



DEPARTMENT OF THE ARMY

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

REPLY TO
ATTENTION OF

Operations and Technical Support Section

24 March 2008

SUBJECT: FY07 Joint Routine Inspection of Completed Works, Flood Damage Reduction Project, Cayuga Inlet, New York (9/11/07)

Kevin D. Delaney, P.E.
New York State Department of Environmental Conservation Region 7
615 Erie Blvd. West
Syracuse, NY 13204-2400

Dear Mr. Delaney:

Transmitted herewith is the FY07 Inspection of Completed Works (ICW) inspection report for the Flood Damage Reduction Project for Cayuga Inlet, Ithaca, New York. I would like to thank you for your participation in this inspection. The rating for this project as determined by the current inspection is **"MINIMALLY ACCEPTABLE" (M)**. 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.

Inspection checklist items rated **"ACCEPTABLE" (A)** have no deficiencies or, may have one or more concerns which could lead to potential minor deficiencies. These concerns are indicated in the report as **"POTENTIAL DEFICIENCIES"**. Corrective action of potential deficiencies is not mandatory; however, failure to address them promptly may lead to designation of these items as deficient during the next inspection.

Inspection checklist items rated **"MINIMALLY ACCEPTABLE" (M)** have one or more minor deficiencies. These are indicated in the report as **"MINOR DEFICIENCIES"**. Corrective action is required by the indicated date(s). Failure to perform corrective action for these deficiencies by the specified dates will result in an automatic downgrade of that particular inspection checklist item(s) to **UNACCEPTABLE ("U")** during the first inspection following the correction date, possibly resulting in a downgrade of the overall project rating.

Inspection checklist items rated **"UNACCEPTABLE" (U)** have deficiencies considered to be serious and will require corrective action. These are indicated in the report as **"SERIOUS DEFICIENCIES"**. Corrective action should be initiated as soon as possible. An individual checklist item rated as **"UNACCEPTABLE" (U)** will likely, but not necessarily, result in an overall project rating of **"UNACCEPTABLE" (U)**.

Projects receiving **"ACCEPTABLE" (A)** and **"MINIMALLY ACCEPTABLE" (M)** ratings will remain active in the Corps of Engineers Rehabilitation and Inspection Program (RIP) and will continue to be eligible for Federal funding to repair the project in the event of damage by a storm event. Projects receiving an **"UNACCEPTABLE" (U)** rating will be designated as

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inactive in the Corps of Engineers RIP and will not be eligible for Federal funding to rehabilitate the project in the event of damage by a storm event. Effective date for unsatisfactory projects to be considered inactive will be date of receipt by the local sponsor of the inspection report. For these projects to become active again all serious deficiencies must be satisfactorily addressed and, the project re-inspected by the Corps with at least a minimally acceptable rating.

For projects rated "ACCEPTABLE" (A), a copy of the report will be forwarded to the local sponsor and county emergency management agency. For projects rated "MINIMALLY ACCEPTABLE" (M), a copy of the report will be forwarded to the local sponsor, county emergency management agency, state emergency management agency, and the local FEMA region. For projects rated "UNACCEPTABLE" U, a copy of the report will be forwarded to the local sponsor, county emergency management agency, state emergency management agency, local FEMA region and the local Congressional delegation.

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 Corps inspector upon his 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 the Corps of Engineers and 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.

Sincerely,

Robert W. Remmers, P.E.
Chief, Operations and Technical Support Section

Enclosure:
Project Inspection Report w/Checklist

CF:
Michael Stankiewicz
NYSDEC, Division of Water, Flood Control Project Unit
625 Broadway, 4th Floor
Albany, NY 12233

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CF: (cont'd)

Lee Shurtleff, Director
Tompkins County Department of
Emergency Response
92 Brown Road
Ithaca, NY 14850

Charles Wright, Regional Director
SEMO Region 4
10 Adler Drive
East Syracuse, NY 12804-1107

Brian Shumon, GIS Specialist
Federal Emergency Management Agency; Region II
26 Federal Plaza, Suite 1337
New York, NY 10278

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1. **OBJECTIVE:** The objective of this inspection is to assess the current condition of the project and to ensure that the local sponsor is fulfilling operations and maintenance requirements as specified in the project Operations and Maintenance (O&M) manual.
2. **PROJECT CLASSIFICATION:** Flood Damage Reduction – Flood Protection
3. **REPORTING PERIOD:** 5/25/06 – 9/11/07
4. **INSPECTION TEAM:** The inspection team met at the project site on 9/11/07. The following representatives from the New York State Department of Environmental Conservation (NYSDEC) and U.S. Army Corps of Engineers (USACE - Buffalo District), participated in the inspection.

<u>Name</u>	<u>Organization</u>	<u>Phone</u>
Robert Remmers	USACE - Buffalo District	(716) 879-4277
David Swiatek	USACE - Buffalo District	(716) 879-4371
Larry Lepak	NYSDEC Region 7	(607) 775-2545
James Burke	NYSDEC Region 7	(315) 426-7506
Thomas Swerdan	NYSDEC Region 7	(607) 753-3095
Kevin Delaney	NYSDEC Region 7	(315) 426-7501
Richard Wojcik	NYSDEC Region 7	(607) 775-2545
Dan Fuller	NYSDEC Region 7	(607) 775-2545
Gary Woolschlager	NYSDEC Region 7	(315) 635-6801
Mike Stankiewicz	NYSDEC Albany	(518) 402-8127
Wayne Sincebaugh	Town of Ithaca – Water & Sewer	(607) 273-1656
Gene Redman	Town of Ithaca – Highway	(607) 273-1656
Richard Ferrel	City of Ithaca – Public Works	(607) 272-1718
Andrew Hillman	City of Ithaca – Forester	(607) 272-1718
Matthew Sledjeski	City of Ithaca – Water & Sewer	(607) 272-1717

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 shall be addressed in a timely manner. Failure to correct any deficiencies that have been noted as either minor or serious by the timeframe indicated could result in an "Unacceptable" (U) rating in the next inspection scheduled after that date.

Prior to this evaluation, the project was last inspected on 5/25/06. The condition of the project at the time of that inspection was rated as "Very Good" (C-2), which roughly compares to "Minimally Acceptable" (M) under the current rating system.

6. **PROJECT LOCATION, DESCRIPTION, AND LOCAL SPONSOR:**

- a. **Project Location:** The project is located on Cayuga Inlet, which flows from the northwest corner of Tioga County into the southern end of Cayuga Lake in the city of

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Ithaca. The project extends from the portion of the inlet located just north of Elmira Road (NYS Route 13) to Cayuga Lake.

- b. Project Description:** The current project was constructed in various stages between 1965 and 1997 and protects the City of Ithaca from flooding caused primarily by Cayuga Inlet. It includes three miles of improved channel along Cayuga Inlet upstream of its confluence with Cayuga Lake, auxiliary diversion levees, drainage basins, bank protection, a fixed railroad bridge, drop structures, stilling basins, a fish-way, a diversionary stop log structure, and a number of spoil areas.
 - c. Local Sponsor:** In accordance with the project O&M Manual, NYSDEC Region 7 has assumed responsibility for the maintenance of the project. In turn, NYSDEC has entered into a separate agreement with the City and Town of Ithaca to assist in operating and maintaining the project.
- 7. INSPECTION FINDINGS:** Deficiencies found during this inspection are noted below. Deficiency categories are described in the report transmittal letter. Refer to Attachment "A" for project inspection photographs, Attachment "B" for project inspection ratings of individual inspection items, Attachment "C" for a project map, and Attachment "D" for Emergency Response Plan guidelines.
- a. Potential Deficiencies:**

 - (1) Riprap along right bank channel and levee from approx. Sta. 160+00 to the railroad bridge is showing signs of deterioration - cracking and disintegration is evident but no eroded areas or wash outs present. Riprap is still functional. See photos 5 & 6.
 - (2) Riprap along left bank levee from approx. Sta. 150+00 to the railroad bridge is showing signs of deterioration - cracking and disintegration is evident but no eroded areas or wash outs present. Riprap is still functional. See photos 13.
 - (3) Small-sized graded riprap along left and right banks of Cayuga Inlet between the State St. bridge and Coy Glen is showing signs of deterioration - some washing out/displacement of the coarser stones is evident but no washouts are evident. Riprap is still functional (see photos 22-24).
 - (4) There is reported shoaling (extent unknown) along the portion of the flood control project channel which is coincident with the navigation channel (approximately from the Taughannock Blvd. bridge to Cayuga Lake). Increasing shoaling in the channel reduces the level of flood protection provided.
 - b. Minor Deficiencies:**

 - (1) Vegetation in riprap along right bank Cayuga Inlet channel and levee from approx. Sta. 160+00 to the railroad bridge (see photos 2, 3, 4, 7, & 8).
 - (2) Vegetation in riprap along left bank levee upstream of railroad bridge (see photos 12 & 13).

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- (3) Moderate shoaling has occurred just upstream of Coy Glen drop structures.
- (4) Heavy vegetation and shoaling between upstream and downstream Coy Glen drop structures (see photo 16).
- (5) Vegetation in riprap along right bank Cayuga Inlet channel, just downstream of the railroad bridge (see photo 20).
- (6) Vegetation in riprap along left bank of Cayuga Inlet channel between State St. bridge and Coy Glen (see photos 22 & 23).
- (7) Vegetation in riprap along left bank Cayuga Inlet channel between State St. and Taughannock Blvd. bridges. See photos 27 (near bridge) & 28.
- (8) Vegetation in riprap along left bank of Cayuga Inlet at Allan Treman State Park, including a large overhanging tree (see photos 29-31).
- (9) Two wooden project signs have been removed some time ago from along left and right banks of Cayuga Creek at State Street.

Correction of all of the above deficiencies is required by 12/31/08.

c. **Serious Deficiencies:** None.

8. SUMMARY OF MAINTENANCE REQUIRED BY LAST INSPECTION REPORT:

- (1) Continue vegetation control throughout the project; especially within the riprapped areas.
- (2) More emphasis is required on vegetation control from the project mid-point to the upstream limits of the project
- (3) Replace the two missing project signs which were removed from near the State Street bridge (left and right banks).

9. SUMMARY OF MAINTENANCE PERFORMED AFTER LAST INSPECTION:

- (1) Vegetation control and mowing of levees and grassy areas.

10. SUMMARY OF CHANGES TO PROJECT SINCE LAST INSPECTION:

- (1) None.

11. PROBLEMS/ISSUES REQUIRING ASSISTANCE OF USACE:

- (1) The Buffalo District Corps is participating on an advisory committee for a study led by the City of Ithaca to dredge the flood control channel.

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(2) The right bank levee appears to drop down prematurely just upstream of the railroad bridge. The project was apparently designed this way, however, the Buffalo District Corps should review this design as to why the levee doesn't fully tie into high ground and, what the impacts might be in regards to potential flooding of the adjacent area. It is noted that the left bank levee and railroad stop-log closure is higher than the right bank levee in this location. See photo 10.

12. ADDITIONAL OBSERVATIONS:

(1) The levees were mowed and well maintained, except for vegetation in riprapped areas. See notes in this report on riprap. See photos 1, 3, 4, 8, 11, 12, & 18.

(2) The Cayuga Inlet channel was clear of debris and obstructions for its entire length as viewed from the water surface (see photos 2, 8, 9, 21-23, 25-28, 31, & 32.

(3) The stop-log closure structure and stop-logs were in good condition (see photo 11 for closure structure). The railroad bridge was also in satisfactory condition - no signs or erosion around abutments (see photos 7, 9, & 10)

(4) The exterior of the fishway is satisfactory, however, no inspection of the interior of the facility was conducted this inspection.

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

(1) The project sponsor needs to have a written system-specific flood Emergency Response Plan to document that they have a solid understanding of how to operate, maintain, and staff the Flood Damage Reduction project during a flood. General guidance for preparing this document is presented in Attachment "D. The project sponsor must physically produce a copy of the project Operations and Maintenance manual and the written Emergency Response Plan for Corps review during all future project inspections beginning in 2008. Failure to provide these required documents will result in a **"Minimally Acceptable"** (M) rating for these specific items and an overall project rating that will also be no better than **"Minimally Acceptable"** (M).

(2) All riprapped areas, including along the right and left bank levees/channel upstream of the railroad bridge, in and around Coy Glen, and along the left and right banks of the Cayuga Inlet channel between the State St. bridge and Coy Glen, need to be closely monitored for further deterioration, especially after a storm event. Any erosion areas or washouts which may form, should be repaired immediately. Riprap is still functional but is showing signs of deterioration.

(3) Vegetation needs to be removed from all riprapped areas as noted in Section 7.b. above.

(4) Shoaling upstream of Coy Glen drop structure needs to be removed.

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(5) Vegetation and shoaling between upstream and downstream Coy Glen drop structures need to be removed.

(6) Large overhanging tree on left bank of Cayuga Inlet at Allan Treman State Park needs to be removed.

(7) The two missing wooden project signs need to be replaced in the locations from which they were removed (State Street along left and right banks).

(8) The extent of the shoaling problem in the Cayuga Creek flood control channel needs to be identified and the channel dredged to restore it back to its original dimensions in order to restore project design level of flood protection. It is acknowledged that NYSDEC and the City of Ithaca, as well as other agencies, are developing a plan to identify and remove the reported shoaling.

14. INSPECTION REPORT PREPARED AND REVIEWED BY:

Robert W. Remmers, P.E.
Chief, Operations and Technical Support Section

15. LIST OF ATTACHMENTS:

- A. Project Inspection Photographs
- B. Project Inspection Checklist
- C. Project Map
- D. Emergency Response Plans Guidelines

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Attachment “A” - Project Inspection Photographs



Photo 1: Right bank levee looking upstream towards Route 13 from approx. Sta. 157+00.



Photo 2: Vegetation in riprap along right bank – looking upstream from approx. Sta. 152+00.

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Photo 3: Right bank levee looking upstream from approx. Sta. 146+00. Vegetation in riprap.



Photo 4: Right bank levee and channel upstream of railroad bridge. Vegetation in riprap.

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Photo 5: Riprap along right bank upstream of railroad bridge.



Photo 6: Close-up of riprap along right bank, upstream of railroad bridge.

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Photo 7: Fishway (right bank), low head dam, and railroad bridge, looking downstream. Vegetation in riprap along right bank.



Photo 8: Low head dam just upstream of railroad bridge. Vegetation in riprap along right bank.

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Photo 9: Railroad bridge over Cayuga Inlet, looking upstream.



Photo 10: Fishway (right bank) and railroad bridge over Cayuga Inlet (looking toward railroad stoplog closure).

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Photo 11: Railroad stoplog closure and left bank levee, looking upstream.



Photo 12: Left bank levee looking downstream from approx. Sta. 147+00.

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Photo 13: Vegetation in riprap along left bank levee, just upstream of railroad bridge.



Photo 14: Coy Glen drop structures. Vegetation along sideslopes and between structures.

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Photo 15: Shoaling in Coy Glen just upstream of Coy Glen drop structures.



Photo 16: Heavy vegetation and shoaling between Coy Glen upstream and downstream drop structures.

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Photo 17: Energy dissipaters and pool at Coy Glen drop structure.



Photo 18: Drainage pipe through left bank levee, just downstream of railroad.

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Photo 19: Riprap basin at Coy Glen looking downstream towards Cayuga Inlet channel.



Photo 20: Right bank Cayuga Inlet, just downstream of railroad bridge. Vegetation in riprap.

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Photo 21: Cayuga Inlet channel looking downstream from Coy Glen.



Photo 22: Left bank of Cayuga Inlet channel, looking downstream from approx. Sta. 110+00. Vegetation in riprap.

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Photo 23: Left bank of Cayuga Inlet channel, looking upstream from approx. Sta. 110+00. Vegetation in riprap.



Photo 24: Close-up of deteriorated riprap along left bank; approx. Sta. 110+00.

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Photo 25: Right bank of Cayuga Inlet channel just upstream of State St. bridge.



Photo 26: Right bank of Cayuga Inlet channel upstream of State St. bridge.

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Photo 27: Cayuga Inlet channel upstream of State St. bridge, looking upstream.



Photo 28: Cayuga Inlet channel upstream of Taughannock Boulevard bridge, looking downstream. Vegetation in riprap.

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Photo 29: Left bank of Cayuga Inlet at Allan Treman State Park. Vegetation in riprap and tree overhanging channel



Photo 30: Left bank of Cayuga Inlet at Allan Treman State Park – large tree growing through riprap.

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Photo 31: Left bank of Cayuga Inlet at Allan Treman State Park – vegetation in riprap.



Photo 32: Cayuga Inlet at confluence with Cayuga Lake.



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Attachment "B"

Flood Damage Reduction Systems Inspection Report

Name of System: Flood Damage Reduction Project, Cayuga Inlet, Ithaca, New York

Public Sponsor(s): NYSDEC Region 7

Public Sponsor Representative: Kevin D. Delaney

Sponsor Phone: (315) 426-7501

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

Corps of Engineers Inspector: Robert Remmers, David Swiatek Date of Inspection: 9/11/07

Inspection Report Prepared By: Robert Remmers Date Report Prepared: 3/28/08

Internal Technical Review (for Periodic Inspections) By: N/A Date of ITR: N/A

Final Approval By: N/A Date Approved: N/A

Type of Inspection: Initial Eligibility Inspection
 Continuing Eligibility Inspection (Routine)
 Continuing Eligibility Inspection (Periodic)

Overall System Rating: Acceptable
 Minimally Acceptable
 Unacceptable

Contents of this Report: Instructions
 Public Sponsor Pre-Inspection Report
 General Items
 Levee Embankments
 Floodwalls
 Interior Drainage System
 Pump Stations
 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.

Instructions - Inspection of Flood Damage Reduction 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 Flood Damage Reduction "systems" as complete and independent units, regardless of relevant "project" or "segment" boundaries.

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 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 and one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable items would not prevent the system from performing as intended during the next flood event.	One or more items are rated as Unacceptable and would prevent the 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.



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Flood Damage Reduction Systems Public Sponsor Pre-Inspection Report

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:
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 system since last inspection:
7. Problems/ issues requiring the assistance of the US Army Corps of Engineers:

General Items - Flood Damage Reduction Systems

For use during all inspections of all Flood Damage Reduction 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.	Refer to Section 13.(1), FY07 Inspection Report
		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 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.	*Refer to Section 13.(1), FY07 Inspection Report
		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.	

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Levee Embankments - Flood Damage Reduction Systems

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
1. Unwanted Vegetation Growth ¹	A	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.	
		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 be removed to reestablish or ascertain levee integrity.	
2. Sod Cover	A	A There is good coverage of sod over the levee.	
		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	A	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.	
		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 Closures) (A or U only)	A	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 system.	

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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.

Levee Embankments - Flood Damage Reduction Systems

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
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 ¹	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	A	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.	
		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.	
		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.	

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¹ Detailed survey elevations are normally required during Periodic Inspections, and whenever there are obvious visual settlements.

Levee Embankments - Flood Damage Reduction Systems

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	N/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.	
		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.	

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¹ 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.

Levee Embankments - Flood Damage Reduction Systems

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
12. Riprap Revetments & Bank Protection	M	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.	Refer to Sections 7.a.(1),(2), 7.b.(1),(2) and 13.(2),(3), FY07 Inspection Report
		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 system, or riprap is discussed in another section.	
13. Revetments other than Riprap	N/A	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 system.	
14. Underseepage Relief Wells/ Toe Drainage Systems	N/A	A Toe drainage systems and pressure relief wells necessary for maintaining FDR 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 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 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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Channels - Flood Damage Reduction Systems

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	M	A No obstructions, vegetation, debris, or sediment accumulation within the channel. Concrete channel joints and weep holes are free of grass and weeds.	Refer to Sections 7.b.(1),(4),(5),(6),(7),(8) and 13.(3),(5),(6), FY07 Inspection Report
		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)	M	A No shoaling or minor, non-vegetated shoaling is present.	Refer to Sections 7.a.(4), 7.b.(3),(4) and 13.(4),(5),(8), FY07 Inspection Report
		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	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 channel.	
		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.	

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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.

Channels - Flood Damage Reduction Systems

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

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
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.	Coy Glen Drop Structures.
		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 channel.	
6. Tilting, Sliding or Settlement of Concrete Structures ¹	A	A There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	Coy Glen Drop Structures.
		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 ²	A	A No active erosion, scouring, or bank caving that might endanger the structure's stability.	Coy Glen Drop Structures.
		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 stable 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.	

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¹ The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.

² 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.

Channels - Flood Damage Reduction Systems

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

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
8. Slab and Monolith Joints	A	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.	Coy Glen Drop Structures.
		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 ¹	N/A	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	M	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.	Refer to Sections 7.a.(1),(3), 7.b.(1),(5),(6),(7),(8) and 13.(2),(3), FY07 Inspection Report
		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 system, or riprap is discussed in another section.	
11 Revetments other than Riprap	A	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 system.	

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¹ Proper operation of this item must be demonstrated during the inspection.

Subject: FY07 Joint Inspection of Completed Works, Flood Damage Reduction Project, Cayuga Inlet, Ithaca, New York (9/11/07)

Attachment “D” - Emergency Response Plan Guidelines

The local sponsor must develop and maintain a written system specific response plan for emergency preparedness and have a solid understanding of how to operate, maintain, and staff the project during an emergency flooding event. These plans should address, at minimum, the following key elements:

1. Organizational Chart/Roster: A chain of command that indicates who will be contacted during a flood emergency.
2. List of Important Project Features: A bullet point list or annotated map that identifies: potentially critical weak points; locations of important structures such as gates, drains, closures; alternate access points, should areas become impassible; available sources of emergency supplies.
3. Flood Plan Response: The written plan does not need to be long or wordy, but should indicate what needs to be done during a flood fight and when. The plan should identify the hierarchy of responsibility, procedures, and equipment. Evacuation plans should be included in the flood plan response.
4. Short Term Planning Elements: Provisions to address temporary situations. For example, what to do in case of flooding during short term construction or replacement of critical elements.
5. Continued Plan Management: Plan should be reviewed annually and amended or revised as necessary; updates to critical information and contacts should be included.

Refer to pages 35 through 52 of Levee Owner’s Manual for Non-Federal Flood Control Works, for additional specific information. This document is available for download via the following link:

http://www.usace.army.mil/cw/cecwhs/em/fcw/lom/pdf_files/Levee%20Owner%27s%20Manual.pdf