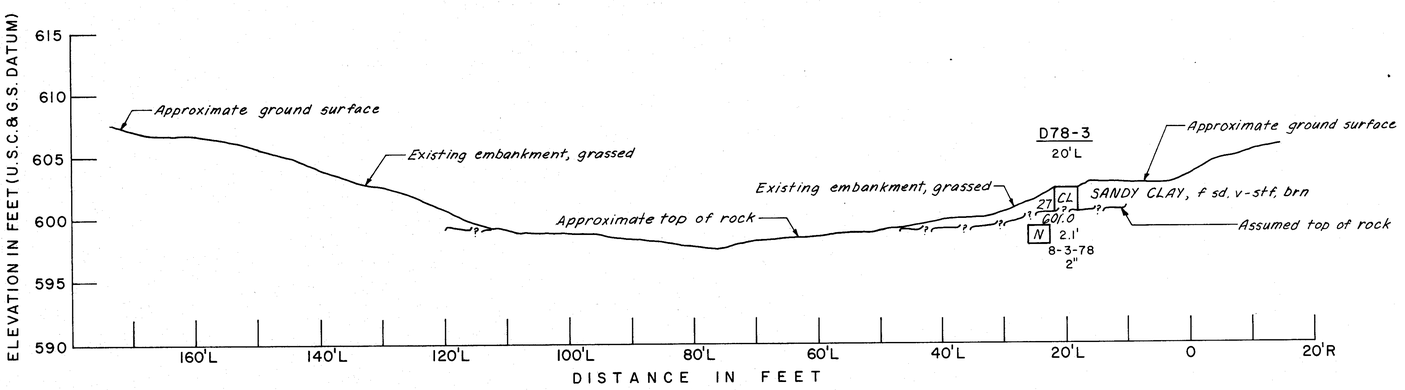
SCALE: AS SHOWN

DRAWING NUMBER 81-CCP-1/11

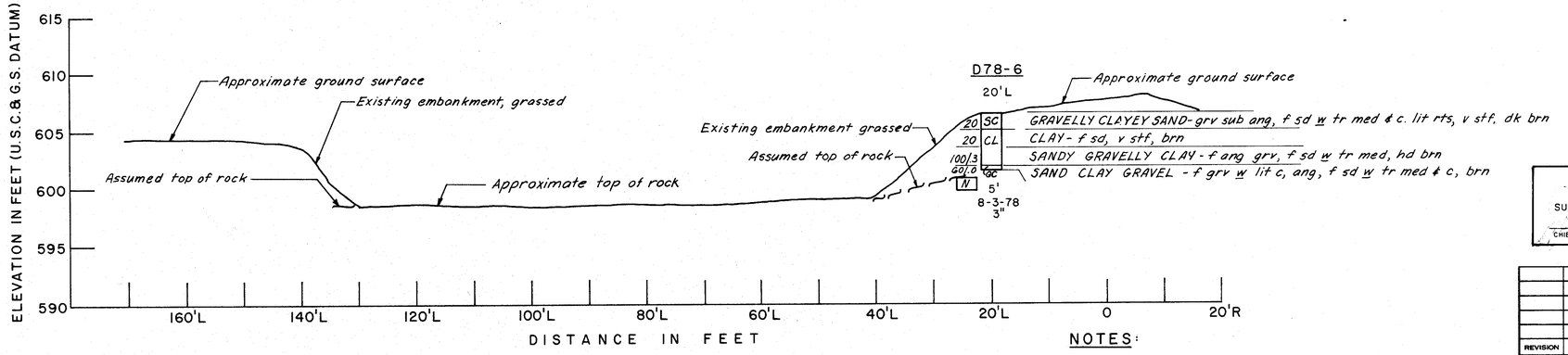
SHEET 11 OF 19



SECTION B-B (BASELINE STATION 7+00)



SECTION C-C (BASELINE STATION 10+10B)



SECTION D-D (BASELINE STATION 13+15B)

NOTES:

1. For the general location of these sections, see Sheet 11 of 18.
2. For table of terms for relative density and consistency, list of abbreviations, and for additional legend of explorations, see Sheet 11 of 18.

AS CONSTRUCTED

SUBMITTED: CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: COL., C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: J. R. A.
DESIGNED BY: J. A. G., J. K. K.
CHECKED BY: T. A. W.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

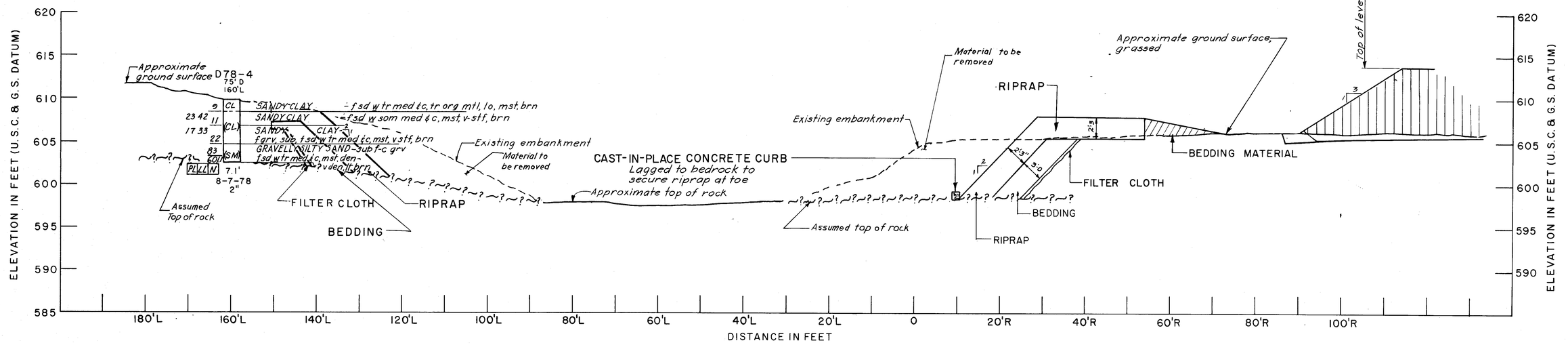
GEOLOGIC SECTIONS
BASELINE STATIONS
7+00, 10+10 AND 13+15

APPROVED: COL., C.E. DISTRICT ENGINEER
DATE: 4/25/81

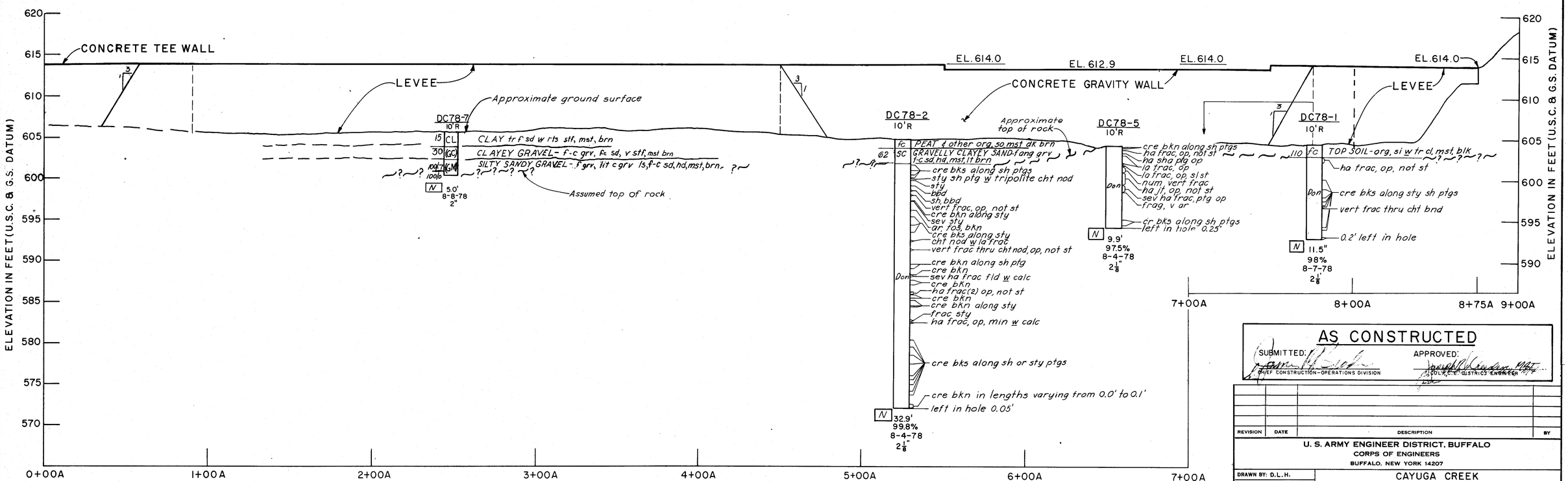
SCALE: AS SHOWN

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

DRAWING NUMBER
81-CCP-1/12
SHEET 12 OF 19



SECTION E-E (BASELINE STATION 8+40B)



PROFILE ALONG ℄ OF LEVEE

NOTES:

1. For the general location of these sections, profiles, and borings, see Sheet 11 of 18.
2. For table of terms for relative density and consistency, list of abbreviations, and for additional legend of explorations, see Sheet 11 of 18.

AS CONSTRUCTED

SUBMITTED: _____ CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: _____ COL., C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: D.L.H.
DESIGNED BY: J.A.G., J.K.K.
CHECKED BY: T.A.W.
SUBMITTED BY: _____ CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

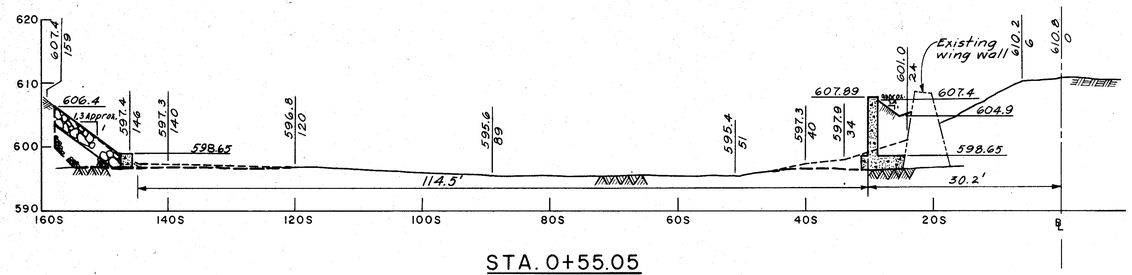
GEOLOGIC SECTION
BASELINE STATION 8+25 AND
GEOLOGIC PROFILE

APPROVED: _____ COL., C.E. DISTRICT ENGINEER
DATE: 5/12/81

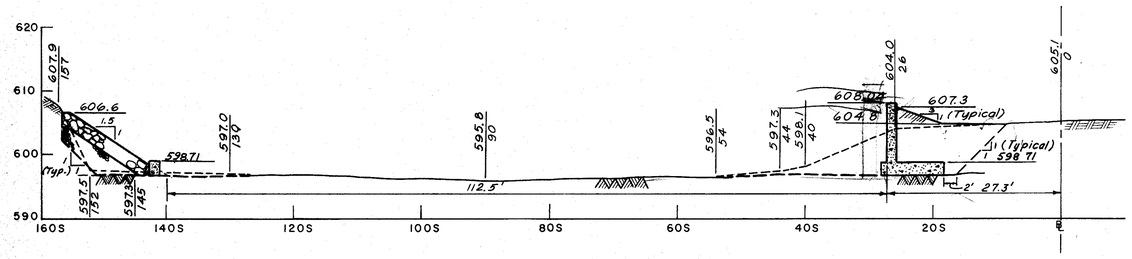
SCALE: AS SHOWN

TO ACCOMPANY REQUEST FOR PROPOSAL
NO. DACW 49 81 R 0060

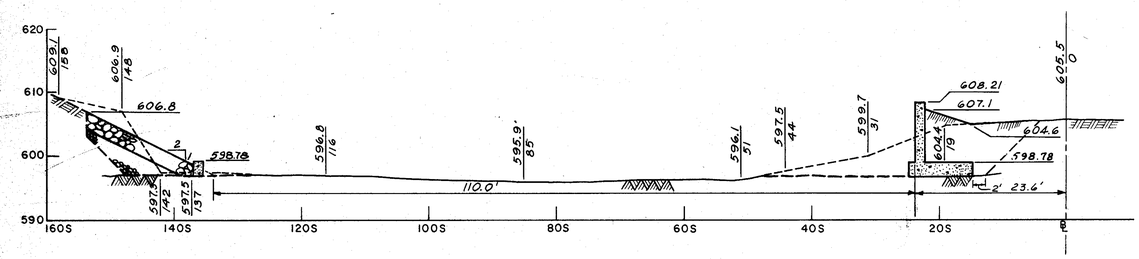
DRAWING NUMBER
81 - CCP - 1/13
SHEET 13 OF 19



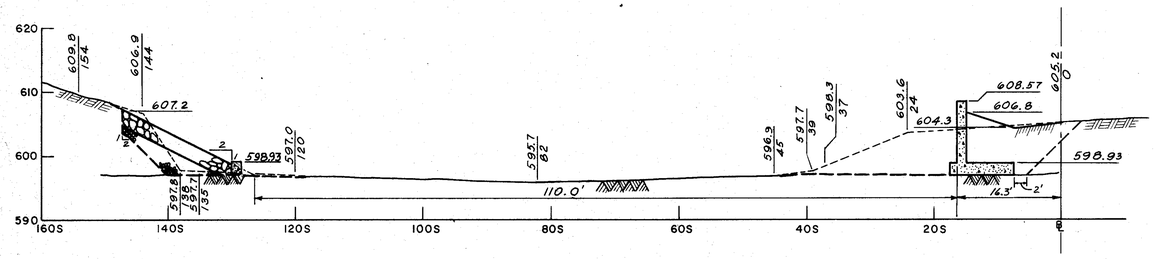
STA. 0+55.05



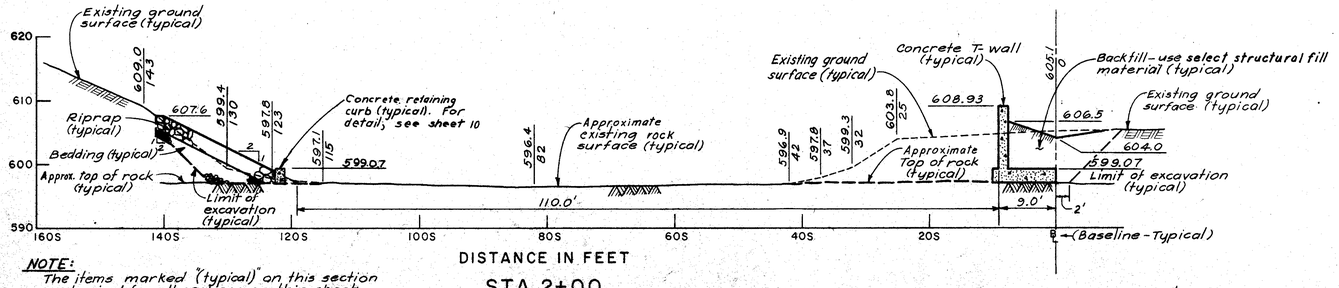
STA. 0+75



STA. 1+00



STA. 1+50

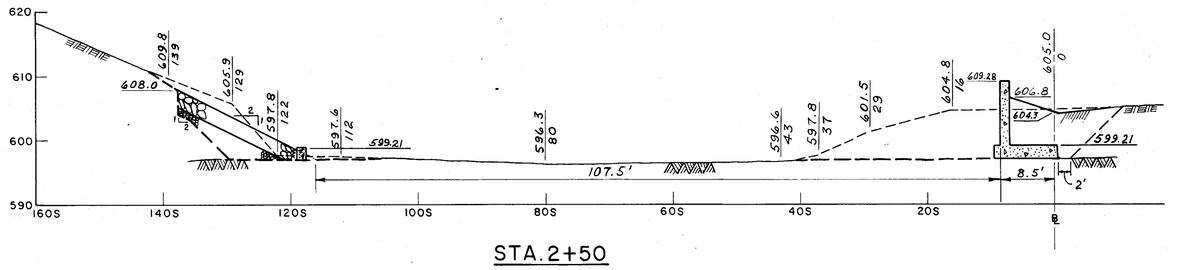


DISTANCE IN FEET

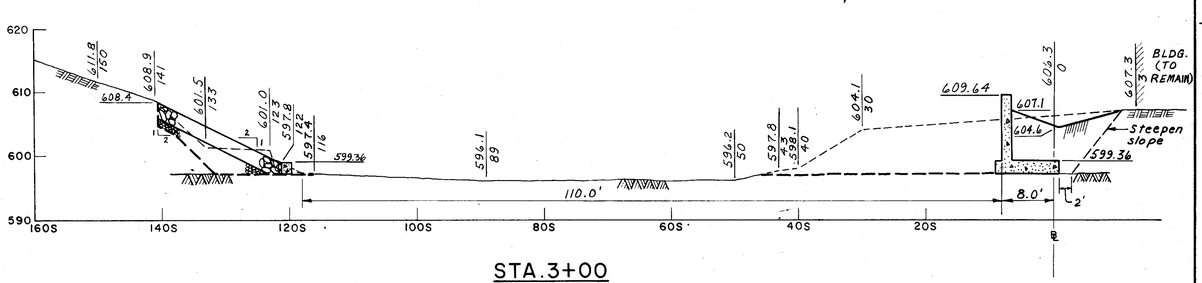
STA. 2+00

NOTE: The items marked "(typical)" on this section are typical for all sections on this sheet. For typical slopes on this sheet, see section at Sta. 0+75.

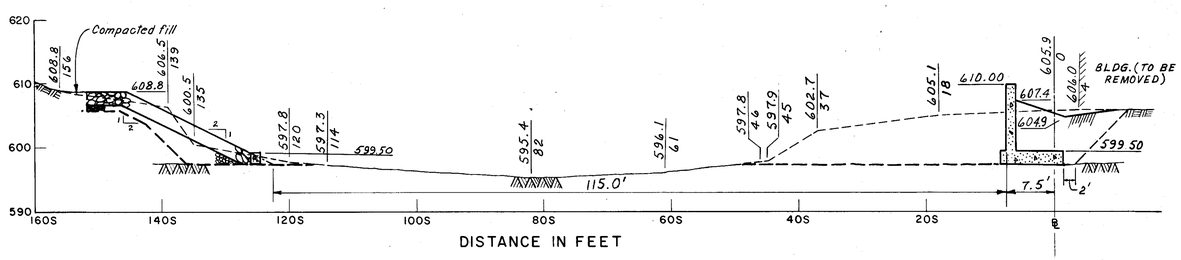
ELEVATION IN FEET (U.S.C.& G.S. DATUM)



STA. 2+50



STA. 3+00



DISTANCE IN FEET

STA. 3+50

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. CROSS SECTIONS ARE BASED ON SURVEYS TAKEN JANUARY–FEBRUARY 1977 AND APRIL 1978. FIELD NOTES ARE FILED UNDER CAYUGA–13 AND CAYUGA–14 IN THE BUFFALO DISTRICT OFFICE.
3. ALL CROSS–SECTIONS ARE DRAWN FACING DOWNSTREAM.
4. 603.8 / 25 FIGURE ON LEFT SIDE OF LINE IS THE EXISTING GROUND SURFACE ELEVATION. FIGURE ON THE RIGHT SIDE OF LINE IS THE OFFSET FROM THE BASELINE. ELEVATIONS WERE OBTAINED ON 90° OFFSETS TO THE BASELINE.
5. 60S THE "S" INDICATES THE SOUTHERLY DIRECTION OF THE OFFSET DISTANCE.
6. FOR ADDITIONAL DETAILS OF LEFT BANK EXCAVATION AND SLOPE PROTECTION, SEE SHEET 10.

AS CONSTRUCTED

SUBMITTED: _____ CHIEF CONSTRUCTION–OPERATIONS DIVISION

APPROVED: _____ COL., C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: M.W.H., R.F.N.
DESIGNED BY: P.J.K., J.K.K.
CHECKED BY: A.J.A.
SUBMITTED BY: _____ CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

CROSS SECTIONS
STA. 0+55.05 TO STA. 3+50

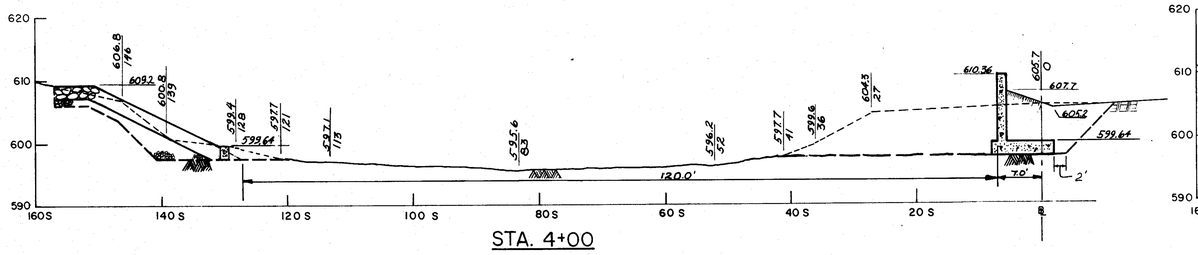
APPROVED: _____ COL., C.E. DISTRICT ENGINEER
DATE:

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

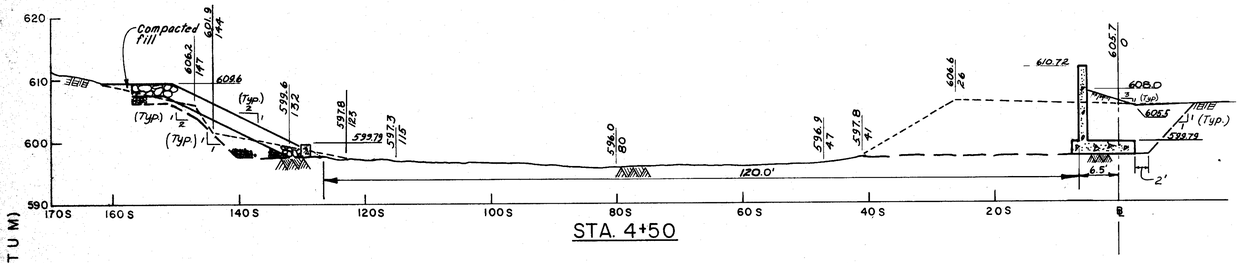
SCALE: AS SHOWN

DRAWING NUMBER 81–CCP–1/14

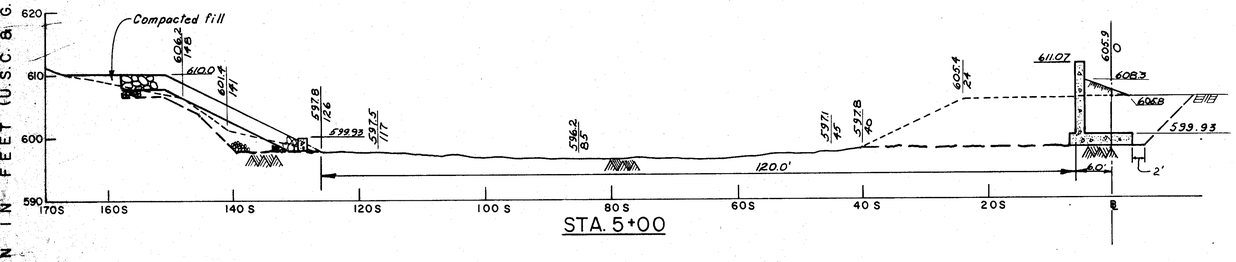
SHEET 14 OF 19



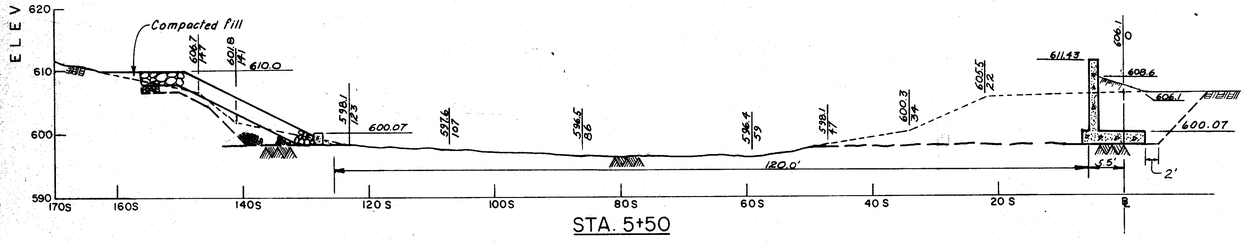
STA. 4+00



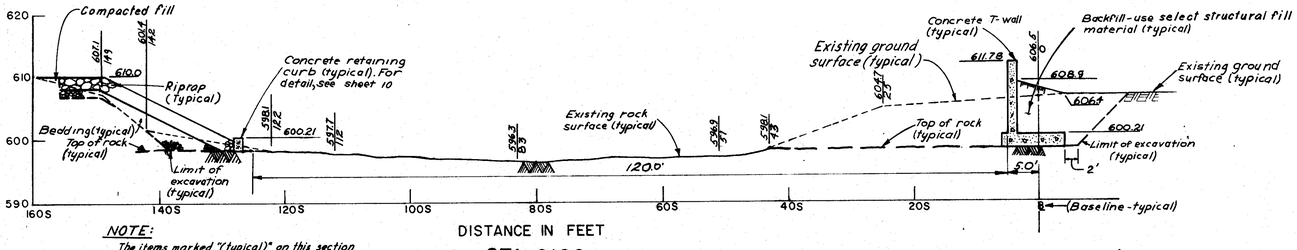
STA. 4+50



STA. 5+00



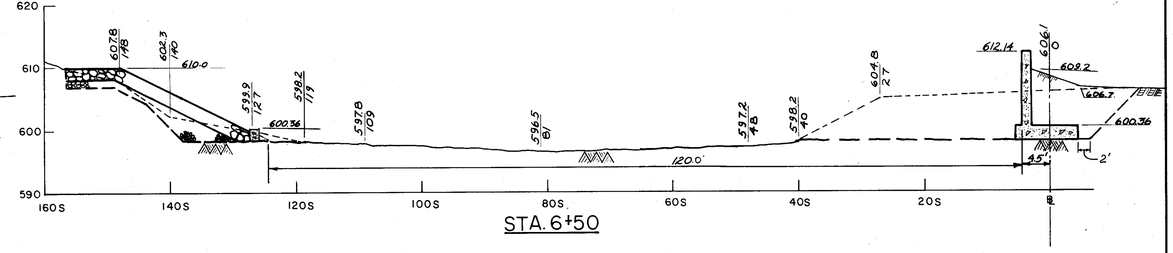
STA. 5+50



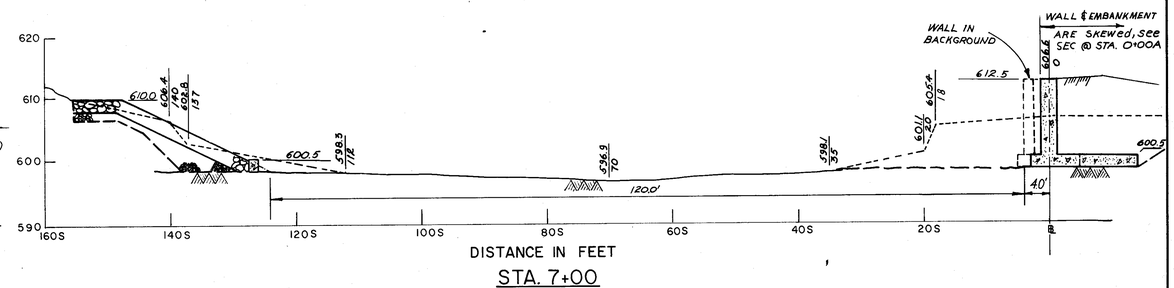
DISTANCE IN FEET

STA. 6+00

NOTE:
The items marked "(typical)" on this section are typical for all sections on this sheet. For typical slopes on this sheet, see section of Sta. 4+50.



STA. 6+50



DISTANCE IN FEET

STA. 7+00

NOTES:

1. NOTES 1–5 ON SHEET 14 APPLY TO THIS SHEET.

ELEVATION IN FEET (U.S.C. & G.S. DATUM)

AS CONSTRUCTED

SUBMITTED: _____ CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: _____ COL., C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: D.L.H.
DESIGNED BY: P.J.K., J.K.K.
CHECKED BY: A.J.A.
SUBMITTED BY: _____ CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION
APPROVED: _____ COL., C.E. DISTRICT ENGINEER
DATE: 4-15-81

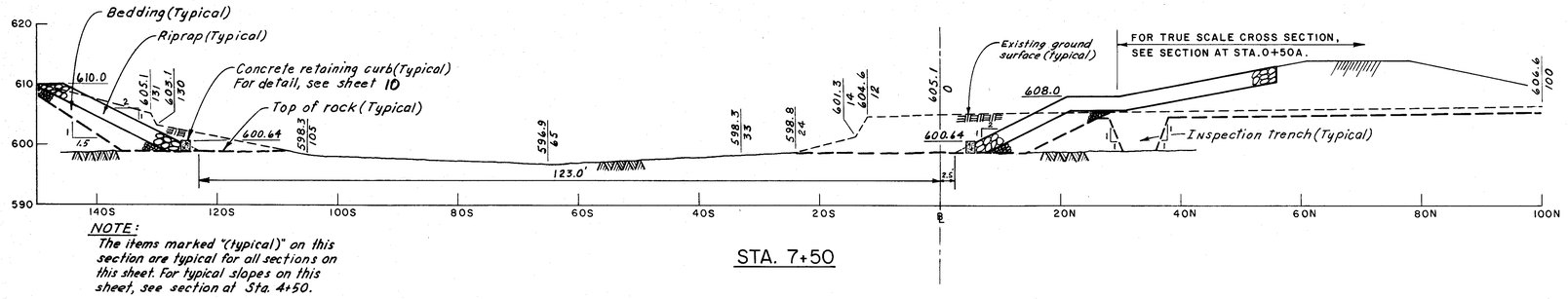
CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

CROSS SECTIONS
FROM STA. 4+00 TO STA. 7+00

SCALE: AS SHOWN

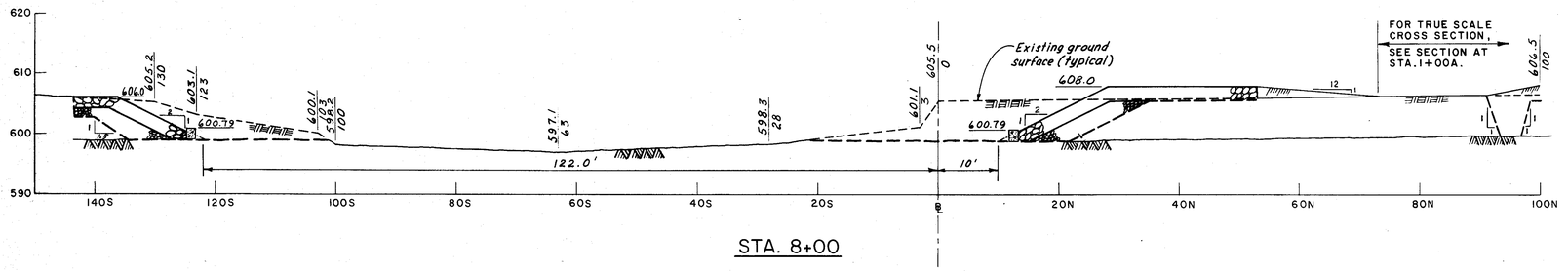
TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

DRAWING NUMBER
81-CCP-1/15
SHEET 15 OF 19



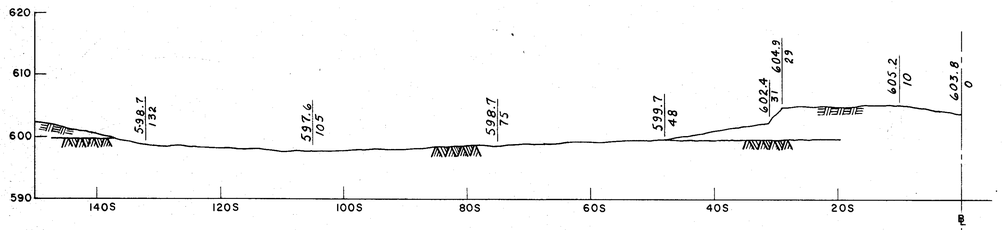
NOTE:
The items marked "(typical)" on this section are typical for all sections on this sheet. For typical slopes on this sheet, see section at Sta. 4+50.

STA. 7+50

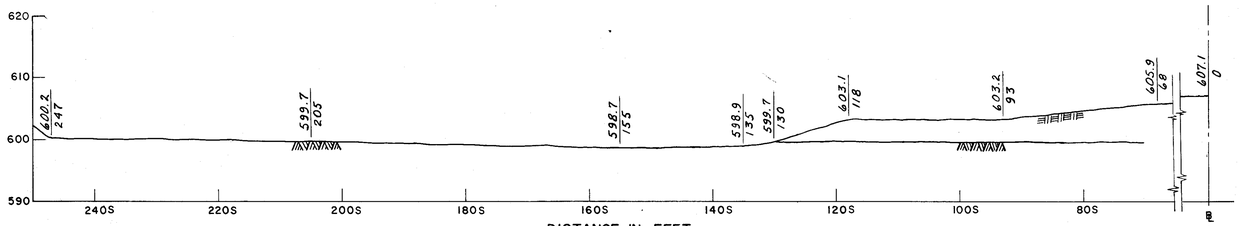


STA. 8+00

ELEVATION IN FEET (U.S.C. & G.S. DATUM)

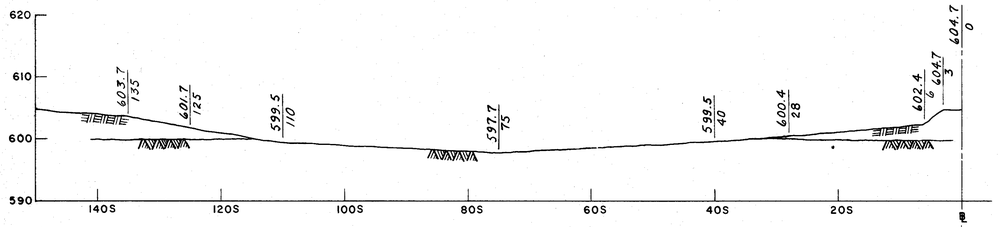


STA. 9+00B

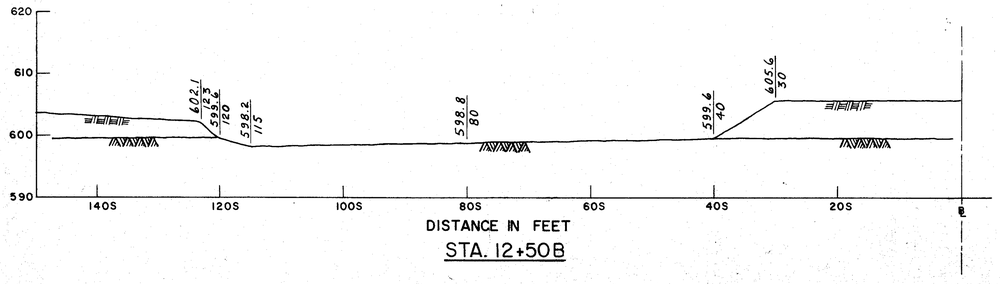


DISTANCE IN FEET

STA. 14+50B



STA. 10+50B



DISTANCE IN FEET

STA. 12+50B

NOTES:

1. NOTES 1 THRU 5 ON SHEET 14 APPLY TO THIS SHEET.
2. 60N THE "N" INDICATES THE NORTHERLY DIRECTION OF THE OFFSET DISTANCE.
3. SECTIONS AT STA. 9+00B TO STA. 14+50B WERE TAKEN FROM A BASELINE DIFFERENT FROM THAT FOR STA. 8+00, SEE SHEET 3.

AS CONSTRUCTED

SUBMITTED: _____ CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: _____ COL., C. E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: R.F.N.
DESIGNED BY: P.J.K., J.K.K.
CHECKED BY: A.J.A.
SUBMITTED BY: _____ CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

CROSS SECTIONS
STA. 7+50 TO STA. 14+50

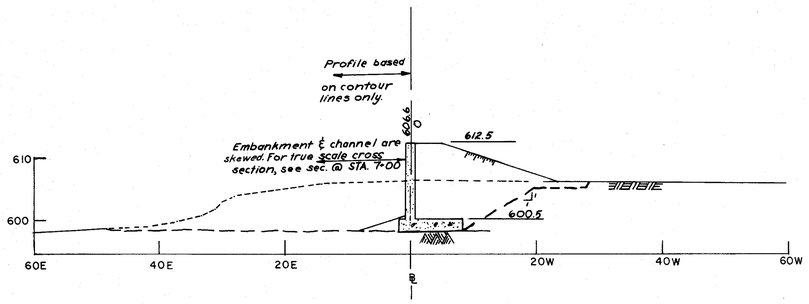
APPROVED: _____ COL., C. E. DISTRICT ENGINEER
DATE: 12/21/81

SCALE: AS SHOWN

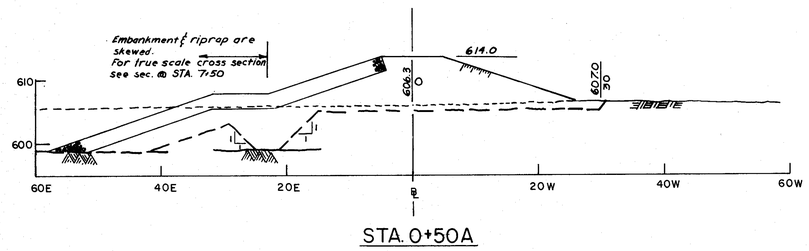
TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

DRAWING NUMBER
81-CCP-1/16
SHEET 16 OF 19

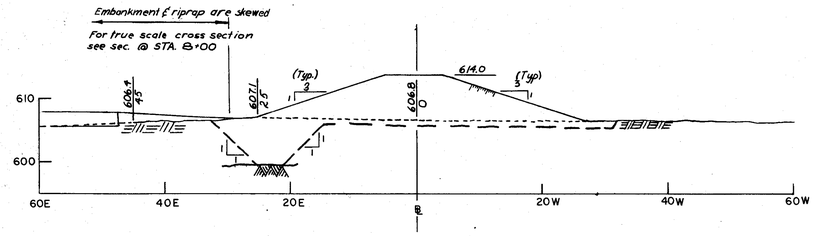
ELEVATION IN FEET (U.S.C. & G.S. DATUM)



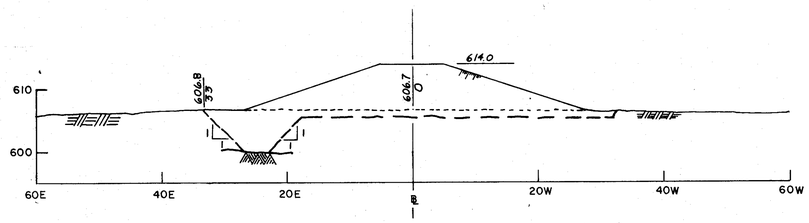
STA. 0+00A



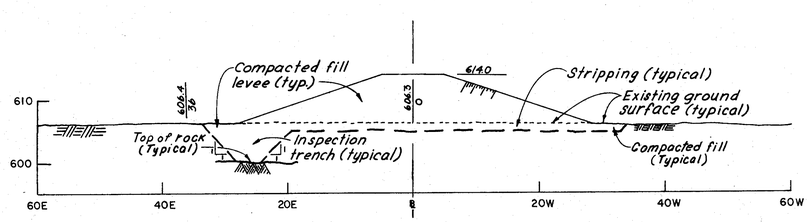
STA. 0+50A



STA. 1+00A



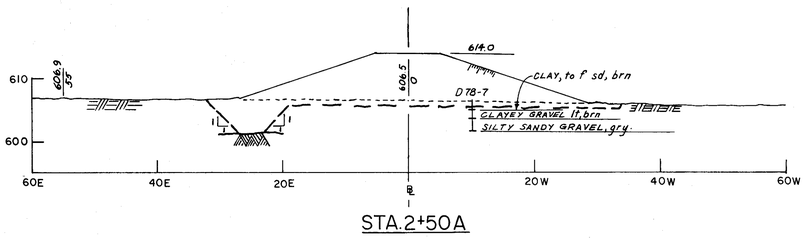
STA. 1+50A



DISTANCE IN FEET

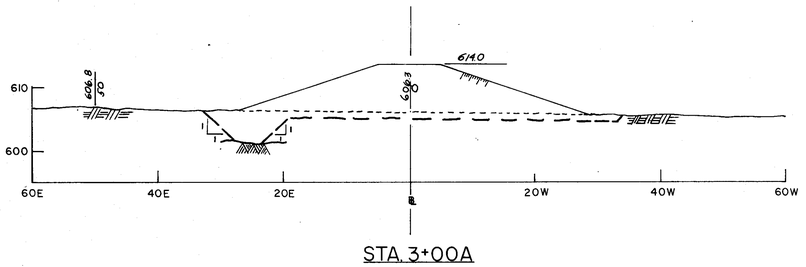
STA. 2+00A

NOTE:
The items marked "(typical)" on this section are typical for all sections on this sheet. For typical slopes on this sheet, see section at Sta. 0+50A & 1+00A.

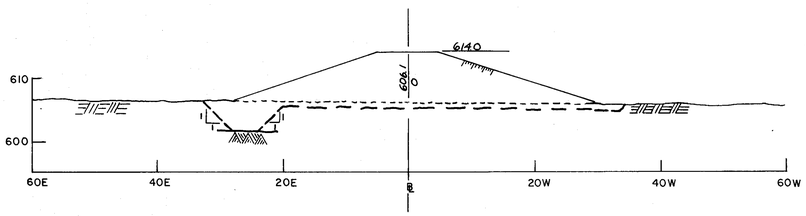


STA. 2+50A

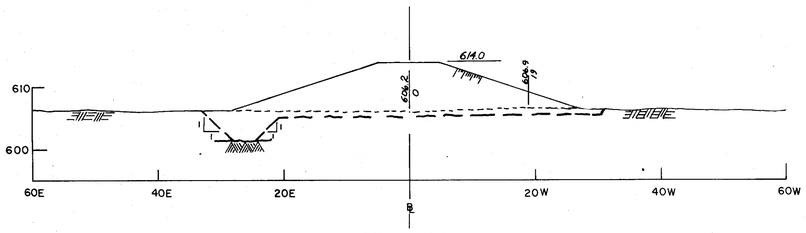
NOTE:
Depth For Breaks
0.0'-1.5' Clay
1.5'-3.0' Clayey Gravel
3.0'-5.0' Silty Sandy Gravel



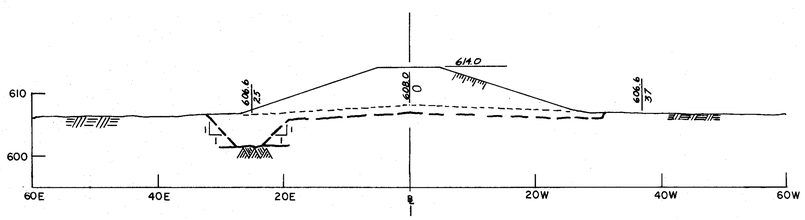
STA. 3+00A



STA. 3+50A



STA. 4+00A



DISTANCE IN FEET

STA. 4+50A

NOTES:

1. FOR GENERAL NOTES, SEE SHEET 1.
2. CROSS-SECTIONS ARE BASED ON SURVEY TAKEN APRIL 1978. FIELD NOTES ARE FILED UNDER CAYUGA-14 IN THE BUFFALO DISTRICT OFFICE.
3. ALL CROSS-SECTIONS ARE DRAWN FACING SOUTH TOWARD CAYUGA CREEK.
4. $\frac{606.9}{19}$ FIGURE ON LEFT SIDE OF LINE IS THE EXISTING GROUND SURFACE ELEVATION. FIGURE ON THE RIGHT SIDE OF LINE IS THE OFFSET FROM THE BASELINE.
5. 40E 40W THE "E" AND "W" INDICATE THE EASTERLY AND WESTERLY DIRECTIONS, RESPECTIVELY OF OFFSET DISTANCES.

AS CONSTRUCTED

SUBMITTED: _____ CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: _____ COL., C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: D.L.H.
DESIGNED BY: P.J.K., J.K.K.
CHECKED BY: A.J.A.
SUBMITTED BY: _____ CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

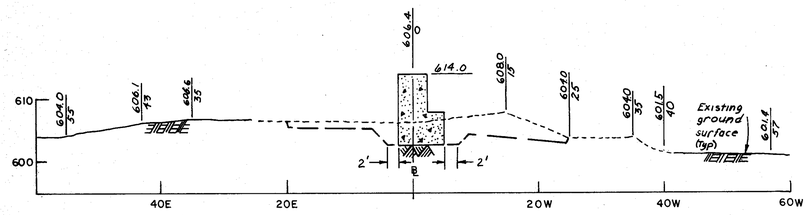
CROSS SECTIONS
STA. 0+00A TO STA. 4+50A

APPROVED: _____ COL. C. E. DISTRICT ENGINEER
DATE: 7/31/79

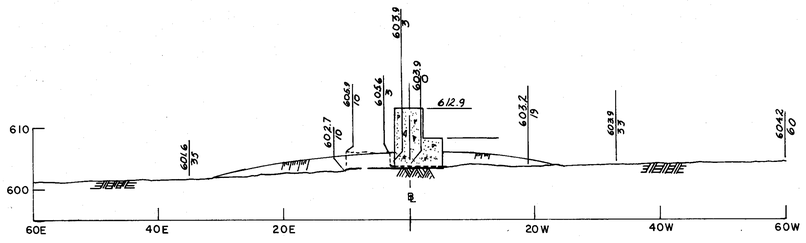
SCALE: AS SHOWN

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

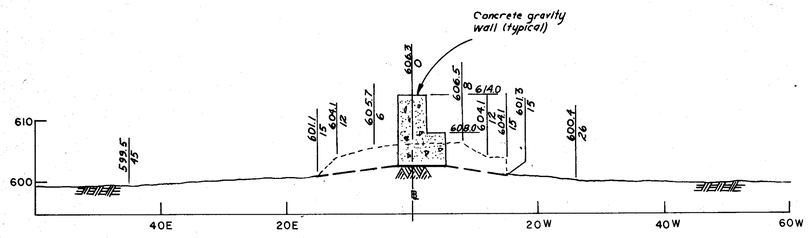
DRAWING NUMBER
81-CCP-1/17
SHEET 17 OF 19



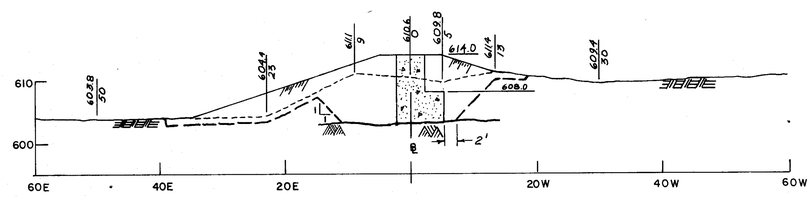
STA. 5+00A



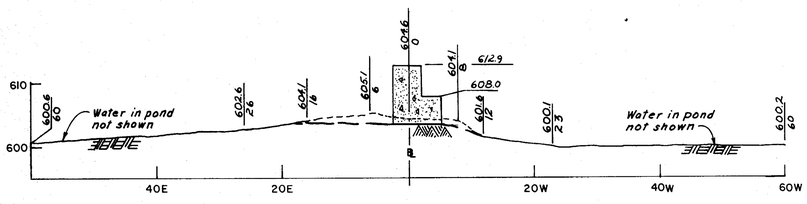
STA. 7+50A



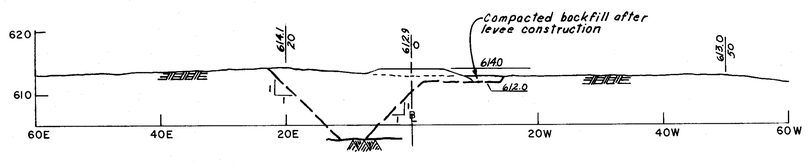
STA. 5+50A



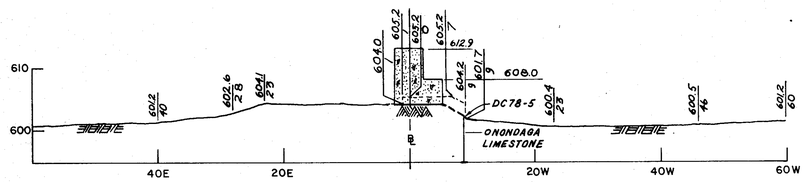
STA. 8+00A



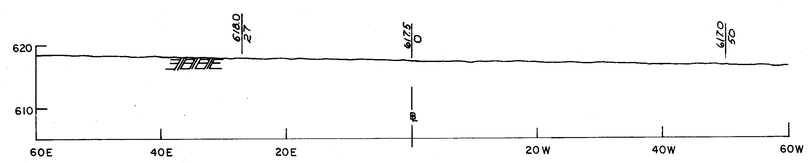
STA. 6+00A



STA. 8+50A

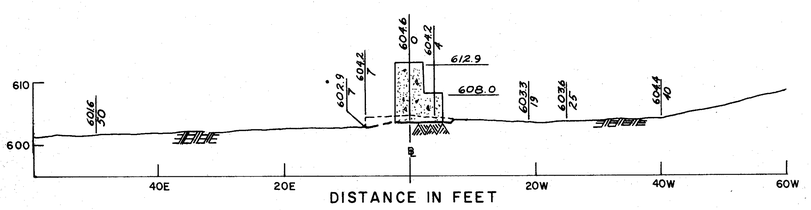


STA. 6+50A



DISTANCE IN FEET

STA. 9+00A



DISTANCE IN FEET

STA. 7+00A

ELEVATION IN FEET (U.S.C. & G.S. DATUM)

NOTES:

1. NOTES 1 THRU 5 ON SHEET 17 APPLY TO THIS SHEET.
2. FOR DETAILS OF CONCRETE GRAVITY WALL SEE SHEET 9.

AS CONSTRUCTED

SUBMITTED: _____ CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: _____ COL., C.E. DISTRICT ENGINEER

REVISION	DATE	DESCRIPTION	BY

U. S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: D. L. H.
DESIGNED BY: P.J.K., J.K.K.
CHECKED BY: A.J.A.
SUBMITTED BY: _____ CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: _____ CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

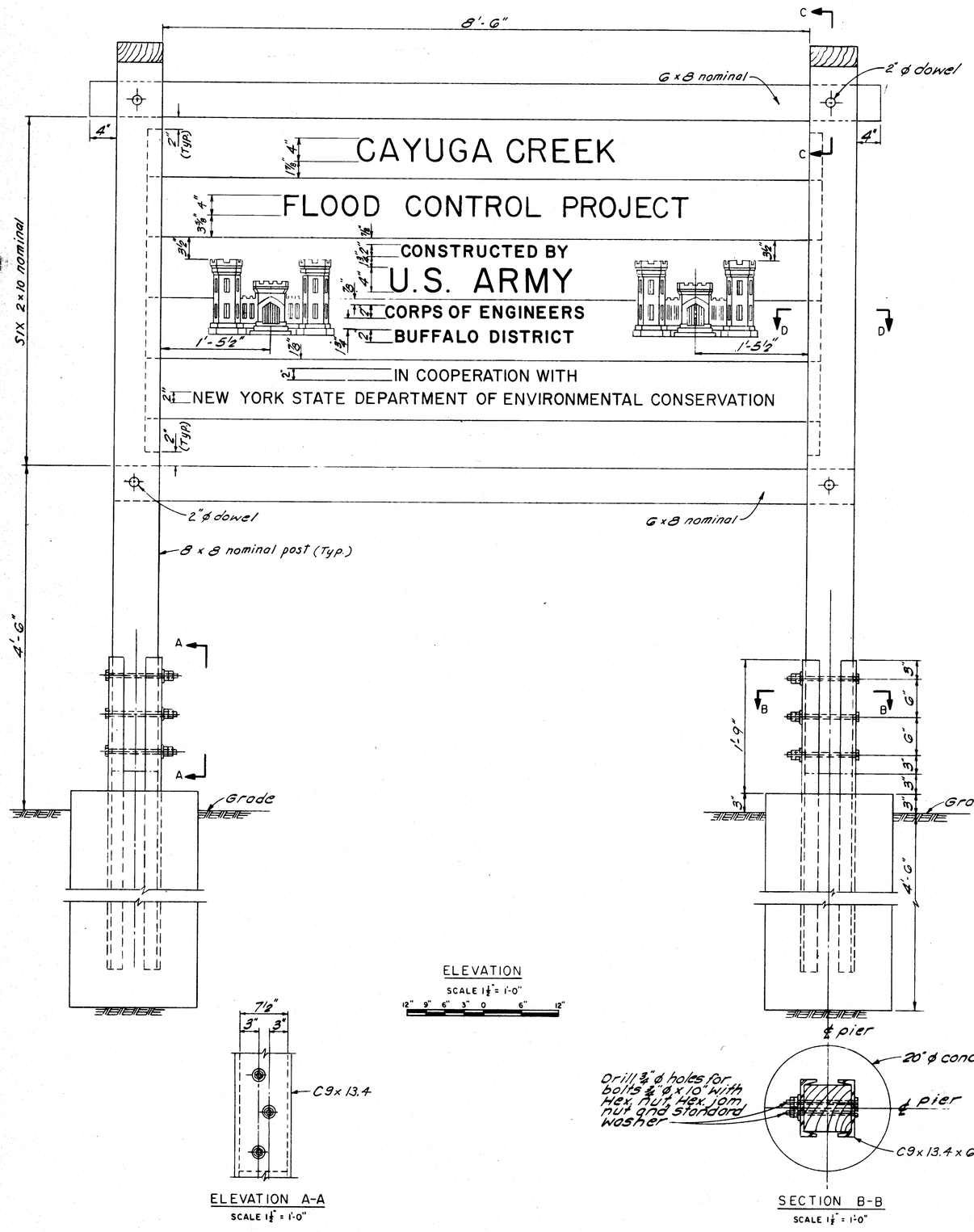
CROSS SECTIONS
STA. 5+00A TO STA. 9+00A

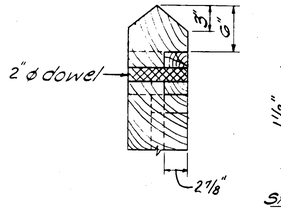
APPROVED: _____ DATE: _____
COL., C. E. DISTRICT ENGINEER

SCALE: AS SHOWN

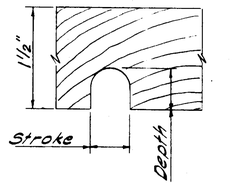
TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060,

DRAWING NUMBER 81-CCP-1/18
SHEET 18 OF 19

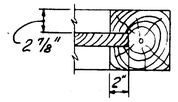




SECTION C-C
SCALE 1½" = 1'-0"



SECTION THRU LETTERS
SCALE 12" = 1'-0"
1" 0 1" 2"



SECTION D-D
SCALE 1½" = 1'-0"

ELEVATION
SCALE 1½" = 1'-0"
12" 9" 6" 3" 0 6" 12"

ELEVATION A-A
SCALE 1½" = 1'-0"

SECTION B-B
SCALE 1½" = 1'-0"

DIMENSION SCHEDULE OF LETTERS			
HEIGHT	AVERAGE WIDTH	STROKE	DEPTH
4"	2¾"	5/8"	5/8"
2"	1½"	3/8"	3/8"

AS CONSTRUCTED

SUBMITTED: [signature] CHIEF CONSTRUCTION-OPERATIONS DIVISION

APPROVED: [signature] COL., C.E. DISTRICT ENGINEER

NOTES:

SIGN SHALL BE CONSTRUCTED OF ~~SELECT GRADE HEARTWOOD OF CEDAR OR~~ REDWOOD LUMBER, SEE SPECIFICATIONS.

NOMINAL SIZE OF PLANKS BETWEEN POSTS SHALL BE 2 x 10. PLANKS SHALL BE DADOED INTO POSTS AND BLIND NAILED.

EDGES OF ALL LUMBER SHALL BE BEVELED 1/8 INCH.

ALL LETTERING SHALL BE ROUTED IN PLANKS, TO THE DIMENSIONS SHOWN, AND PAINTED. COLOR SHALL CONFORM TO FEDERAL STANDARD NO. 595, 13655.

CASTLE INSIGNIA TO BE FURNISHED BY U.S. GOVERNMENT AND INSTALLED BY THE CONTRACTOR.

FOR PAINTING DETAILS, SEE SPECIFICATIONS.

REVISION	DATE	DESCRIPTION	BY

U.S. ARMY ENGINEER DISTRICT, BUFFALO
CORPS OF ENGINEERS
BUFFALO, NEW YORK 14207

DRAWN BY: R.F.N.
DESIGNED BY: R.M.F.
CHECKED BY: A.J.A.
SUBMITTED BY: [signature] CHIEF DESIGN BRANCH
APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION

CAYUGA CREEK
CHEEKTOWAGA, NEW YORK
LOCAL FLOOD CONTROL

PROJECT SIGN

APPROVED: [signature] COL. C. E. DISTRICT ENGINEER
DATE: 6/25/81

TO ACCOMPANY REQUEST FOR PROPOSAL NO. DACW 49 81 R 0060

SCALE: AS SHOWN

DRAWING NUMBER 81-CCP-1/19
SHEET 19 OF 19

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

March 12, 2015

REPLY TO
ATTENTION OF

Operations and Technical Support Section

SUBJECT: FY14 Joint Routine Inspection of Completed Works, Flood Damage Reduction Project, Cayuga Creek, Cheektowaga, New York (09/09/14)

Alan A. Fuchs, P.E.
NYSDEC – Division of Water
Bureau of Flood Protection & Dam Safety
625 Broadway
Albany, NY 12233-3504

Dear Mr. Fuchs:

Transmitted herewith is the FY14 Inspection of Completed Works (ICW) inspection report for the Flood Damage Reduction Project for Cayuga Creek in Cheektowaga, New York. Thank you for your agency's participation in this inspection. The rating for this project as determined by the current inspection is **"MINIMALLY ACCEPTABLE" (M)**. This project is "**ACTIVE**" in the USACE Rehabilitation Program. Please refer to the enclosed inspection report, which includes an inspection checklist (Attachment "B"), for a description of project deficiencies requiring corrective action, if any.

The inspection checklist (Attachment "B") includes a two page section labeled "Public Sponsor Pre-Inspection Report". The local sponsor should complete this section just prior to the next scheduled inspection and provide to the United States Army Corps of Engineers (USACE) inspector upon arrival. The "Reporting Period" is the timeframe between inspections (i.e. inspection date of this report and date of next scheduled inspection).

Please keep this office informed if there are any changes to the project that would affect the design level of protection afforded by the project, or if there are any other changes which may alter or impact any project features. Such changes require prior written approval from USACE and New York State Department of Environmental Conservation (NYSDEC).

Questions pertaining to this matter should be directed to the undersigned, who can be contacted in writing at the above address, by telephone at 716-879-4277 or by e-mail at robert.w.remmers@usace.army.mil.

SUBJECT: FY14 Joint Routine Inspection of Completed Works, Flood Damage Reduction Project, Cayuga Creek, Cheektowaga, New York (09/09/14)

Sincerely,

Robert W. Remmers

Robert W. Remmers, P.E., PMP
Levee Safety Program Manager
Chief, Operations and Technical Support Section

Enclosure:
Project Inspection Report w/Checklist

CF:

Theodore Myers, P.E., NYSDEC, Region 9
Stephen Len, NYSDEC, Division of Water, Flood Control Project Unit (e-copy)
Daniel Naverth Jr., Director, Erie County Department of Emergency Services (e-copy)
Douglas Winner, Acting Director, New York State Office of Emergency Management - Region 5 (e-copy)
Brian Shumon, GIS Specialist, Federal Emergency Management Agency; Region II (e-copy)

SUBJECT: FY14 Joint Routine Inspection of Completed Works, Flood Damage Reduction Project, Cayuga Creek, Cheektowaga, New York (09/09/14)

1. **OBJECTIVE**: The objective of this inspection is to ensure project sponsor compliance with existing agreements, evaluate effectiveness of the sponsor to operate and maintain facilities constructed by the U.S. Army Corps of Engineers (USACE) in accordance with the Operations and Maintenance (O&M) manual, and determine if the sponsor has adequately met standards required to maintain eligibility for PL 84-99 Federal rehabilitation assistance should the project be damaged by flooding or a storm event.

2. **PROJECT CLASSIFICATION**: Flood Damage Reduction – Flood Protection Project

3. **REPORTING PERIOD:** 08/27/13 – 09/09/14

4. **INSPECTION TEAM**: The inspection team met at the project site on 09/09/14. The following representatives from the New York State Department of Environmental Conservation (NYSDEC), Town of Cheektowaga and USACE - Buffalo District, participated in the inspection.

Name	Organization	Phone
Robert Remmers	USACE - Buffalo District	(716) 879-4277
Daniel Bennett	USACE - Buffalo District	(716) 879-4249
David Mitchell	USACE - Buffalo District	(716) 879-4115
David Swiatek	USACE - Buffalo District	(716) 879-4371
Katie Mitchell	USACE - Buffalo District	(716) 879-4149
Theodore Myers	NYSDEC Region 9	(716) 851-7070
Stephen Dong	NYSDEC Albany	(518) 402-8252
Earl Loder	Cheektowaga OEM	(716) 583-4303
Patrick Bowen	Town of Cheektowaga Engineering	(716) 897-7288
Scott Kowal	Town of Cheektowaga Highway	(716) 352-0727
Gail Milburth	Town of Cheektowaga Engineering	(716) 897-7288
Mark Cartenoto	Town of Cheektowaga Highway	(716) 686-3450

5. **OVERALL PROJECT RATING:** In accordance with Headquarters, USACE guidance, this project is rated **"Minimally Acceptable" (M)**. The presence of one or more deficient conditions that lessen the degree of project reliability was the determining factor for the project rating. Specific deficiencies are discussed in Section 7 of this report. All deficiencies must be addressed in a timely manner. Failure to correct any deficiencies that have been noted as either "Minimally Acceptable" (M) or "Unacceptable" (U) by the timeframe indicated could result in an "Unacceptable" (U) rating for the overall project in the next inspection scheduled after that date.

   Prior to this evaluation, the project was last inspected on 08/27/13. The condition of the project at that time of the inspection was rated as "Minimally Acceptable" (M).

6. PROJECT LOCATION, DESCRIPTION, AND LOCAL SPONSOR:

a. Project Location: The project is located on Cayuga Creek in Cheektowaga, New York. Project limits extend from the east edge of the Union Road bridge to approximately 1,000 feet upstream.

b. Project Description: The project consists of approximately 690 feet of reinforced concrete inverted T-wall, approximately 960 feet of channel embankment protection with 27-inch riprap, a concrete curb on the south bank of Cayuga Creek extending upstream from the Union Road bridge, approximately 525 feet of transverse levee from the north bank extending northerly across the flood-plain to high ground on the north side of the creek, 350 feet of concrete gravity wall extending between abandoned quarry ponds, approximately 280 feet of 18-inch CMP culvert, for draining the quarry pond, and approximately 1,000 feet of bank clearing with mulching and seeding applied. A project sign was placed at the down stream limit of the project at the Union Road bridge. The project was designed to protect nearby residential and commercial structures from flooding during high water events.

c. Local Sponsor: In accordance with the project O&M Manual, NYSDEC, Region 9 has assumed responsibility for the operation and maintenance of the project. NYSDEC has entered into a separate agreement with the Town of Cheektowaga to perform required operation and maintenance.

7. INSPECTION FINDINGS: Deficiencies found during the inspections are noted in the Attachments listed below. Project photographs are found in Attachment B.

- Attachment A – Summary of Deficiencies and Recommendations
- Attachment B – Right Bank and Channel Inspection Report
- Attachment C – Project Map
- Attachment D – Section 408 Request to Alter, Impact, or Encroach upon a Buffalo District Inspection of Completed Works Project
- Attachment E – Public Sponsor Pre-Inspection Report

8. SUMMARY OF MAINTENANCE REQUIRED BY LAST INSPECTION REPORT:

(1) See FY13 Inspection Report (inspection date 08/27/13).

9. SUMMARY OF MAINTENANCE PERFORMED AFTER LAST INSPECTION:

(1) The sponsor has performed routine maintenance such as mowing of the levee and vegetation and debris removal in the channel.

(2) Sponsor visually inspected flap gates and drain pipes through the floodwall.

(3) Sponsor has satisfactorily completed the required pipe video inspections for this project. Information was provided to USACE as of the FY11 Inspection (09/23/11) and no significant problems noted. Next pipe video inspection is required by 09/23/16.

10. SUMMARY OF CHANGES TO PROJECT SINCE LAST INSPECTION:

None.

11. PROBLEMS/ISSUES REQUIRING ASSISTANCE OF USACE:

(1) ALTERATIONS: Unauthorized existing alterations to the project as noted below have not been documented. An after-the-fact review by the USACE will be required for each change to determine whether or not the change can be approved or correction/removal will be required. To facilitate this review, the local sponsor is required to submit a alteration request including design criteria, as-built drawings, or other pertinent documents and information. A rating of "A", "M", or "U" will be assigned to existing unauthorized alterations under "encroachments" on the checklist, depending on potential impacts to the functioning of the project, until approval by USACE has been granted. Should any of the cited alterations have been previously approved by USACE, the local sponsor shall submit approval documentation as proof. Future project alterations shall be approved by USACE in advance of the work.

The following unauthorized project alterations were observed and require submission of an "After-the-Fact" Project Alteration Request for Corps review and approval, or possible removal:

i. Concrete patio, two white fences, and a number of bushes near the floodwall along the banquet hall facility.

ii. Riprap placed along right bank channel sideslope, Sta. 9+00 to 12+00

12. ADDITIONAL OBSERVATIONS:

(1) The main features of the project, including the channel, concrete inverted T-wall, transverse levee, and gravity floodwall are all generally in satisfactory condition.

(2) The project sponsor had a copy of the project O&M manual and Emergency Preparedness Plan.

13. RECOMMENDATIONS AND MAINTENANCE REQUIRED AS A RESULT OF THIS INSPECTION:

Required maintenance for deficiencies found during this inspection are noted in the "Recommendations" column of Attachment A – Summary of Deficiencies and Recommendations.

14. INSPECTION REPORT PREPARED BY:

for Daniel A. Bennett, P.E.
Civil Engineer
Operations and Technical Support Section

15. INSPECTION REPORT REVIEWED BY:

Robert W. Remmers, P.E., PMP
Levee Safety Program Manager
Chief, Operations and Technical Support Section

Attachment A – Summary of Deficiencies and Recommendations

Attachment A - Summary of Deficiencies and Recommendations

ID # (USACE_CELRB_N-09_2014_a_....)	Category	Deficiency	Deficiency Recommendation	Photo # (USACE_CELRB_N-09_2014_a_....)	Rating	Status Comments	Station 1	Station 2
_0017	General Items	Sponsor presented O&M Manual at beginning of inspection.	NA		A	NA	NA	NA
_0018	General Items	Sponsor presented flood response plan at beginning of inspection.	NA		A	NA	NA	NA
_0003	Levee	Two trees and tall grass (15' R/S toe).	Remove trees and mow grass to less then 6" height	0003_1.jpg 0003_2.jpg	M	06/30/15, FY13 Inspection Report	8+50A	NA
_0013	Levee	Sod cover adequate.	NA	0013_1.jpg	A	NA	NA	NA
_0034	Levee	Sod cover adequate.	NA	0034_1.jpg	A	NA	NA	NA
_0004	Levee	Tree debris (15' R/S toe).	Remove tree debris.	0004_1.jpg	M	12/31/13, FY12 Inspection Report	8+50A	NA
_0037	Levee	Private property sign.	Submit alteration request.	0037_1.jpg	M	06/30/16, FY14 Inspection Report	NA	NA
_0032	Levee	1' x 1' depression on levee crown.	Repair depression.	0032_1.jpg	M	06/30/16, FY14 Inspection Report	NA	NA
_0033	Levee	Soil settlement between Floodwall and Levee.	Repair settlement.	0033_1.jpg	M	06/30/16, FY14 Inspection Report	NA	NA
_0024	Floodwalls	Bushes within 15' of L/S of Floodwall.	Remove bushes.	0024_1.jpg	M	06/30/15, FY13 Inspection Report	5+00	5+50
_0023	Floodwalls	White picket fence.	Remove fence within 15' of flood wall or submit alteration request.	0023_1.jpg	M	06/30/15, FY13 Inspection Report	5+50	NA
_0025	Floodwalls	Concrete patio and tent	Remove encroachment within easement of Floodwall or submit alteration request.	0025_1.jpg	M	06/30/15, FY13 Inspection Report	5+00	5+50
_0035	Floodwalls	White picket fence.	Remove encroachment within easement of Floodwall or submit alteration request.	0035_1.jpg	M	06/30/15, FY13 Inspection Report	5+00	NA
_0008	Floodwalls	1/2" x 2' crack in Floodwall.	Repair crack	0008_1.jpg	M	06/30/16, FY14 Inspection Report	NA	NA
_0011	Floodwalls	Gravity wall in good condition.	NA	0011_1.jpg	A	NA	NA	NA
_0021	Floodwalls	Crack along previous concrete repair.	Repair crack and monitor fence post.	0021_1.jpg	M	06/30/16, FY14 Inspection Report	7+00	NA
_0030	Floodwalls	Typical Floodwall repair.	NA		A	NA	NA	NA
_0036	Floodwalls	Downstream limit of Floodwall - O.K.	NA	0036_1.jpg	A	NA	0+50	NA
_0022	Floodwalls	Monolith joint expansion material missing.	Clean and replace expansion joint material.	0022_1.jpg USACE_CELRB_N-09_2014_a_0022_2.jpg	M	12/31/13, FY12 Inspection Report	0+50	7+00
_0001	Interior Drainage	12" and 15" HDPE storm drainage outfalls and white reflective post. Approved project alteration.	NA	0001_1.jpg	A	NA	6+10A	NA
_0026	Interior Drainage	Catch basin for approved project alteration.	NA	0026_1.jpg	A	NA	3+50	NA
_0002	Interior Drainage	Adequate mowing.	NA	0002_1.jpg	A	NA	8+00A	NA
_0005	Interior Drainage	24" CMP Flap gate operated - O.K.	NA	0005_1.jpg	A	NA	7+10A	NA
_0012	Interior Drainage	Ponding area outlet	NA	0012_1.jpg	A	NA	5+00A	NA
_0014	Interior Drainage	18" CMP outfall.	NA	0014_1.jpg	A	NA	11+20	NA
_0028	Interior Drainage	10" HDPE	NA	0028_1.jpg	A	NA	3+05	NA
_0006	Interior Drainage	Sluice Gate operated and fully functional.	NA	0006_1.jpg 0006_2.jpg	A	NA	7+10A	NA
_0007	Interior Drainage	24" Flap gate.	NA	0007_1.jpg	A	NA	7+10A	NA
_0027	Interior Drainage	10" Flap gate exercised.	NA	0027_1.jpg	A	NA	3+05	NA
_0029	Interior Drainage	18" Flap gate exercised.	NA	0029_1.jpg	A	NA	2+05	NA
_0031	Interior Drainage	Catch basin.	NA	No Photo	A	NA	2+05	NA
_0038	FDR Channels	Monitor for woody vegetation.	NA	0038_1.jpg	A	NA	NA	NA
_0015	FDR Channels	Riprap placed on right bank channel sideslope.	Submit alteration request.	0015_1.jpg	M	06/30/15, FY13 Inspection Report	9+00	12+00
_0019	FDR Channels	Trees above channel side slope riprap.	Monitor trees.	0019_1.jpg	A	NA	0+00	9+00
_0020	FDR Channels	Typical riprap condition.	NA	0020_1.jpg	A	NA	7+40	9+00

Attachment B – Right Bank & Channel Inspection Report

Flood Damage Reduction Segment / System Inspection Report

US Army Corps of Engineers®

Name of Segment / System: Cayuga Creek - Right Bank and Channel, Cheektowaga

Public Sponsor(s): NYSDEC - Region 9

Public Sponsor Representative: Theodore Myers, P.E.

Sponsor Phone: (716) 851 - 7070

Sponsor Email: tamyers@gw.dec.state.ny.us

Corps of Engineers Inspector: D. Swiatek, D. Bennett, K. Mitchell, D. Mitchell, R. Remmers

Inspection Start Date: 9/9/2014

Inspection End Date: 9/9/2014

Inspection Report Prepared By: Daniel A. Bennett, P.E.

Date Report Prepared:

Internal Technical Review (for Periodic Inspections) By:

Date of ITR:

Final Approved By:

Date Approved:

Type of Inspection:

- ☐ **Initial Eligibility Inspection**
- ☒ **Continuing Eligibility Inspection (Routine)**
- ☐ **Continuing Eligibility Inspection (Periodic)**

Overall Segment / System Rating:

- ☐ **Acceptable**
- ☒ **Minimally Acceptable**
- ☐ **Unacceptable**

Contents of Report:

- ☒ **Instructions**
- ☐ **Initial Eligibility Inspection**
- ☒ **General Items for All Flood Control Works**
- ☒ **Levee Embankment**
- ☒ **Concrete Floodwalls**
- ☐ **Sheet Pile and Concrete I-walls**
- ☐ **Interior Drainage System**
- ☐ **Pump Stations**
- ☒ **FDR System Channels**

Note: In addition to the report contents indicated here, a plan view drawing of the system, with stationing, should be included with this report to reference locations of items rated less than acceptable. Photos of general system condition and any noted deficiencies should also be attached.

Note: This inspection rating represents the Corps evaluation of operations and maintenance of the flood damage reduction system and may be used in conjunction with other information for a levee certification determination for National Flood Insurance Program (NFIP) purposes if applicable. An Acceptable Corps inspection rating, alone, does not equate to a certifiable levee for the NFIP. It is recommended for levee systems currently accredited by the Federal Emergency Management Agency (FEMA) for NFIP purposes receiving a Corps Minimally Acceptable or Unacceptable rating, be evaluated by the levee owner to determine the potential impacts to the certification for FEMA.

US Army Corps
of Engineers®

Flood Damage Reduction Segment / System
Public Sponsor Pre-Inspection Form

The following information is to be provided by the levee district sponsor prior to an inspection. This information will be used to help evaluate the organizational capability of the levee district to manage the levee segment / system maintenance program.

1. Levee segment / system and district: (name of the segment / system and levee district) Cayuga Creek - Right Bank and Channel, Cheektowaga for CELRB
2. Reporting period: (month/day/year to month/day/year)
3. Summary of maintenance required by last inspection report:
4. Summary of maintenance performed this reporting period:
5. Summary of maintenance planned next reporting period:
6. Summary of changes to segment / system since last inspection:
7. Problems/ issues requiring the assistance of the US Army Corps of Engineers:

Public Sponsor Pre-Inspection Report

The following information is to be provided by the levee district sponsor prior to an inspection

8. Levee district organization: (elected or appointed levee district officials and key employees)

Name	Position	Mailing Address	Phone Number	Email Address

General Instructions for the Inspection of Flood Damage Reduction Segments / Systems

A. Purpose of USACE Inspections:

The primary purpose of these inspections is to prevent loss of life and catastrophic damages; preserve the value of Federal investments, and to encourage non-Federal sponsors to bear responsibility for their own protection. Inspections should assure that Flood Damage Reduction structures and facilities are continually maintained and operated as necessary to obtain the maximum benefits. Inspections are also conducted to determine eligibility for Rehabilitation Assistance under authority of PL 84-99 for Federal and non-Federal systems. (ER 1130-2-530, ER 500-1-1)

B. Types of Inspections:

The Corps conducts several types of inspections of Flood Damage Reduction systems, as outlined below:

Initial Eligibility Inspections	Continuing Eligibility Inspections	
	Routine Inspections	**Periodic Inspections**
IEIs are conducted to determine whether a non-Federally constructed Flood Damage Reduction system meets the minimum criteria and standards set forth by the Corps for initial inclusion into the Rehabilitation and Inspection Program.	RIs are intended to verify proper maintenance, owner preparedness, and component operation.	PIs are intended to verify proper maintenance and component operation and to evaluate operational adequacy, structural stability, and safety of the system. Periodic Inspections evaluate the system's original design criteria vs. current design criteria to determine potential performance impacts, evaluate the current conditions, and compare the design loads and design analysis used against current design standards. This is to be done to identify components and features for the sponsor that need to be monitored more closely over time or corrected as needed. (Periodic Inspections are used as the basis of risk assessments.)

C. Inspection Boundaries:

Inspections should be conducted so as to rate each Flood Damage Reduction "Segment" of the system. The overall system rating will be the lowest segment rating in the system.

Project	System	Segment
A flood damage reduction project is made up of one or more flood damage reduction systems which were under the same authorization.	A flood damage reduction system is made up of one or more flood damage reduction segments which collectively provide flood damage reduction to a defined area. Failure of one segment within a system constitutes failure of the entire system. Failure of one system does not affect another system.	A flood damage reduction segment is defined as a discrete portion of a flood damage reduction system that is operated and maintained by a single entity. A flood damage reduction segment can be made up of one or more features (levee, floodwall, pump stations, etc).

D. Land Use Definitions:

The following three definitions are intended for use in determining minimum required inspection intervals and initial requirements for inclusion into the Rehabilitation and Inspection Program. Inspections should be considered for all systems that would result in significant environmental or economic impact upon failure regardless of specific land use.

Agricultural	Rural	Urban
Protected population in the range of zero to 5 households per square mile protected.	Protected population in the range of 6 to 20 households per square mile protected.	Greater than 20 households per square mile; major industrial areas with significant infrastructure investment. Some protected urban areas have no permanent population but may be industrial areas with high value infrastructure with no overnight population.

E. Use of the Inspection Report Template:

The report template is intended for use in all Army Corps of Engineers inspections of levee and floodwall systems and flood damage reduction channels. The section of the template labeled “Initial Eligibility" only needs to be completed during Initial Eligibility Inspections of Non-Federally constructed Flood Damage Reduction Systems. The section labeled "General Items" needs to be completed with every inspection, along with all other sections that correspond to features in the system. The section labeled "Public Sponsor Pre-Inspection Report" is intended for completion before the inspection, if possible.

F. Individual Item / Component Ratings:

Assessment of individual components rated during the inspection should be based on the criteria provided in the inspection report template, though inspectors may incorporate additional items into the report based on the characteristics of the system. The assessment of individual components should be based on the following definitions.

Acceptable Item	Minimally Acceptable Item	Unacceptable Item
The inspected item is in satisfactory condition, with no deficiencies, and will function as intended during the next flood event.	The inspected item has one or more minor deficiencies that need to be corrected. The minor deficiency or deficiencies will not seriously impair the functioning of the item as intended during the next flood event.	The inspected item has one or more serious deficiencies that need to be corrected. The serious deficiency or deficiencies will seriously impair the functioning of the item as intended during the next flood event.

G. Overall Segment / System Ratings:

Determination of the overall system rating is based on the definitions below. Note that an Unacceptable System Rating may be either based on an engineering determination that concluded that noted deficiencies would prevent the system from functioning as intended during the next flood event, or based on the sponsor's demonstrated lack of commitment or inability to correct serious deficiencies in a timely manner.

Acceptable System	Minimally Acceptable System	Unacceptable System
All items or components are rated as Acceptable.	One or more items are rated as Minimally Acceptable or one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable items would not prevent the segment / system from performing as intended during the next flood event.	One or more items are rated as Unacceptable and would prevent the segment / system from performing as intended, or a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established timeframe, not to exceed two years.

H. Eligibility for PL84-99 Rehabilitation Assistance:

Inspected systems that are not operated and maintained by the Federal government may be Active in the Corps' Rehabilitation and Inspection Program (RIP) and eligible for rehabilitation assistance from the Corps as defined below:

If the Overall System Rating is Acceptable	If the Overall System Rating is Minimally Acceptable	If the Overall System Rating is Unacceptable
The system is active in the RIP and eligible for PL84-99 rehabilitation assistance.	The system is Active in the RIP during the time that it takes to make needed corrections. Active systems are eligible for rehabilitation assistance. However, if the sponsor does not present USACE with proof that serious deficiencies (which had previously resulted in a minimally acceptable system rating) were corrected within the established timeframe, then the system will become Inactive in the RIP.	The system is Inactive in the RIP, and the status will remain Inactive until the sponsor presents USACE with proof that all items rated Unacceptable have been corrected. Inactive systems are ineligible for rehabilitation assistance.

I. Reporting:

After the inspection, the Corps is responsible for assembling an inspection report (or a summary report if it was a Periodic Inspection) including the following information:

a. All sections of the report template used during the inspection, including the cover and pre-inspection materials. (Supplemental data collected, and any sections of the template that weren't used during the inspection do not need to be included with the report.)

b. Photos of the general system condition and noted deficiencies.

c. A plan view drawing of the system, with stationing, to reference locations of items rated less than acceptable.

d. The relative importance of the identified maintenance issues should be specified in the transmittal letter.

e. If the Overall System Rating is Minimally Acceptable, the report needs to establish a timeframe for correction of serious deficiencies noted (not to exceed two years) and indicate that if these items are not corrected within the required timeframe, the system will be rated as Unacceptable and made Inactive in the Rehabilitation Inspection Program.

J. Notification:

Reports are to be disseminated as follows within 30 days of the inspection date.

If the Overall System Rating is Acceptable	If the Overall System Rating is Minimally Acceptable	If the Overall System Rating is Unacceptable
Reports need to be provided to the local sponsor and the county emergency management agency.	Reports need to be provided to the local sponsor, state emergency management agency, county emergency management agency, and to the FEMA region.	Reports need to be provided to the local sponsor, state emergency management agency, county emergency management agency, FEMA region, and to the Congressional delegation within 30 days of the inspection.

General Items for All Flood Damage Reduction Segments / Systems

For use during all inspections of all Flood Damage Reduction Segments / Systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Operations and Maintenance Manuals	**A**	**A**	Levee Owner's Manual, O&M Manuals, and/or manufacturer's operating instructions are present.	N-09_2014_a_0017: Station_1 NA: Sponsor presented O&M Manual at beginning of inspection.: NA (A)
		M	Sponsor manuals are lost or missing or out of date; however, sponsor will obtain manuals prior to next scheduled inspection.	
		U	Sponsor has not obtained lost or missing manuals identified during previous inspection.	
2. Emergency Supplies and Equipment (A or M only)	**A**	**A**	The sponsor maintains a stockpile of sandbags, shovels, and other flood fight supplies which will adequately supply all needs for the initial days of a flood fight. Sponsor determines required quantity of supplies after consulting with inspector.	
		M	The sponsor does not maintain an adequate supply of flood fighting materials as part of their preparedness activities.	
3. Flood Preparedness and Training (A or M only)	**A**	**A**	Sponsor has a written system-specific flood response plan and a solid understanding of how to operate, maintain, and staff the FDR system during a flood. Sponsor maintains a list of emergency contact information for appropriate personnel and other emergency response agencies.	N-09_2014_a_0018: Station_1 NA: Sponsor presented flood response plan at beginning of inspection.: NA (A)
		M	The sponsor maintains a good working knowledge of flood response activities, but documentation of system-specific emergency procedures and emergency contact personnel is insufficient or out of date.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Unwanted Vegetation Growth[1]	**M**	**A**	The levee has little or no unwanted vegetation (trees, bush, or undesirable weeds), except for vegetation that is properly contained and/or situated on overbuilt sections, such that the mandatory 3-foot root-free zone is preserved around the levee profile. The levee has been recently mowed. The vegetation-free zone extends 15 feet from both the landside and riverside toes of the levee to the centerline of the tree. If the levee access easement doesn't extend to the described limits, then the vegetation-free zone must be maintained to the easement limits. Reference EM 1110-2-301 or Corps policy for regional vegetation variance.	N-09_2014_a_0003: Station_1 8+50A: Two trees and tall grass (15' R/S toe).: Remove trees and mow grass to less then 6" height (M)
		M	Minimal vegetation growth (brush, weeds, or trees 2 inches in diameter or smaller) is present within the zones described above. This vegetation must be removed but does not currently threaten the operation or integrity of the levee.	
		U	Significant vegetation growth (brush, weeds, or any trees greater than 2 inches in diameter) is present within the zones described above and must to be removed to reestablish or ascertain levee integrity.	
2. Sod Cover	**A**	**A**	There is good coverage of sod over the levee.	N-09_2014_a_0013: Station_1 NA: Sod cover adequate.: NA (A) N-09_2014_a_0034: Station_1 NA: Sod cover adequate.: NA (A)
		M	Approximately 25% of the sod cover is missing or damaged over a significant portion or over significant portions of the levee embankment. This may be the result of over-grazing or feeding on the levee, unauthorized vehicular traffic, chemical or insect problems, or burning during inappropriate seasons.	
		U	Over 50% of the sod cover is missing or damaged over a significant portion or portions of the levee embankment.	
		N/A	Surface protection is provided by other means.	
3. Encroachments	**M**	**A**	No trash, debris, unauthorized farming activity, structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the levee.	N-09_2014_a_0004: Station_1 8+50A: Tree debris (15' R/S toe).: Remove tree debris. (M) N-09_2014_a_0037: Station_1 NA: Private property sign.: Submit alteration request. (M)
		M	Trash, debris, unauthorized farming activity, structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the levee.	
4. Closure Structures (Stop Log, Earthen Closures, Gates, or Sandbag	**NA**	**A**	Closure structure in good repair. Placing equipment, stoplogs, and other materials are readily available at all times. Components are clearly marked and installation instructions/ procedures readily available. Trial erections have been accomplished in accordance with the O&M Manual.	

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Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
Closures) (A or U only)		**U**	Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.	
		N/A	There are no closure structures along this component of the FDR segment / system.	
5. Slope Stability	**A**	**A**	No slides, sloughs, tension cracking, slope depressions, or bulges are present.	
		M	Minor slope stability problems that do not pose an immediate threat to the levee embankment.	
		U	Major slope stability problems (ex. deep seated sliding) identified that must be repaired to reestablish the integrity of the levee embankment.	
6. Erosion/ Bank Caving	**A**	**A**	No erosion or bank caving is observed on the landward or riverward sides of the levee that might endanger its stability.	
		M	There are areas where minor erosion is occurring or has occurred on or near the levee embankment, but levee integrity is not threatened.	
		U	Erosion or caving is occurring or has occurred that threatens the stability and integrity of the levee. The erosion or caving has progressed into the levee section or into the extended footprint of the levee foundation and has compromised the levee foundation stability.	
7. Settlement[2]	**A**	**A**	No observed depressions in crown. Records exist and indicate no unexplained historical changes.	
		M	Minor irregularities that do not threaten integrity of levee. Records are incomplete or inclusive.	
		U	Obvious variations in elevation over significant reaches. No records exist or records indicate that design elevation is compromised.	
8. Depressions/ Rutting	**M**	**A**	There are scattered, shallow ruts, pot holes, or other depressions on the levee that are unrelated to levee settlement. The levee crown, embankments, and access road crowns are well established and drain properly without any ponded water.	N-09_2014_a_0032: Station_1 NA: 1' x 1' depression on levee crown.: Repair depression. (M) N-09_2014_a_0033: Station_1 NA: Station_2 NA: Soil settlement between Floodwall and Levee.: Repair settlement. (M)
		M	There are some infrequent minor depressions less than 6 inches deep in the levee crown, embankment, or access roads that will pond water.	
		U	There are depressions greater than 6 inches deep that will pond water.	
9. Cracking	**A**	**A**	Minor longitudinal, transverse, or desiccation cracks with no vertical movement along the crack. No cracks extend continuously through the levee crest.	
		M	Longitudinal and/or transverse cracks up to 6 inches in depth with no vertical movement along the crack. No cracks extend continuously through the levee crest. Longitudinal cracks are no longer than the height of the levee.	

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Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	Cracks exceed 6 inches in depth. Longitudinal cracks are longer than the height of the levee and/or exhibit vertical movement along the crack. Transverse cracks extend through the entire levee width.	
10. Animal Control	**A**	**A**	Continuous animal burrow control program in place that includes the elimination of active burrowing and the filling in of existing burrows.	
		M	The existing animal burrow control program needs to be improved. Several burrows are present which may lead to seepage or slope stability problems, and they require immediate attention.	
		U	Animal burrow control program is not effective or is nonexistent. Significant maintenance is required to fill existing burrows, and the levee will not provide reliable flood protection until this maintenance is complete.	
11. Culverts/ Discharge Pipes[3] (This item includes both concrete and corrugated metal pipes.)	**NA**	**A**	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
		N/A	There are no discharge pipes/ culverts.	
12. Riprap Revetments &	**NA**	**A**	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.	

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Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
Bank Protection		**M**	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.	
		N/A	There is no riprap protecting this feature of the segment / system, or riprap is discussed in another section.	
13. Revetments other than Riprap	**NA**	**A**	Existing revetment protection is properly maintained, undamaged, and clearly visible.	
		M	Minor revetment displacement or deterioration that does not pose an immediate threat to the integrity of the levee. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.	
		N/A	There are no such revetments protecting this feature of the segment / system.	
14. Underseepage Relief Wells/ Toe Drainage Systems	**NA**	**A**	Toe drainage systems and pressure relief wells necessary for maintaining FDR segment / system stability during high water functioned properly during the last flood event and no sediment is observed in horizontal system (if applicable). Nothing is observed which would indicate that the drainage systems won't function properly during the next flood, and maintenance records indicate regular cleaning. Wells have been pumped tested within the past 5 years and documentation is provided.	
		M	Toe drainage systems or pressure relief wells are damaged and may become clogged if they are not repaired. Maintenance records are incomplete or indicate irregular cleaning and pump testing.	
		U	Toe drainage systems or pressure relief wells necessary for maintaining FDR segment / system stability during flood events have fallen into disrepair or have become clogged. No maintenance records. No documentation of the required pump testing.	
		N/A	There are no relief wells/ toe drainage systems along this component of the FDR segment / system.	
15. Seepage	**A**	**A**	No evidence or history of unrepaired seepage, saturated areas, or boils.	
		M	Evidence or history of minor unrepaired seepage or small saturated areas at or beyond the landside toe but not on the landward slope of levee. No evidence of soil transport.	
		U	Evidence or history of active seepage, extensive saturated areas, or boils.	

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Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

[1] If there is significant growth on the levee that inhibits the inspection of animal burrows or other items, the inspection should be ended until this item is corrected.
[2] Detailed survey elevations are normally required during Periodic Inspections, and whenever there are obvious visual settlements.
[3] The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

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	**Inspect ID:** N-09_2014_a_0003 **Title:** USACE_CELRB_N-09_2014_a_0003_1.jpg **Rated Item:** 1. Unwanted Vegetation Growth **Caption:** Rating: Minimally Acceptable; Remarks: Two trees and tall grass (15' R/S toe).; Action: Remove trees and mow grass to less then 6" height; Station_1: 8+50A
	**Inspect ID:** N-09_2014_a_0003 **Title:** USACE_CELRB_N-09_2014_a_0003_2.jpg **Rated Item:** 1. Unwanted Vegetation Growth **Caption:** Rating: Minimally Acceptable; Remarks: Two trees and tall grass (15' R/S toe).; Action: Remove trees and mow grass to less then 6" height; Station_1: 8+50A

	**Inspect ID:** N-09_2014_a_0013 **Title:** USACE_CELRB_N-09_2014_a_0013_1.jpg **Rated Item:** 2. Sod Cover **Caption:** Rating: Acceptable; Remarks: Sod cover adequate.; Action: NA; Station_1: NA
	**Inspect ID:** N-09_2014_a_0034 **Title:** USACE_CELRB_N-09_2014_a_0034_1.jpg **Rated Item:** 2. Sod Cover **Caption:** Rating: Acceptable; Remarks: Sod cover adequate.; Action: NA; Station_1: NA

	**Inspect ID:** N-09_2014_a_0004 **Title:** USACE_CELRB_N-09_2014_a_0004_1.jpg **Rated Item:** 3. Encroachments **Caption:** Rating: Minimally Acceptable; Remarks: Tree debris (15' R/S toe).; Action: Remove tree debris.; Station_1: 8+50A
	**Inspect ID:** N-09_2014_a_0037 **Title:** USACE_CELRB_N-09_2014_a_0037_1.jpg **Rated Item:** 3. Encroachments **Caption:** Rating: Minimally Acceptable; Remarks: Private property sign.; Action: Submit alteration request.; Station_1: NA

	**Inspect ID:** N-09_2014_a_0032 **Title:** USACE_CELRB_N-09_2014_a_0032_1.jpg **Rated Item:** 8. Depressions/ Rutting **Caption:** Rating: Minimally Acceptable; Remarks: 1' x 1' depression on levee crown.; Action: Repair depression.; Station_1: NA
	**Inspect ID:** N-09_2014_a_0033 **Title:** USACE_CELRB_N-09_2014_a_0033_1.jpg **Rated Item:** 8. Depressions/ Rutting **Caption:** Rating: Minimally Acceptable; Remarks: Soil settlement between Floodwall and Levee.; Action: Repair settlement.; Station_1: NA; Station_2: NA

Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Unwanted Vegetation Growth[1]	**M**	**A**	A grass-only or paved zone is maintained on both sides of the floodwall, free of all trees, brush, and undesirable weeds. The vegetation-free zone extends 15 feet from both the land and riverside of the floodwall, at ground-level, to the centerline of the tree. Additionally, an 8-foot root-free zone is maintained around the entire structure, including the floodwall toe, heel, and any toe-drains. If the floodwall access easement doesn't extend to the described limits, then the vegetation-free zone must be maintained to the easement limits. Reference EM 1110-2-301 and/or Corps policy for regional vegetation variance.	N-09_2014_a_0024: Station_1 5+00: Station_2 5+50: Bushes within 15' of L/S of Floodwall.: Remove bushes. (M)
		M	Minimal vegetation growth (brush, weeds, or trees 2 inches in diameter or smaller) is present within the zones described above. This vegetation must be removed but does not currently threaten the operation or integrity of the floodwall.	
		U	Significant vegetation growth (brush, weeds, or any trees greater than 2 inches in diameter) is present within the zones described above. This vegetation threatens the operation or integrity of the floodwall and must be removed.	
2. Encroachments	**M**	**A**	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the floodwall.	N-09_2014_a_0023: Station_1 5+50: White picket fence.: Remove fence within 15' of flood wall or submit alteration request. (M) N-09_2014_a_0025: Station_1 5+00: Station_2 5+50: Patio and tent: Remove encroachment within easement of Floodwall or submit alteration request. (M) N-09_2014_a_0035: Station_1 5+00: White picket fence.: Remove encroachment within easement of Floodwall or submit alteration request. (M)
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the floodwall.	
3. Closure Structures (Stop Log Closures and Gates) (A or U only)	**NA**	**A**	Closure structure in good repair. Placing equipment, stoplogs, and other materials are readily available at all times. Components are clearly marked and installation instructions/ procedures readily available. Trial erections have been accomplished in accordance with the O&M Manual.	
		U	Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.	
		N/A	There are no closure structures along this component of the FDR segment / system.	
4. Concrete Surfaces	**M**	**A**	Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	N-09_2014_a_0008: Station_1 NA: 1/2" x 2' crack in Floodwall.: Repair crack (M) N-09_2014_a_0011: Station_1 NA: Gravity wall in good condition.: NA (A) N-09_2014_a_0021: Station_1 7+00: Crack along previous concrete repair.: Repair crack and monitor fence post. (M)
		M	Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	

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Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	N-09_2014_a_0036: Station_1 0+50: Downstream limit of Floodwall - O.K.: NA (A)
5. Tilting, Sliding or Settlement of Concrete Structures[2]	**A**	**A**	There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M	There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U	There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	
6. Foundation of Concrete Structures[1]	**A**	**A**	No active erosion, scouring, or bank caving that might endanger the structure's stability.	
		M	There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. For the purposes of inspection, the erosion or scour is not closer to the riverside face of the wall than twice the floodwall's underground base width if the wall is of L-wall or T-wall construction; or if the wall is of sheetpile or I-wall construction, the erosion is not closer than twice the wall's visible height. Additionally, rate of erosion is such that the wall is expected to remain stabile until the next inspection.	
		U	Erosion or bank caving observed that is closer to the wall than the limits described above, or is outside these limits but may lead to structural instabilities before the next inspection. Additionally, if the floodwall is of I-wall or sheetpile construction, the foundation is unacceptable if any turf, soil or pavement material got washed away from the landside of the I-wall as the result of a previous overtopping event.	
7. Monolith Joints	**M**	**A**	The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	N-09_2014_a_0022: Station_1 0+50: Station_2 7+00: Monolith joint expansion material missing.: Clean and replace expansion joint material. (M)
		M	The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	

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Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
		N/A	There are no monolith joints in the floodwall.	
8. Underseepage Relief Wells/ Toe Drainage Systems	**A**	**A**	Toe drainage systems and pressure relief wells necessary for maintaining FDR segment / system stability during high water functioned properly during the last flood event and no sediment is observed in horizontal system (if applicable). Nothing is observed which would indicate that the drainage systems won't function properly during the next flood, and maintenance records indicate regular cleaning. Wells have been pumped tested within the past 5 years and documentation is provided.	
		M	Toe drainage systems or pressure relief wells are damaged and may become clogged if they are not repaired. Maintenance records are incomplete or indicate irregular cleaning and pump testing.	
		U	Toe drainage systems or pressure relief wells necessary for maintaining FDR segment / system stability during flood events have fallen into disrepair or have become clogged. No maintenance records. No documentation of the required pump testing.	
		N/A	There are no relief wells/ toe drainage systems along this component of the FDR segment / system.	
9. Seepage	**A**	**A**	No evidence or history of unrepaired seepage, saturated areas, or boils.	
		M	Evidence or history of minor unrepaired seepage or small saturated areas at or beyond the landside toe but not on the landward slope of levee. No evidence of soil transport.	
		U	Evidence or history of active seepage, extensive saturated areas, or boils.	

[1] Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.
[2] The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.

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	**Inspect ID:** N-09_2014_a_0024 **Title:** USACE_CELRB_N-09_2014_a_0024_1.jpg **Rated Item:** 1. Unwanted Vegetation Growth **Caption:** Rating: Minimally Acceptable; Remarks: Bushes within 15' of L/S of Floodwall.; Action: Remove bushes.; Station_1: 5+00; Station_2: 5+50
	**Inspect ID:** N-09_2014_a_0023 **Title:** USACE_CELRB_N-09_2014_a_0023_1.jpg **Rated Item:** 2. Encroachments **Caption:** Rating: Minimally Acceptable; Remarks: White picket fence.; Action: Remove fence within 15' of flood wall or submit alteration request.; Station_1: 5+50

Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

	**Inspect ID:** N-09_2014_a_0025 **Title:** USACE_CELRB_N-09_2014_a_0025_1.jpg **Rated Item:** 2. Encroachments **Caption:** Rating: Minimally Acceptable; Remarks: Patio and tent; Action: Remove encroachment within easement of Floodwall or submit alteration request.; Station_1: 5+00; Station_2: 5+50
	**Inspect ID:** N-09_2014_a_0035 **Title:** USACE_CELRB_N-09_2014_a_0035_1.jpg **Rated Item:** 2. Encroachments **Caption:** Rating: Minimally Acceptable; Remarks: White picket fence.; Action: Remove encroachment within easement of Floodwall or submit alteration request.; Station_1: 5+00

Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

	**Inspect ID:** N-09_2014_a_0008 **Title:** USACE_CELRB_N-09_2014_a_0008_1.jpg **Rated Item:** 4. Concrete Surfaces **Caption:** Rating: Minimally Acceptable; Remarks: 1/2" x 2' crack in Floodwall. ; Action: Repair crack; Station_1: NA; ; ;
	**Inspect ID:** N-09_2014_a_0011 **Title:** USACE_CELRB_N-09_2014_a_0011_1.jpg **Rated Item:** 4. Concrete Surfaces **Caption:** Rating: Acceptable; Remarks: Gravity wall in good condition.; Action: NA; Station_1: NA

	**Inspect ID:** N-09_2014_a_0021 **Title:** USACE_CELRB_N-09_2014_a_0021_1.jpg **Rated Item:** 4. Concrete Surfaces **Caption:** Rating: Minimally Acceptable; Remarks: Crack along previous concrete repair.; Action: Repair crack and monitor fence post.; Station_1: 7+00
	**Inspect ID:** N-09_2014_a_0036 **Title:** USACE_CELRB_N-09_2014_a_0036_1.jpg **Rated Item:** 4. Concrete Surfaces **Caption:** Rating: Acceptable; Remarks: Downstream limit of Floodwall - O.K.; Action: NA; Station_1: 0+50

	**Inspect ID:** N-09_2014_a_0022 **Title:** USACE_CELRB_N-09_2014_a_0022_1.jpg **Rated Item:** 7. Monolith Joints **Caption:** Rating: Minimally Acceptable; Remarks: Monolith joint expansion material missing.; Action: Clean and replace expansion joint material.; Station_1: 0+50; Station_2: 7+00
	**Inspect ID:** N-09_2014_a_0022 **Title:** USACE_CELRB_N-09_2014_a_0022_2.jpg **Rated Item:** 7. Monolith Joints **Caption:** Rating: Minimally Acceptable; Remarks: Monolith joint expansion material missing.; Action: Clean and replace expansion joint material.; Station_1: 0+50; Station_2: 7+00

Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Vegetation and Obstructions	**A**	**A**	No obstructions, vegetation, debris, or sediment accumulation noted within interior drainage channels or blocking the culverts, inlets, or discharge areas. Concrete joints and weep holes are free of grass and weeds.	
		M	Obstructions, vegetation, debris, or sediment are minor and have not impaired channel flow capacity or blocked more than 10% of any culvert openings, but should be removed. A limited volume of grass and weeds may be present in concrete channel joints and weep holes.	
		U	Obstructions, vegetation, debris, or sediment have impaired the channel flow capacity or blocked more than 10% of a culvert opening. Sediment and debris removal required to re-establish flow capacity.	
2. Encroachments	**A**	**A**	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the interior drainage system.	N-09_2014_a_0001: Station_1 6+10A: 12" and 15" HDPE storm drainage outfalls and white reflective post. Approved project alteration.: NA (A) N-09_2014_a_0026: Station_1 3+50: Catch basin for approved project alteration.: NA (A)
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of this component of the interior drainage system.	
3. Ponding Areas	**A**	**A**	No trash, debris, structures, or other obstructions present within the ponding areas. Sediment deposits do not exceed 10% of capacity.	N-09_2014_a_0002: Station_1 8+00A: Adequate mowing.: NA (A)
		M	Trash, debris, excavations, structures, or other obstructions present, or inappropriate activities that will not inhibit operations and maintenance. Sediment deposits do not exceed 30% of capacity.	
		U	Trash, debris, excavations, structures, or other obstructions, or other encroachments or activities noted that will inhibit operations, maintenance, or emergency work. Sediment deposits exceeds 30% of capacity.	
		N/A	There are no ponding areas associated with the interior drainage system.	
4. Fencing and Gates[1]	**NA**	**A**	Fencing is in good condition and provides protection against falling or unauthorized access. Gates open and close freely, locks are in place, and there is little corrosion on metal parts.	
		M	Fencing or gates are damaged or corroded but appear to be maintainable. Locks may be missing or damaged.	
		U	Fencing and gates are damaged or corroded to the point that replacement is required, or potentially dangerous features are not secured.	
		N/A	There are no features noted that require safety fencing.	
5. Concrete Surfaces (Such as gate	**A**	**A**	Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
wells, outfalls, intakes, or culverts)		**M**	Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	
		U	Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	
		N/A	There are no concrete items in the interior drainage system.	
6. Tilting, Sliding or Settlement of Concrete and Sheet Pile Structures[2] (Such as gate wells, outfalls, intakes, or culverts)	**NA**	**A**	There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M	There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U	There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	
		N/A	There are no concrete items in the interior drainage system.	
7. Foundation of Concrete Structures[3] (Such as culverts, inlet and discharge structures, or gatewells.)	**NA**	**A**	No active erosion, scouring, or bank caving that might endanger the structure's stability.	
		M	There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. The rate of erosion is such that the structure is expected to remain stabile until the next inspection.	
		U	Erosion or bank caving observed that may lead to structural instabilities before the next inspection.	
		N/A	There are no concrete items in the interior drainage system.	
8. Monolith Joints	**NA**	**A**	The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	
		M	The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
		N/A	There are no monolith joints in the interior drainage system.	
9. Culverts/ Discharge Pipes[4]	**A**	**A**	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	N-09_2014_a_0005: Station_1 7+10A: 24" CMP Flap gate operated - O.K.: NA (A) N-09_2014_a_0012: Station_1 5+00A: Ponding area outlet: NA (A) N-09_2014_a_0014: Station_1 11+20: 18" CMP outfall.: NA (A) N-09_2014_a_0028: Station_1 3+05: 10" HDPE: NA (A)
		M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
		N/A	There are no discharge pipes/ culverts.	
10. Sluice / Slide Gates[5]	**A**	**A**	Gates open and close freely to a tight seal or minor leakage. Gate operators are in good working condition and are properly maintained. Sill is free of sediment and other obstructions. Gates and lifters have been maintained and are free of corrosion. Documentation provided during the inspection.	N-09_2014_a_0006: Station_1 7+10A: Sluice Gate operated and fully functional.: NA (A)
		M	Gates and/or operators have been damaged or have minor corrosion, and open and close with resistance or binding. Leakage quantity is controllable, but maintenance is required. Sill is free of sediment and other obstructions.	
		U	Gates do not open or close and/or operators do not function. Gate, stem, lifter and/or guides may be damaged or have major corrosion.	
		N/A	There are no sluice/ slide gates.	

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
11. Flap Gates/ Flap Valves/ Pinch Valves[1]	**A**	**A**	Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.	N-09_2014_a_0007: Station_1 7+10A: 24" Flap gate.: NA (A) N-09_2014_a_0027: Station_1 3+05: 10" Flap gate exercised.: NA (A) N-09_2014_a_0029: Station_1 2+05: 18" Flap gate exercised.: NA (A)
		M	Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.	
		U	Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.	
		N/A	There are no flap gates.	
12. Trash Racks (non-mechanical)	**NA**	**A**	Trash racks are fastened in place and properly maintained.	
		M	Trash racks are in place but are unfastened or have bent bars that allow debris to enter into the pipe or pump station, bars are corroded to the point that up to 10% of the sectional area may be lost. Repair or replacement is required.	
		U	Trash racks are missing or damaged to the extent that they are no longer functional and must be replaced. (For example, more than 10% of the sectional area may be lost.)	
		N/A	There are no trash racks, or they are covered in the pump stations section of the report.	
13. Other Metallic Items	**NA**	**A**	All metal parts are protected from corrosion damage and show no rust, damage, or deterioration that would cause a safety concern.	
		M	Corrosion seen on metallic parts appears to be maintainable.	
		U	Metallic parts are severely corroded and require replacement to prevent failure, equipment damage, or safety issues.	
		N/A	There are no other significant metallic items.	
14. Riprap Revetments of Inlet/ Discharge Areas	**A**	**A**	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.	
		M	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.	
		N/A	There is no riprap protecting this feature of the segment / system, or riprap is discussed in another section.	
15. Revetments other than Riprap	**NA**	**A**	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.	

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		M	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.	
		N/A	There are no such revetments protecting this feature of the segment / system.	

[1] Proper operation of this item must be demonstrated during the inspection.
[2] The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.
[3] Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.
[4] The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.
[5] Proper operation of the gates (full open and closed) must be demonstrated during the inspection if no documentation is available. Be aware of both manual and electrical operators.

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

	**Inspect ID:** N-09_2014_a_0001 **Title:** USACE_CELRB_N-09_2014_a_0001_1.jpg **Rated Item:** 2. Encroachments **Caption:** Rating: Acceptable; Remarks: 12" and 15" HDPE storm drainage outfalls and white reflective post. Approved project alteration.; Action: NA; Station_1: 6+10A
	**Inspect ID:** N-09_2014_a_0026 **Title:** USACE_CELRB_N-09_2014_a_0026_1.jpg **Rated Item:** 2. Encroachments **Caption:** Rating: Acceptable; Remarks: Catch basin for approved project alteration.; Action: NA; Station_1: 3+50

Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

	**Inspect ID:** N-09_2014_a_0002 **Title:** USACE_CELRB_N-09_2014_a_0002_1.jpg **Rated Item:** 3. Ponding Areas **Caption:** Rating: Acceptable; Remarks: Adequate mowing.; Action: NA; Station_1: 8+00A
	**Inspect ID:** N-09_2014_a_0005 **Title:** USACE_CELRB_N-09_2014_a_0005_1.jpg **Rated Item:** 9. Culverts/ Discharge Pipes **Caption:** Rating: Acceptable; Remarks: 24" CMP Flap gate operated - O.K.; Action: NA; Station_1: 7+10A

	**Inspect ID:** N-09_2014_a_0012 **Title:** USACE_CELRB_N-09_2014_a_0012_1.jpg **Rated Item:** 9. Culverts/ Discharge Pipes **Caption:** Rating: Acceptable; Remarks: Ponding area outlet; Action: NA; Station_1: 5+00A
	**Inspect ID:** N-09_2014_a_0014 **Title:** USACE_CELRB_N-09_2014_a_0014_1.jpg **Rated Item:** 9. Culverts/ Discharge Pipes **Caption:** Rating: Acceptable; Remarks: 18" CMP outfall.; Action: NA; Station_1: 11+20

	**Inspect ID:** N-09_2014_a_0028 **Title:** USACE_CELRB_N-09_2014_a_0028_1.jpg **Rated Item:** 9. Culverts/ Discharge Pipes **Caption:** Rating: Acceptable; Remarks: 10" HDPE; Action: NA; Station_1: 3+05
	**Inspect ID:** N-09_2014_a_0006 **Title:** USACE_CELRB_N-09_2014_a_0006_1.jpg **Rated Item:** 10. Sluice/ Slide Gates **Caption:** Rating: Acceptable; Remarks: Sluice Gate operated and fully functional.; Action: NA; Station_1: 7+10A

	**Inspect ID:** N-09_2014_a_0006 **Title:** USACE_CELRB_N-09_2014_a_0006_2.jpg **Rated Item:** 10. Sluice/ Slide Gates **Caption:** Rating: Acceptable; Remarks: Sluice Gate operated and fully functional.; Action: NA; Station_1: 7+10A
	**Inspect ID:** N-09_2014_a_0007 **Title:** USACE_CELRB_N-09_2014_a_0007_1.jpg **Rated Item:** 11. Flap Gates/ Flap Valves/ Pinch Valves **Caption:** Rating: Acceptable; Remarks: 24" Flap gate.; Action: NA; Station_1: 7+10A

Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

	**Inspect ID:** N-09_2014_a_0027 **Title:** USACE_CELRB_N-09_2014_a_0027_1.jpg **Rated Item:** 11. Flap Gates/ Flap Valves/ Pinch Valves **Caption:** Rating: Acceptable; Remarks: 10" Flap gate exercised.; Action: NA; Station_1: 3+05
	**Inspect ID:** N-09_2014_a_0029 **Title:** USACE_CELRB_N-09_2014_a_0029_1.jpg **Rated Item:** 11. Flap Gates/ Flap Valves/ Pinch Valves **Caption:** Rating: Acceptable; Remarks: 18" Flap gate exercised.; Action: NA; Station_1: 2+05

Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Vegetation and Obstructions	**A**	**A**	No obstructions, vegetation, debris, or sediment accumulation within the channel. Concrete channel joints and weep holes are free of grass and weeds.	N-09_2014_a_0038: Station_1 NA: Station_2 NA: Monitor for woody vegetation.: NA (A)
		M	Obstructions (including log jams), vegetation, debris, or sediment are minor and have not impaired channel flow capacity, but should be removed. Sediment shoals have not developed to the extent that they can support vegetation other than non-aquatic grasses. A limited volume of grass and weeds may be present in concrete channel joints and weep holes.	
		U	Obstructions (including log jams), vegetation, debris or sediment have impaired the channel flow capacity. Sediment shoals are well established and support woody and/or brushy vegetation. Sediment and debris removal required to re-establish flow capacity.	
2. Shoaling[1] (sediment deposition)	**A**	**A**	No shoaling or minor, non-vegetated shoaling is present.	
		M	More widespread vegetated and non-vegetated shoaling is present. Non-aquatic grasses are present on shoal. No trees or brush is present on shoal, and channel flow is not significantly reduced. Sediment and debris removal recommended.	
		U	Shoaling is well established, stabilized by saplings, brush, or other vegetation. Shoals are diverting flow to channel walls. Channel flow capacity is reduced and maintenance is required.	
3. Encroachments	**M**	**A**	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the channel.	N-09_2014_a_0015: Station_1 9+00: Station_2 12+00: Riprap placed on right bank channel sideslope.: Submit alteration request. (M)
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the channel.	
4. Erosion	**A**	**A**	No head cutting or horizontal deviation observed.	
		M	Head cutting and horizontal deviation evident, but is less than 1 foot from the designed grade or cross section.	
		U	Head cutting and horizontal deviation of more than 1 foot from the designed grade or cross section. Corrective actions required to stop or slow erosion.	
5. Concrete Surfaces	**A**	**A**	Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	
		M	Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	
		N/A	There are no concrete items in the channel.	
6. Tilting, Sliding or Settlement of Concrete Structures[2]	**A**	**A**	There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M	There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U	There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	
		N/A	There are no concrete items in the channel.	
7. Foundation of Concrete Structures[3]	**A**	**A**	No active erosion, scouring, or bank caving that might endanger the structure's stability.	
		M	There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. For the purposes of inspection, the erosion or scour is not closer to the riverside face of the wall than twice the floodwall's underground base width if the wall is of L-wall or T-wall construction; or if the wall is of sheetpile or I-wall construction, the erosion is not closer than twice the wall's visible height. Additionally, rate of erosion is such that the wall is expected to remain stabile until the next inspection.	
		U	Erosion or bank caving observed that is closer to the wall than the limits described above, or is outside these limits but may lead to structural instabilities before the next inspection. Additionally, if the floodwall is of I-wall or sheetpile construction, the foundation is unacceptable if any turf, soil or pavement material got washed away from the landside of the I-wall as the result of a previous overtopping event.	
		N/A	There are no concrete items in the channel.	
8. Slab and Monolith Joints	**NA**	**A**	The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	

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Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		M	The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	
		U	The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
		N/A	There are no concrete items in the channel.	
9. Flap Gates/ Flap Valves/ Pinch Valves[4]	**NA**	**A**	Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.	
		M	Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.	
		U	Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.	
		N/A	There are no flap gates.	
10. Riprap Revetments & Banks	**A**	**A**	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.	N-09_2014_a_0019: Station_1 0+00: Station_2 9+00: Trees above channel side slope riprap.: Monitor trees. (A) N-09_2014_a_0020: Station_1 7+40: Station_2 9+00: Typical riprap condition.: NA (A)
		M	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.	
		N/A	There is no riprap protecting this feature of the segment / system, or riprap is discussed in another section.	
11. Revetments other than Riprap	**NA**	**A**	Existing revetment protection is properly maintained, undamaged, and clearly visible.	
		M	Minor revetment displacement or deterioration that does not pose an immediate threat to the integrity of the levee. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.	
		N/A	There are no such revetments protecting this feature of the segment / system.	

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Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels

[1] If weather and flow conditions allow, inspectors should walk in the channel and probe shoal areas in order to estimate extent of blockage of the cross-sectional area where shoaling is present.
[2] The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.
[3] Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.
[4] Proper operation of this item must be demonstrated during the inspection.

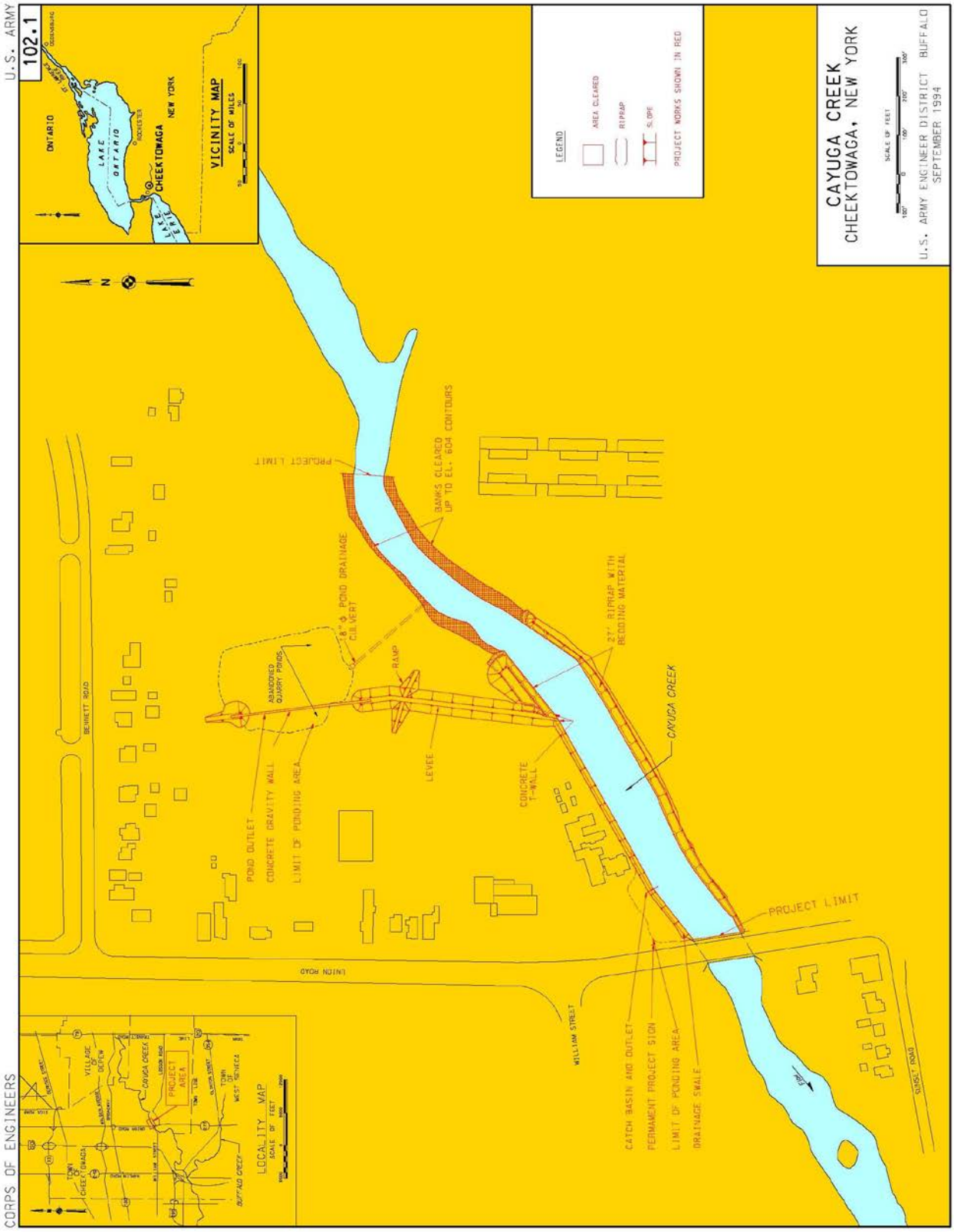
Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

	**Inspect ID:** N-09_2014_a_0038 **Title:** USACE_CELRB_N-09_2014_a_0038_1.jpg **Rated Item:** 1. Vegetation and Obstructions **Caption:** Rating: Acceptable; Remarks: Monitor for woody vegetation.; Action: NA; Station_1: NA; Station_2: NA
	**Inspect ID:** N-09_2014_a_0015 **Title:** USACE_CELRB_N-09_2014_a_0015_1.jpg **Rated Item:** 3. Encroachments **Caption:** Rating: Minimally Acceptable; Remarks: Riprap placed on right bank channel sideslope.; Action: Submit alteration request.; Station_1: 9+00; Station_2: 12+00

	**Inspect ID:** N-09_2014_a_0019 **Title:** USACE_CELRB_N-09_2014_a_0019_1.jpg **Rated Item:** 10. Riprap Revetments & Banks **Caption:** Rating: Acceptable; Remarks: Trees above channel side slope riprap.; Action: Monitor trees.; Station_1: 0+00; Station_2: 9+00
	**Inspect ID:** N-09_2014_a_0020 **Title:** USACE_CELRB_N-09_2014_a_0020_1.jpg **Rated Item:** 10. Riprap Revetments & Banks **Caption:** Rating: Acceptable; Remarks: Typical riprap condition.; Action: NA; Station_1: 7+40; Station_2: 9+00

SUBJECT: FY14 Joint Routine Inspection of Completed Works, Flood Damage Reduction Project, Cayuga Creek, Cheektowaga, New York (09/09/14)

Attachment "C" - Project Map



Attachment D – Section 408 Request to Alter, Impact, or Encroach upon a Buffalo District Inspection of Completed Works Project

SUBJECT: Section 408 Request to Alter, Impact, or Encroach upon a Buffalo District Inspection of Completed Works Project

1. Purpose: This form is to be used for Section 408 requests to alter, impact, or encroach upon a Federally constructed Inspection of Completed Works (ICW) project.

2. Name, City, and State of ICW Project:

3. Name of Alteration:

4. Existing ☐ or Proposed ☐ Alteration

5. Points of Contact:

a. Government:

Name:	Robert W. Remmers, P.E., PMP
Title:	Chief, Operations and Technical Support Section
Address:	U.S. Army Corps of Engineers, Buffalo District 1776 Niagara St. Buffalo, NY 14207
Phone Number:	(716) 879-4277
E-mail Address:	robert.w.remmers@usace.army.mil

b. Requestor (not applicable if Sponsor is Requestor):

Name:	
Title:	
Organization:	
Address:	
Phone Number:	
E-mail Address:	

SUBJECT: Section 408 Request to Alter, Impact, or Encroach upon a Buffalo District Inspection of Completed Works Project

c. Sponsor:

Name:	
Title:	
Organization:	
Address:	
Phone Number:	
E-mail Address:	

6. Brief description or scope of work of alteration:

7. Purpose of alteration:

8. Approx. timeframe of work (Mo./Yr. to Mo./Yr.):

SUBJECT: Section 408 Request to Alter, Impact, or Encroach upon a Buffalo District Inspection of Completed Works Project

9. Property name, description, and address (if applicable):

10. Location of alteration (Body of Water, Bank, Approx. Stationing, Nearby Streets, etc.):

11. Criteria considered in USACE Review: USACE will review the alteration request for potential adverse impacts to the project based on the following criteria:

a. Reliability of the project to function as designed.
b. Sponsor and/or USACE's ability to adequately inspect the project during normal conditions.
c. Sponsor's and/or USACE's ability to adequately inspect the project during potential or actual flood conditions.
d. Sponsor's ability to adequately operate and maintain the project.
e. Sponsor's ability to conduct flood fight operations during an emergency.
f. Alteration impacts to the structural or geotechnical integrity of project components (including stability, embankment or floodwall strength, seepage, sideslopes, closure structures, miscellaneous structures, etc.).
g. Alteration impacts on the hydraulic or coastal functioning of the project.
h. Alteration impacts to a floodplain or floodway.
i. Alteration impacts on the interior drainage system or drainage facilities (i.e outfalls, gatewells, storm sewer lines, pump stations, drainage ditches, etc.).
j. Alteration impacts on environmental aspects of the project, including compliance with National Environment Policy Act (NEPA) requirements.
k. Alteration impacts on safety aspects of the project.
l. Alteration impacts to the real estate easement requirements, including project access.
m. USACE Regulatory permit requirements (for work within "Waters of the United States").

SUBJECT: Section 408 Request to Alter, Impact, or Encroach upon a Buffalo District Inspection of Completed Works Project

12. Additional Operations and Maintenance:

Describe additional operations and maintenance that will be required as a result of this alteration. (Note: Sponsor is required to ensure that adequate additional operations and maintenance is performed, even if alteration is by a third party).

13. The following documents are attached in support of this alteration request:

Detailed Plans ☐ Drawings/Sketches ☐ Photos ☐ Written Details ☐
Other ☐ (Describe):

14. SPECIAL CONDITIONS: If the alteration request is approved, work shall not begin until written approval is obtained from USACE. USACE reserves the right to require a pre/post-construction inspection or meeting with sponsor and other interested parties. If requested by USACE, as-built drawings, construction photographs, or other documentation of the work will be required. Further conditions or requirements may apply and will be provided in writing at the time of approval of the request.

If the alteration request is disapproved, the sponsor will be notified in writing of the justification for disapproval.

SUBJECT: Section 408 Request to Alter, Impact, or Encroach upon a Buffalo District Inspection of Completed Works Project

15. Signature Block:

Requestor (not applicable if Sponsor is Requestor):

Organization or Agency

Printed Name

Title

Signature

Date

Sponsor:

Organization or Agency

Printed Name

Title

Signature

Date

NOTE: An electronic copy of this form is available by contacting Robert Remmers at e-mail address robert.w.remmers@usace.army.mil.

Updated: 2/6/15 (RWR)

Attachment E – Public Sponsor Pre-Inspection Report

US Army Corps of Engineers®

Flood Damage Reduction Systems
Public Sponsor Pre-Inspection Report - 2014

The following information is to be provided by the local sponsor prior to an inspection. This information will be used to help evaluate the organizational capability of the local sponsor to manage the levee system maintenance program.

1. Project name and local sponsor: Cayuga Creek Flood Control Project, Cheektowaga, New York

   New York State Department of Environmental Conservation Region 9

2. Reporting period: (month/day/year to month/day/year)

   8/27/2013 to 9/09/2014

3. Summary of maintenance required by last inspection report:
   (a) Control vegetation at the base of the levee and around the gravity wall (b) maintain grass height of 6 inches (c) address any animal burrows (d) address floodwall encroachments (e) monitor one localized spalling area on river face of concrete floodwall (f) monitor corrosion of embedded fence posts and related cracking on the T floodwall (g) remove all vegetation growing out of the monolith joints and reseal where necessary on the concrete floodwall and gravity wall (h) remove the soft vegetation from the riprap on the right and left banks of the stream channel.

4. Summary of maintenance performed this reporting period:
   (a) Performed routine mowing on the transverse levee, adjacent lawn areas and in front of the gravity wall (b) Greased and operated the gravity wall sluice gate (c) Cut vegetation on the backside of the gravity wall (d) Performed visual inspection of the flapgates and drain pipes through the flood wall (e) Cut and controlled the vegetation on the south (left) bank (f) Removed vegetation from the creek channel (g) Continued to monitor encroachments along the floodwall (h) Monitored encroachments on the earth levee and Pond's edge

5. Summary of maintenance planned next reporting period:
   (a) Continue routine mowing on the transverse levee, adjacent lawn areas and in front of the gravity wall (b) Control vegetation on the backside of the gravity wall (c) Grease and operate the gravity wall sluice gate (d) (e) Remove vegetation from the creek channel (f) Cut and control the vegetation on the south (left) bank (g) Perform visual inspection of the flapgates and drain pipes through the flood wall (h) Continue to monitor encroachments along the floodwall and earth levee. (i) Repair and reseal monolithic joints on the concrete T Floodwall and Gravity Wall

6. Summary of changes to system since last inspection:
   None

7. Problems/ issues requiring the assistance of the US Army Corps of Engineers: None