SUMMARY REPORT

OPERATIONS and MAINTENANCE PLANS and CRITERIA

HOUSATONIC RIVER and NAUGATUCK RIVER

FLOOD PROTECTION PROJECTS

SECTION 1

ANSONIA and DERBY, CONNECTICUT

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Prepared for:

City of Ansonia
253 Main Street
Ansonia, CT 06401

City of Derby
One Elizabeth Street
Derby, CT 06418

Prepared by:

MILONE & MACBROOM
99 Realty Drive / Cheshire, Connecticut 06410
203.271.1773 / 203.272.9733 (Fax)
www.miloneandmacbroom.com

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Date of Inspection – 4/22/2009 – Provided to Ansonia on February 3, 2010

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Date of Inspection – 4/23/2009 – Provided to Derby on February 3, 2010

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OPERATION AND MAINTENANCE MANUAL FOR FLOOD PROTECTION WORKS – ANSONIA, CONNECTICUT – REVISED DECEMBER 2010
(under separate cover)

OPERATION AND MAINTENANCE MANUAL FOR FLOOD PROTECTION WORKS – DERBY, CONNECTICUT – REVISED DECEMBER 2010
(under separate cover)

1.0 INTRODUCTION

In June 2010, Ansonia and Derby retained Milone & MacBroom, Inc. (MMI) of Cheshire, Connecticut to perform the investigative and engineering services required to pursue accreditation of Section 1 of the Housatonic River and Naugatuck River Flood Control Systems. In order to establish and/or maintain accreditation of a levee system, the levee owners (Ansonia and Derby) are required to demonstrate compliance with Section 65.10 under Title 44, Chapter 1, Subchapter B, Part 65 of the Code of Federal Regulations.

For the purposes of this report, the observations, analyses, conclusions, and recommendations provided herein pertain to Section 1 only as described below:

- Section 1 – The left (east) bank of the Housatonic River in Derby from Bridge Street to the confluence with the Naugatuck River/Route 8 embankment and the right (west) bank of the Naugatuck River from the Main Street (Route 34) bridge north through Derby to the embankment supporting Pershing Drive in Ansonia

In particular, this report provides an assessment of the existing operation and maintenance plans and criteria associated with the flood protection systems in accordance with Section 65.10(c) and (d) summarized under Section 2 below.

2.0 FEDERAL REGULATORY CRITERIA

44 CFR Section 65.10(c) - *Operations plans and criteria*

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

Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP.

44 CFR Section 65.10(c)(1) - *Closures*

Operation plans for closures must include the following:

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

44 CFR Section 65.10(c)(2) - *Interior drainage systems*

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

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

44 CFR Section 65.10(c)(1) - *Other operation plans and criteria*

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

44 CFR Section 65.10(d) - *Maintenance plans and criteria*

For levee systems to be recognized as providing protection from the base flood, the maintenance criteria must be as described herein. Levee systems must be maintained in accordance with an officially adopted maintenance plan, and a copy of this plan must be provided to FEMA by the owner of the levee system when recognition is being sought or when the plan for a previously recognized system is revised in any manner. All maintenance activities must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance. This plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. At a minimum, maintenance plans shall specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance.

3.0 SUMMARY OF OPERATIONS AND MAINTENANCE PLANS

3.1 History

City of Ansonia

On March 31, 1967, the Mayor of the City of Ansonia with the approval and consent of its Board of Aldermen executed an assurance agreement with the U.S. Army Corps of Engineers (USACE) to maintain and operate the flood control works in accordance with the regulations established by the USACE and later supplemented by specific operation and maintenance procedures outlined in the May 1973 Operation and Maintenance Manual provided to the city following completion of the construction of the Ansonia Local Protection Project.

City of Derby

On June 26, 1968, the Mayor of the City of Derby with the approval and consent of its Board of Aldermen executed an assurance agreement with the USACE to maintain and operate the flood control works in accordance with the regulations established by

the USACE and later supplemented by specific operation and maintenance procedures outlined in the September 1973 Operation and Maintenance Manual provided to the city following completion of the construction of the Derby Local Protection Project.

3.2 Regulatory Oversight

Ansonia and Derby's responsibilities under this manual are under the jurisdiction of the USACE, District Engineer, and the system is subject to annual and periodic inspections by the USACE and its consultants. The USACE determines whether the status of the flood protection system is active or inactive based upon the results of the inspections and the implementation of repairs and maintenance in response to requirements and recommendations offered by the USACE and other duly authorized agencies or individuals.

More specifically, the USACE assigns one of three system or segment ratings based upon the inspection results and findings, which are:

- Acceptable
- Minimally Acceptable
- Unacceptable

Ansonia

In the USACE's most recent inspection report for the segment described as the Naugatuck River RB-Southend, Ansonia received a Minimally Acceptable rating with several areas requiring attention in order to maintain an "active" status for this segment.

The following categories/items were rated Unacceptable:

- Unwanted vegetation growth (along slope and adjacent to railroad flood gate)
- Culverts/discharge pipes (lack of camera inspections)
- Megger testing on pump motors and critical power cables

The following categories/items were rated Minimally Acceptable:

- Animal control (animal burrows along levee embankment)
- Sluice/slide gates (safety concern – missing gate well cover plates)
- Safety compliance (lack of safety compliance reports)
- Shoaling (sediment deposition) - large islands and sediment build – monitor and dredge if deposition begins to impede channel flow

Derby

In the USACE's most recent inspection report for the segment described as the Naugatuck River RB-Southend Derby/Housatonic River LB Derby, CT, Derby received a Minimally Acceptable rating with several areas requiring attention in order maintain an "active" status for this segment.

The following categories/items were rated Unacceptable:

- Unwanted vegetation growth
- Underseepage relief wells/toe drainage systems (testing and inspection)
- Culverts/discharge pipes (lack of camera inspections – location of risers and drains)
- Megger testing on pump motors and critical power cables

The following categories/items were rated Minimally Acceptable:

- Encroachments (storage of equipment materials)
- Animal control (animal burrows along levee embankment)
- Revetments other than riprap (monitor condition of metal bin type retaining walls)
- Seepage (vegetation obscured view of interior ponds and standing water near toe drain and relief wells)
- Unwanted vegetation growth (near floodwalls)
- Monolith joints (reseal cracked joints)
- Safety compliance (lack of safety compliance reports)

Since receipt of the USACE's inspection reports, both municipalities have pursued measures to address the Unacceptable and Minimally Acceptable items in addition to their standard operation and maintenance procedures. The following items have been pursued:

<u>Unwanted Vegetation Growth</u>

- Derby has removed most of the encroaching vegetation adjacent to the flood control structures. Along the Route 8 embankment, vegetation removal has been initiated but has not been completed. More information regarding the vegetation removal in this area is provided in the Engineering Report – Embankment Protection Analysis, prepared by MMI, dated December 2010 and included as Appendix C of the collective Federal Emergency Management Agency (FEMA) Certification package.
- Ansonia has also completed most of the removal of unwanted vegetation along this segment of the levee system.

Underdrains, Culverts, and Discharge Pipes

- Closed circuit television (CCTV) inspections have been performed in the accessible underdrains, culverts, and discharge pipes including those that pass through the levee embankment and those that collect interior drainage. More information regarding the piping inspections and the CCTV inspections of each of the Derby relief wells is provided in the Engineering Report – Interior Drainage Analysis, prepared by MMI, dated December 2010 and included as Appendix F of the collective FEMA Certification package.

Megger Testing at Pump Stations

- The pumps at both the Ansonia and Derby pumping stations are diesel engine driven and designed to be operational without electrical service. At the Derby pump station, Megger Testing was performed on the internal electrical conductors and also on the service provided via the Derby Water Pollution Control Authority plant. Emergency power is also available from the existing generator located at the plant facility. More information regarding the pumping stations is provided in the Engineering Report – Interior Drainage Analysis, prepared by MMI, dated December 2010 and included as Appendix F of the collective FEMA Certification package.

The municipalities continue to investigate and address the other Minimally Acceptable items including repairs to animal burrows and monitoring areas where minor repairs and maintenance can prevent Unacceptable deteriorations.

The Operations and Maintenance Manuals referenced herein originally provided specific procedures that included flood warning protocols, detailed and specific actions, assignments of personnel and responsible individuals, notification to railroad authorities and other critical agencies, equipment and flood fighting materials (i.e., readily available supply of sand and

sandbags, etc.), and other provisions for periodic and flood time inspection of interior drainage systems, mechanical features, and any other flood control features. The manual also outlines specific intervals for when inspections, maintenance, and testing of the system should be performed.

As part of the FEMA Certification documentation, the original Operations and Maintenance Manuals have been updated for Section 1 of the Derby and Ansonia shared flood control system to incorporate current regulations provided by FEMA, reference to current Levee Ownership Manuals, new USACE inspection forms and format, emergency contact personnel information, and other items that help to bring the manual into compliance with current engineering and emergency preparedness practices.

4.0 CONCLUSIONS

The updated Operation and Maintenance Manuals for Ansonia and Derby are included as appendices to this report. On October 28, 2010, the Derby Board of Aldermen adopted the revised manual with the provision to include subsequent revisions that may result during the FEMA accreditation or through review by the USACE. On December 14, 2010, the Ansonia Board of Aldermen initiated their discussion regarding the updated manual, and formal adoption is expected in December 2010.

For the limited section of the Ansonia flood control system included in this phase of the certification effort, the only updates to the manual include reference to updated regulations, reference to current levee maintenance documentation, and updated emergency personnel notification information.

Therefore, it is our opinion that Operation and Maintenance Plans originally prepared for the Ansonia and Derby local flood protection projects and the updated manuals meet the requirements outlined in 44 CFR Section 65.10(c) and (d).

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