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Via Electronic Mail

September 16, 2022

Mr. Joshua Fontaine
U.S. Environmental Protection Agency, New England Region
Five Post Office Square
Suite 100
Boston, MA 02109

Re: GE-Pittsfield/Housatonic River Site
Rest of River (GECD850)
Operation, Monitoring, and Maintenance Plan for Willow Mill Dam

Dear Mr. Fontaine:

Under the Revised Final Resource Conservation and Recovery Act Permit issued by EPA to GE on December 16, 2020 and the *Final Revised Rest of River Statement of Work* (Final Revised SOW), submitted to and approved by EPA in September 2021, GE is required to prepare and submit monitoring and maintenance plans for the non-GE-owned dams on the Housatonic Rest of River in Massachusetts. Section II.B.2.j.(2)(b) of the Revised Permit and Section 4..5.3 of the Final Revised SOW specify the requirements to be included in those plans; and they also allow GE to request EPA approval for another party, such as the dam owner/operator, to implement some or all of the required monitoring and maintenance activities.

Enclosed is an Operation, Monitoring, and Maintenance Plan for Willow Mill Dam. Based on discussions and agreement with the dam owner, Onyx Specialty Papers, Inc. (Onyx), this plan provides for some activities to be performed by Onyx as dam owner and operator and some to be performed by GE. By this letter, GE is requesting EPA's approval for Onyx to perform the monitoring and maintenance activities specified in this plan as activities to be performed by the dam owner/operator.

Please let me know if you have any questions about the enclosed Operation, Monitoring, and Maintenance Plan or the division of responsibilities specified in it.

Very truly yours,

Kevin G. Mooney
Senior Project Manager – Environmental Remediation

Enclosure

SEMS Doc ID 668289

Cc: (via electronic mail)

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Donald Zukowski, Onyx
Andrew Begrowicz, Onyx
John Healy, Onyx
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OPERATION, MONITORING, AND MAINTENANCE PLAN WILLOW MILL DAM – MA 00262

South Lee, MA

September 16, 2022

PREPARED FOR:
Onyx Specialty Papers, Inc.
Lee, Massachusetts
and
General Electric Company
Pittsfield, Massachusetts

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1.0 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This document constitutes an Operation, Monitoring, and Maintenance (OM&M) Plan for the Willow Mill Dam (MA00262, also known as Hurlbut Dam, and referred to herein as the Dam), which is owned by the Onyx Specialty Papers, Inc. (Onyx, referred to herein as the Owner/Operator) and is located on the Housatonic River in in South Lee, Massachusetts (**Figure 1**). This document and the forms and figures included in this Plan will be periodically reviewed and modified as necessary to reflect operational and structural changes to the Dam. This OM&M Plan was prepared by GZA GeoEnvironmental, Inc. (GZA) on behalf of Onyx and the General Electric Company (GE). This Plan provides for some activities to be performed by Onyx as the Dam Owner/Operator and some to be performed by GE. Responsibility for operation, monitoring and maintenance activities is discussed in the sections below and in the summary table in Section 9. This division of responsibilities has been discussed with and agreed to by the Owner/Operator and GE.

This OM&M Plan is submitted pursuant to the Revised Final Resource Conservation and Recovery Act (RCRA) Permit issued by the United States Environmental Protection Agency (EPA) to GE on December 16, 2020 (Revised EPA Permit) and Section 4.5.3 of GE's Final Revised Rest of River Statement of Work (Final Revised SOW), submitted by GE and approved by EPA in September 2021. The procedures described herein have been developed in consideration of the requirements specified in those documents, as well as the procedures that Onyx currently follows, which conform to the Massachusetts Dam Safety Regulations set forth in 302 CMR 10.00.

Unless otherwise noted, elevations in this OM&M Plan were supplied by others and are referenced to the National Geodetic Vertical Datum of 1929 (NGVD).

1.2 PURPOSE

The purpose of this OM&M Plan is to describe the OM&M program for Willow Mill Dam. One objective of that program is to minimize releases of polychlorinated biphenyls (PCBs) in the sediments and surface water of the Willow Mill impoundment behind the Dam that could be prevented by appropriate inspection, monitoring, and maintenance activities for the Dam.

The responsibility for maintaining a safe dam rests with the dam owner. The Massachusetts Dam Safety Regulations state in 302 CMR 10.13 that "the owner shall be responsible and liable for damage to property of others or injury to persons, including but not limited to loss of life, resulting from the operation, failure of or mis-operation of a dam."

Definitions of commonly used terms associated with dams and/or used in this OM&M Plan are provided in **Attachment A**. This plan also contains visual inspection checklists for the quarterly, annual, and Phase I engineering inspections discussed in Section 3. The Owner/Operator's current Emergency Action Plan (EAP) addressing emergency dam safety conditions is provided in **Attachment B**.

1.3 DESCRIPTION OF THE WILLOW MILL DAM

1.3.1 Dam Location

Town: South Lee

County: Berkshire

The Dam is located on the Housatonic River just south of Route 102, about three miles west of the intersection of the Massachusetts Turnpike and Route 102, in South Lee, Massachusetts. The left (south) abutment of the Dam is part of a parking lot for an existing paper mill (Onyx Specialty Papers, Inc. at 40 Willow Street). To access the right (north) abutment from Route 102, one turns south onto Willow Street, and an existing parking lot is located on the right abutment. Willow Street crosses the Housatonic River approximately 100 feet downstream of the dam over an existing concrete arch bridge.

The Willow Mill Dam location is shown on **Figure 1** and on the United States Geological Survey (USGS) Stockbridge, MA topographic map. The approximate coordinates are -73.2847 degrees longitude and 42.2760 degrees latitude.

1.3.2 Description of the Dam and Appurtenances

Willow Mill Dam is a run-of-the-river dam which impounds the main branch of the Housatonic River. The Dam has a structural height of about 24 feet and a length of approximately 150 feet. Major dam components include (from left to right): an intake structure with auxiliary spillway/headrace channel; a central arched spillway; and a river outlet control outlet structure with two outlet gates (Refer to **Figure 2** for a site plan of the dam).

The primary spillway is a run-of-the-river arched stone masonry structure with a mid-point arc length of about 110 feet and a width that varies from approximately nine feet at the crest to a maximum of about 14 feet at the base. The height of the primary spillway overflow section ranges from approximately 10 feet at the left (south) abutment to 14 feet at the right (north) abutment. The hydraulic height of the dam is therefore 14 feet. A local area about 25 feet from the right abutment has a height of about 17 feet at the downstream face.

Adjacent to the right (north) abutment is the river outlet control structure which contains two river-level sluiceways (approximately six feet high by five feet wide) controlled by manually operated sluicegates. A reinforced concrete buttress was constructed on the downstream side of the river outlet control structure in 1994.

The left masonry abutment is a stone masonry intake structure near the south bank of the river. It forms the terminus of both the primary and secondary spillways. It also supports the intake trash racks and headwall where the headrace control gates are located. A fire protection intake is located between the trash racks and headrace control gates. The left masonry abutment is not part of the natural riverbank, but is a free-standing structure, approximately 18 feet tall, founded on bedrock in the river channel. A reinforced concrete buttress was constructed on the downstream side of the left masonry abutment in 2002 and faced with stone in 2004.

The auxiliary spillway is a separate masonry structure which extends from the left masonry abutment to the masonry training wall on the east side of Willow Street. The auxiliary spillway is a gravity structure which also forms the north side of the headrace channel. The auxiliary spillway is approximately 56 feet long and ranges in height from approximately 9 to 12 feet. The upstream face (headrace side) is battered (i.e., receding), while the downstream face is approximately vertical. The crest of the structure is capped with granite slabs which slopes

down towards the headrace channel. A reinforced concrete buttress was constructed at the downstream face of the auxiliary spillway in 2002 and faced with stone in 2004. The headrace is a short open channel canal which conveys diverted river water into an enclosed channel under the Willow Street roadway and mill, then into steel penstocks which supply mill process water and an off-line turbine. After water has passed the mill, it flows into a 160-foot-long masonry tailrace and is discharged back into the river through a concrete headwall approximately 600 feet downstream of the dam. Two slide gates at the headrace headwall control flow into the headrace. These control sluicegates are typically open to provide continuous flow through the headrace. In addition, during periods of high flow in the river, excess water is discharged from the canal over the crest of the auxiliary spillway, providing additional hydraulic capacity. Water flowing over the auxiliary spillway falls onto the top of the concrete buttress and then onto the bedrock at the toe of the buttress and flows back into the river channel just upstream of the Willow Street Bridge. An uncontrolled six-inch diameter canal drain pipe is located at the base of the auxiliary spillway near the canal streambed.

Stone masonry training walls on both sides of the river upstream of the dam abutments direct streamflow to the Dam and spillway. Downstream of the Dam, the channel walls consist of stone masonry and/or cast-in-place concrete. Portions of these walls form abutments of the steel Willow Street Bridge (located about 100 feet downstream of the Dam) which provides access to the mill from Route 102.

1.3.3 Dam Construction History

The Willow Mill Dam, including the stone masonry canal walls, arched dam, buttresses, headrace and tailrace, were all constructed in 1872. The impoundment was formerly used to power the mill and generate electricity. Miscellaneous repairs to the stone-masonry walls and Dam were performed in 1985, and in 1993 a fish screen was installed at the intake on the left abutment. In 1994 a stone-masonry buttress was installed at the right abutment, and in 1995 a sinkhole was repaired behind the training wall near the right abutment. From 2002 to 2004, reinforced concrete buttresses faced with stone were constructed at the downstream face of the auxiliary spillway and left masonry abutment. The 2002 to 2004 rehabilitation also included repair of the river outlet (including fabrication of stop logs, lining sluiceway, repair of gate stems, leafs, and seals), cleaning and inspection of the spillway crest, construction of a toe apron, installation of tie-down anchors in spillway, and partial re-pointing and repairs to dam masonry.

1.3.4 Drainage Area

The drainage area for the Dam is approximately 243 square miles and encompasses a large portion of western Massachusetts along the New York border. The drainage area includes large areas of agricultural and residential development, wooded mountainous terrain, and several small urban areas.

1.3.5 Reservoir Storage Volume

Normal pool reservoir storage volume (pool elevation 839.2 feet, NGVD29) has been reported as 85 acre-feet (GZA 2003) and 50 acre-feet (FO 2017). The storage volume is 250 acre-feet at maximum pool elevation of 848.2 feet, NGVD29 (GZA 2003).

1.3.6 General Elevations (FO 2017, unless otherwise noted)

Feature	Approx. Elev. (feet, NGVD)
A. Top of Dam	846.0
B. Spillway Design Flood Pool	Unknown

C.	Normal Pool	838.0
D.	Primary Spillway Crest	838.0
E.	Auxiliary Spillway Crest	839.9 (GZA 2005)
F.	Low Level Outlet Invert	830.0
G.	Streambed at Toe of the Dam	830
H.	Low Point Along Toe of Dam	826

1.3.7 Dam Size and Hazard Classification

Willow Mill Dam has a height of dam of approximately 24 feet and a maximum storage capacity of 250 acre-feet. Refer to **Attachment A** for definitions of height of dam and storage. Therefore, in accordance with the classification procedures of the Massachusetts Department of Conservation and Recreation (MassDCR) Office of Dam Safety (ODS) under the Massachusetts Dam Safety Regulations, Willow Mill Dam is an **Intermediate** size structure based on maximum storage of between 50 and 1,000 acre-feet.

In accordance with MassDCR classification procedures, under the Massachusetts Dam Safety Regulations, the Dam is classified as a dam with **Significant Hazard** potential.

1.3.8 Recent Phase I Inspections

A visual Phase I engineering inspection of the Dam was conducted by Fuss & O'Neill in March 2017 and is described in Fuss & O'Neill's March 2017 *Willow Mill Dam Phase I Inspection/Evaluation Report* (Fuss & O'Neill, 2017). Based on the results of that inspection, the Dam was found to be in Satisfactory Condition. An additional visual Phase I inspection of the Dam was conducted by Fuss & O'Neill on July 29, 2022. A report on that inspection is in preparation.

1.4 CURRENT KEY PERSONNEL AND THEIR RESPONSIBILITIES

Onyx is the owner and operator of the Dam and is responsible for overseeing the operations and maintenance of the Dam. The current Caretaker on Onyx's behalf is:

Donald Zukowski, Operation Support Manager
Onyx Specialty Papers, Inc.
40 Willow Street, PO Box 188
Lee, MA 01260-0188
Daytime Phone: 413-243-7421
Emergency/Cell Phone: 413-822-7408

Onyx retained Professional Engineers to conduct the 2017 and 2022 Phase 1 Inspection/Evaluation. The consulting dam safety engineer who performed the 2017 Phase I Inspection/Evaluation was:

Kristine M. Baker, P.E.
Fuss & O'Neill, Inc.
146 Hartford Road
Manchester, Connecticut 06040
Phone: (860) 646-2469

The dam engineer who performed the 2022 Phase I Inspection /Evaluation was Elizabeth M. Isenstein, P.E. of Fuss & O'Neill, Inc. (same address as above).

In accordance with the Revised EPA Permit and the Final Revised SOW, and as provided in this OM&M Plan, GE will have some responsibilities relating to the Dam. GE's representative is:

Kevin Mooney
General Electric Company
Global Operations – Environment, Health & Safety
1 Plastics Avenue
Pittsfield, MA 01201
Daytime Phone: 413-553-6610 (Direct Office Number)
Cell Phone: 413-441-4619

In addition, GE has retained a Professional Engineer experienced in dam engineering and safety to prepare this OM&M Plan, conduct annual inspections, and to review other dam issues on an as-needed basis. The current GE consulting dam safety engineer is:

Jonathan D. Andrews, P.E.
GZA GeoEnvironmental, Inc.
249 Vanderbilt Avenue
Norwood, Massachusetts 02062
Phone: (781) 278-5808
Cell: (781) 983-2881

In the event that any of the foregoing personnel changes, GE will advise EPA of those changes.

2.0 OPERATIONS

The Dam is operated on a run-of-the-river basis and, the reservoir is normally at or above the spillway weir crest normal pool level. The following description is from the Owner/Operator's Internal Mill Procedure 911D02 (Flood or Flood Warnings). Revision 4 (July 19, 2021). In a typical year, there is considerable variation in river flow, as measured at a U.S. Geological Survey (USGS) gaging station in Great Barrington (No. 01197500), located 11 river miles downstream of the Dam. River flow can range from less than 150 cubic feet per second (cfs) in the middle of summer to 3,000 to 7,000 cfs during the spring run-off, depending on how much snow has fallen during the winter months and how heavy the spring rains are. The map delineating the Housatonic River 100-year flood limit for the course of the river through the Town of Lee records the high-water level as 10 feet above the crest of the Dam and the water level downstream of the Dam as 0.6 feet above the crest of the Dam. The related river flow is believed to be 12,200 cfs, recorded on January 1, 1949.

In a typical spring, flooding occurs in the flatlands above the Dam and in lowlands adjacent to the river course below the Dam and in Stockbridge. As the spring run-off starts to build, the floodgates at the Dam are opened by Willow Mill plant maintenance personnel in an attempt to equitably distribute the flooding above and below the Dam; however, after the river flow reaches a certain level, the gates have no discernible effect.

2.1 RIVER FLOW INFORMATION

The 2017 Phase 1 Inspection report noted that hydrologic and hydraulic (H&H) analyses had been performed, and that those analyses indicated a Probable Maximum Flood (PMF) Spillway Design Flood (SDF) inflow of 132,000 cfs and Inflow Design Flood (IDF) of 13,200 cfs. Spillway capacity, flood pool elevation, overtopping potential, and outlet/auxiliary spillway capacity were not reported.

Current, historical, and predicted Housatonic River flows at the above-referenced USGS Great Barrington gage No. 01197500 are available online.[1] This gage measures flow from a drainage area of 282 square miles. By multiplying the flow measured at the gage by the ratio of the dam drainage area to the gage drainage area (e.g. flow x 0.85), the inflow into the Willow Mill impoundment may be estimated. Impoundment and tailwater level measurements are described in Section 3.1.4 below.

2.2 NORMAL OPERATIONS

No operator action is required for normal dam operations. The uncontrolled run-of-the river overflow spillway conveys flow downstream.

2.3 FLOOD OPERATION

During flood flows in the river, the river outlet gates may be opened to help limit the rise of the impoundment behind the Dam. This is done to attempt to help protect upstream property and the Dam itself. In general, operation of the river sluiceway gates commonly begins when water begins to overflow the crest of the auxiliary spillway (approximate impoundment elevation 340.0 feet). If the USGS Great Barrington gage forecast predicts the river will reach the "Action" level, which corresponds to a depth of seven feet on the USGS gage, plant maintenance adjusts the gate(s) to pass extra water. If the forecast predicts the river will reach the "Minor" or "Moderate" levels, which corresponds to a depth of 9-feet on the staff gage, plant maintenance adjusts the gates to maximum opening. When the threat of flooding has passed, the gate is closed by plant maintenance. Note that at 10.8 feet on the Great Barrington level gage, the river reaches a corner of the driveway in front of

[1] https://water.weather.gov/ahps2/hydrograph.php?gage=GTBM3&wfo=aly

the Willow Mill/Hurlbut offices. While the forecast has been reliable, localized events could enhance flooding. Visual observations of the Dam are made daily by Willow Mill plant personnel. There are seasonal impacts, as winter thaw combined with rain can cause the river to rise quickly. As noted above, as the spring run-off starts to build, the floodgates at the Dam are typically opened by plant maintenance in an attempt to equitably distribute the flooding above and below the dam; however, after the river flow reaches a certain level, the gates have no discernible effect.

Due to the complexity of the response of the river to existing and predicted hydrologic conditions, exact operating procedures cannot be pre-established; therefore, operating personnel will utilize their judgment based on available information and past experience. As flooding subsides, the gates will be shut gradually in reverse of the opening sequence.

Actions during an actual or potential emergency are discussed further in Section 5 and set forth in the Willow Mill Dam EAP provided in **Attachment B**.

2.4 NON-EMERGENCY DRAWDOWN

In the event that it is necessary to lower the water impoundment level more than two feet below spillway crest to perform maintenance or repairs, the Owner/Operator will advise GE, and GE will develop a separate proposal for drawing down the impoundment level and submit it to EPA. That proposal will include a description of the proposed dewatering, as well as the monitoring and/or other actions that will be undertaken to monitor and control the potential releases of PCBs in that situation. In addition, the Lee Conservation Commission will be notified in advance of any regularly scheduled significant drawdown of the Willow Mill impoundment. Further, the contact person at the downstream Glendale Dam will be notified a minimum of 24 hours prior to drawdown of the Willow Mill Dam and again at least 24 hours prior to beginning the refill process.

In general, non-emergency drawdowns will be coordinated with fire protection intake requirements and will be conducted over a period of no less than 24 hours. Gate opening will be set to exceed river flows, and then incrementally increased to prevent large spikes in downstream flow. Refill of the reservoir will reverse the procedure. The gates will not be fully closed until depth of flow over the crest of the primary spillway is greater than 0.3 inches. Until such time, both gates will be kept open to allow minimal flow through the gates.

2.5 EQUIPMENT OPERATION

2.5.1 River Outlet Sluice Gates

The river outlet sluice gates, adjacent to the right (north) abutment, allow water to be discharged from the impoundment directly into the downstream river channel. These sluice gates may provide a certain amount of control over the water level in the upstream impoundment. It should be stressed that the amount of control over water levels provided by the sluice gates is limited, and the response time of the impoundment is slow.

The two river outlet sluice gates are operated independently, each by its own wheel attached to a gear reducer mechanism. The wheel is turned clockwise to raise the gate and counterclockwise to lower the gate. Raising the gates provides more flow. Lowering the gates provides less flow or closes the gates. Permanent marks on the gate stems indicate the position of the gates.

Rating curves have been developed for the river outlet sluice gates. Flow through the gates is dependent on both the amount which the gate is open and the elevation of water in the impoundment. **Table 1** presents the estimated rating curves for the gates.

The date of gate operation and the change in gate position should be entered into the plant log book each time the gates are operated.

2.5.2 Headrace Gates

There are two sluice gates (gates 3 and 4) at the headwall of the headrace channel on the left (south) bank of the river. These gates are typically used only to dewater the headrace, tunnel, and penstocks for inspection and/or maintenance. The headrace canal is used to provide continual process water supply to the mill. During normal operation, one gate is open to provide flow to the canal while the other is closed. Operations personnel periodically alternate which gate is open. Both gates should be fully open during periods of extreme flooding since flow must pass through these gates prior to discharge over the auxiliary spillway. The headrace gates must not be closed when such an operation would result in a loss of minimum flow to the downstream channel. Operation of the gates is via a lever bar inserted into a toothed wheel at each gate. The lever bar remains secured at the gate location at all times. In the past, sand bags have been used to reduce leakage through the closed gates.

2.5.3 Boat Barrier Installation/Removal

Onyx Specialty Papers, Inc. maintains a boat barrier across the width of the Housatonic River channel upstream of the Dam to warn boaters of the Dam. The boat barrier consists of two pontoons tethered to a cable which is anchored on both banks of the river. The boat barrier is installed by the plant operations staff in the spring, no later than April 15. The boat barrier is removed in the winter due to ice. Plant operations staff removes the boat barrier no earlier than November 15. When not in use, the boat barrier is stored at the Willow Mill. When installing or removing the boat barrier, plant operations staff also checks to see that the warning sign on the upstream bridge is still in place.

2.5.4 Bar Rack Cleaning

A bar rack fish screen has been installed upstream of the headrace canal at the point where water is withdrawn from the impoundment. The bar rack helps to prevent fish from being entrained in water going to the mill. Occasionally, the bar rack becomes partially clogged with debris and requires cleaning by plant personnel. This happens particularly in the autumn months when there are large amounts of fallen leaves in the water which mat against the bars. The bar rack will be observed monthly for clogging. When the bar rack is seen to be clogged with debris, it will be cleaned. During the fall season, cleaning may need to occur on a weekly or even daily basis.

Cleaning of the bar racks is done by using a rake or other long-handled tool to dislodge debris from the bars. An elevator platform is utilized to move up and down the bar racks to get within reach of the water line. At least two plant operations personnel need to be present when the bar racks are being cleaned, and appropriate safety equipment is and will continue to be utilized during the cleaning.

2.5.5 Stoplog Structure

There is a stoplog structure with stoplog slots upstream of the river outlet sluicegates. Steel plates are installed in the stoplog slots as needed for water control during maintenance or repairs to the sluice gates or sluice gate discharge chambers. The steel plates are stored at the mill and installed using heavy equipment.

3.0 INSPECTIONS

This section describes the proposed inspection/observation program for the Dam. These inspections will include routine periodic inspections, regulatory engineering inspections, inspections after large storm events, and other special inspections. The Willow Mill Dam Emergency Action Plan (**Attachment B**) will be followed during emergency conditions.

Inspections are a necessary part of operation since early detection and correction of gradual changes can improve safety and reduce repair costs. Routine inspections provide a way to monitor the dam performance. All routine and post-storm observations will be performed by personnel familiar with the Dam and its operations. In addition, mill personnel cross the Willow Street Bridge on a daily basis and the Dam is visible from the bridge, the mill, and Route 102, enhancing opportunities for informal observation and detection of unusual or unsafe conditions.

3.1 ROUTINE VISUAL INSPECTIONS

Routine visual inspections will include quarterly and annual inspections. The Owner/Operator will perform the quarterly inspections. Annual inspections will be conducted by GE. Quarterly and annual inspections will include observation of conditions requiring monitoring or maintenance as noted in the plant log book. In addition, informal daily observations will be made if conditions are changing, during unusually high flow events (less than those described in Section 3.3), or during other unusual events.

3.1.1 Quarterly Inspections

Quarterly inspections of the Dam will be made by Willow Mill plant personnel. The quarterly inspections are intended to provide insight on how the Dam is operating under current weather conditions. They will also provide insight on whether the Dam is mechanically operable for emergencies. River flow conditions will also be regularly monitored. Water levels and gate operating position changes will be recorded in the plant logbook.

Observations made during the quarterly inspections, including any exceptional or unusual conditions, will be recorded on the quarterly inspection checklist provided in **Attachment C**. If significant changes in the condition of the Dam are noticed, the Caretaker will be notified and a dam safety engineer will be contacted.

The quarterly inspections will also include ice-out inspections – defined as inspections after ice that has been present for a significant period in the river has disappeared due to thawing or breakup. During these inspections, particular attention will be paid to the spillway. Care will be taken to look for damage to the concrete and masonry of the spillway, training walls, and forebay, as well as debris that may reduce spillway, auxiliary spillway or gate flow capacity. The results of this inspection will be recorded on the quarterly inspection checklist.

3.1.2 Annual Inspections

Annual inspections will be conducted by GE's dam safety engineer to evaluate how the Dam performed throughout the year and to determine the Dam's condition. Annual inspections will evaluate whether the Dam has changed from its as-built plan condition and its condition as noted in the previous year. Detailed photographic documentation will be prepared to provide a permanent record of conditions, including observed changes. Maintenance and repair items will be identified for correction. These inspections will be performed, if practicable, in mid-year (July or August) during low flow periods in the river. At least once every five years, prior to GE's annual inspection, the Willow Mill impoundment will be drawn down to, at minimum, expose the downstream face of the primary spillway and the bedrock in the splash area at the toe of the Dam. This will not

require a total drawdown of the impoundment, but rather opening of the river outlet gates in a manner such that no flow passes over the spillway crest.

The checklist from the previous annual inspection, as well as the checklists from any post-storm and ice-out observations and the report on the most recent Phase I inspection, will be reviewed by the inspector prior to the annual inspection.

During the annual inspection, the inspecting personnel will carry and complete the visual inspection checklist contained in **Attachment D**. This checklist has been customized for Willow Mill Dam. An inspection sketch will be used to note the location of concerns identified during the inspection. During the annual inspection, a check of the plant log book will be made to verify that gates have been operated over a wide range in the past year.

During the annual inspection, close observation of the "splash" area at the downstream toe of the primary spillway in the main river channel is particularly important. Careful attention will be paid to the depth and extent of scour holes at the toe of the Dam, and evidence of seepage, cracking, and masonry displacement will be noted and documented with photos and measurements. Progressive scour may be a sign that a new reinforced concrete toe apron in the spillway "splash" area is required. Inspection of the toe may require a personal flotation device, safety line, or other measures deemed necessary for proper health and safety procedures. Similar precautions, as well as fall protection, are required for access to the crest of the primary spillway. A safety line strung from the left masonry abutment to the river outlet structure may be used as a part of the fall protection system.

The dam safety engineer will evaluate the need for maintenance or further inspection activities, as well as the need for any revisions to this OM&M Plan, and will provide recommendations regarding those matters to GE within 30 days of the inspection. Following coordination with the Owner/Operator GE will provide any such recommendations to EPA, along with a plan for addressing those recommendations, in the annual inspection report described in Section 7 of this OM&M Plan.

3.1.3 Water Levels

Daily visual observation of water levels will be made by the plant operations personnel. If rapid changes in water surface elevations are seen (up or down), these will be noted in the plant log book. In the event of rapid increases in water surface level in the impoundment due to flood flows, the plant operations personnel will be prepared to open the flood gates as required. If rapid decreases in the water level are observed, the operations personnel will investigate the potential causes (i.e., open sluice gate, leakage, etc.) and take appropriate action.

If necessary, such as during flood operations discussed in Section 2.3, the water surface in the impoundment will be measured by using a tape measure lowered from the floor slab of either the river outlet structure or the left masonry abutment. To determine the water surface elevation in the river, the distance to the water "Y" will be subtracted from the floor slab elevation as follows:

at River Outlet Structure: Water Surface Elev. (ft) = 848.2 ft. – Y_1

at Left Masonry Abutment: Water Surface Elev. (ft.) = 846.0 ft. – Y_2

Care should be taken to measure the distance to water as far away from the spillway crest and sluice gates as safely possible, as flow over or through these features can affect the accuracy of the measurements.

3.2 ENGINEERING PHASE 1 INSPECTION/EVALUATIONS

Massachusetts Dam Safety Regulations (302 CMR 10.00) require that a qualified Professional Engineer registered in Massachusetts with experience in dam safety engineering perform an inspection of the Dam, referred to as a Phase I inspection, once every five years. As noted in Section 1.3.8, the most recent such Phase I inspection of the Willow Mill Dam was performed on July 29, 2022, with a report in progress. Going forward, the Owner/Operator will continue to arrange for such Phase I inspections of the Dam by a registered dam safety engineer at five-year intervals, with the next such inspection to be conducted in 2027. The Massachusetts Department of Conservation and Recreation (MassDCR) Office of Dam Safety (ODS) template, format, and contents of the Phase 1 visual inspection will be used;[2] the most recent checklist is included as **Attachment E**. The purpose of this independent visual dam safety inspection is to verify and supplement the results of the quarterly and annual inspections. The inspecting engineer will be provided with the results of the quarterly and annual inspections prior to the field visit, along with any additional inspection information or observations collected by the plant operations personnel. The engineer's inspection will be conducted in accordance with the MassDCR ODS requirements for a Phase 1 Inspection/Evaluation.

A Phase 1 Inspection/Evaluation Report will be prepared and submitted to EPA, MassDCR ODS, and GE within 90 days after each such inspection. That report will follow the standard MassDCR Phase I format. These reports will also be kept on file for review during subsequent quarterly and annual inspections.

3.3 POST-STORM OBSERVATIONS

Observations of the Dam will also be made by the Owner/Operator after high-flow events. For this purpose, a high-flow event is defined as a flow event with a measured peak river flow of 3,650 cubic feet per second (cfs) at the USGS Great Barrington stream gauge, which corresponds to the "Action Stage" of seven feet above gage streambed, as determined by the Advanced Hydrologic Prediction Service (AHPS). The post-storm observations will be made as soon as flood water conditions have subsided and conditions allow safe access to the Dam, and will include the same activities and use the same inspection form described above for a quarterly inspection.

In addition, some limited dam observations will be made at Willow Mill Dam during major storms that are expected to result in peak flows over the "Action Stage" at the USGS Great Barrington stream gage, provided that safe access is available. These observations will be conducted to identify whether significant damage to the Dam has occurred or is occurring as a result of the storm.

3.4 POST-EARTHQUAKE INSPECTIONS

In addition to the foregoing inspections, in the event that there is an earthquake with reported damage in Berkshire County, the Owner/Operator will have a dam safety engineer conduct a thorough inspection of Willow Mill Dam to assess whether any damage has occurred.

[2] Refer to https://www.mass.gov/office-of-dam-safety.

4.0 MAINTENANCE AND REPAIRS

This section describes the maintenance and repair activities to be performed at Willow Mill Dam. Maintenance actions performed will be documented, and the documentation will be made available to the dam safety engineer as part of the facility documents available for each annual inspection and Engineering Phase 1 Inspection/Evaluation. Documentation of the maintenance will include relevant dates, photographs and notes regarding the pre-maintenance condition, identification of who took the maintenance action, a description of the maintenance action, and relevant drawings, cut sheets, specifications, etc.

4.1 ROUTINE MAINTENANCE

Routine maintenance and repairs will be performed at the Dam by the Owner/Operator, as described below.

Routine Maintenance: Routine maintenance will be performed by the Owner/Operator and generally consists of ensuring the proper functioning of gates and operator mechanisms, clearing debris and sediment, and maintaining the masonry surface condition. Routine maintenance should assist in reducing future repair costs and help provide for safe operation of the Dam and appurtenant structures.

Gate Maintenance: All sluice gates will be operated regularly to maintain function and to flush sediment from the gate area. Debris will be cleared from the sluices and nearby areas. The gearing of the gate operators will be lubricated with an approved lubricant annually or more frequently, as required. Care will be exercised in lubricating gate operators that lubricant is not spilled into the water. Gates will be exercised through their full range at least once per year.

Debris Removal: Debris in the river occasionally becomes lodged on the crest of the primary spillway. In particular, large logs or tree trunks can snag on the crest or hang over the crest onto the downstream streambed. In most cases, this debris will be dislodged during subsequent high flows; however, in some cases the debris is persistent. When debris accumulation impedes the hydraulic capacity of spillways or gates, it will be removed either by the plant operations staff or by a contractor.

When debris accumulates in front of the river outlet structure or on the primary spillway near the abutments, plant operations personnel may attempt to dislodge the material with long-handled tools. When the debris is further out on the crest, alternative means must be used. Plant operations personnel will assess the situation, including the type of debris and its location. In some instances, a contractor with a crane may be needed to clear the debris. Work on the crest of the spillway requires all plant safety procedures to be observed, including fall protection. Debris cleared from the dam will be appropriately disposed of outside the river channel.

The bar screens at the headrace channel will be cleaned regularly, with more frequent cleanings during the autumn, when there are significant quantities of leaves in the river.

Headrace Canal Cleaning: Sediment suspended in the river water can be carried into the headrace. Over time, sediment can be deposited and accumulate on the floor of the headrace channel behind the auxiliary spillway. Periodically, this sediment must be removed from the channel. During annual inspection of the headrace channel, the amount of sediment will be assessed. If the sediment interferes with headrace performance, the channel will be cleared of sediment. This may be done by various methods. In the past, a contractor has placed a skid-steer loader in the channel via crane, and excavated sediment was removed from the channel via a bucket attached to the crane line. Excavated sediment will be handled, managed, and disposed of as described in Section 4.3 below.

Maintenance of Masonry Surfaces: The long-term durability of masonry structures can be significantly influenced by the condition of the joints between individual stones. If these joints are kept in good repair, the durability of the structure is improved. Proper maintenance of masonry joints primarily involves excluding plants and water. In all cases, maintenance of masonry joints will be performed using health and safety procedures appropriate to the location.

Vegetation Removal: Masonry joints will be observed for signs of vegetation growing between stones. When found to be present, the vegetation will be removed. If the plants are small, they may be pulled by hand. For larger plants, it is appropriate to first treat the plants with an herbicide approved for use near water, such as Rodeo® manufactured by Monsanto, in order to kill the roots of the plant. The herbicide will first be applied to the plants as per the manufacturer's directions. Once the plant is observed to be dead, it will then be cut away from the masonry. If mortar joints are damaged during the process of vegetation removal, then joints will be repointed as discussed below. IMPORTANT NOTE REGARDING HERBICIDE APPLICATION: Herbicide may be applied at the dam site only by an applicator licensed by the Commonwealth of Massachusetts.

Repointing: If the mortared joints between masonry stones are observed to have lost significant amounts of mortar, they will be repointed. This may either be done by plant operations personnel or by contractors when the job is larger. Prior to repointing a joint, it will be thoroughly cleaned, and all dirt, debris, and loose mortar removed. Then a cement mortar will be toweled into the joint and shaped to encourage drainage. A hydraulic cement mortar will be used in cases where the joint is leaking. The mortar will be properly cured by keeping the area moist for a minimum of seven days and repointing only during mild weather.

Security Item Repair: Where observations indicate a need for repair of the chain-link fence, fence fabric, signs, rails, locks, chains, and/or boat barrier, such repairs will be made.

4.2 OTHER MAINTENANCE OR REPAIRS

Apart from the above-described regular maintenance, the Owner/Operator will perform other maintenance and repair activities where necessary in response to observations during the inspections (or other observations, if any). The need for other maintenance or repairs will be determined in consultation with a dam safety engineer.

4.3 HANDLING, MANAGEMENT, AND DISPOSITION OF SEDIMENTS AND SOILS

In the event that dam maintenance or repair activities or other response activities relating to Willow Mill Dam involve the handling, management, and/or disposition of Housatonic River sediments in the Willow Mill impoundment or otherwise adjacent to the Dam, the Owner/Operator and GE, will, in cooperation with each other, take steps to ensure that those materials are properly handled, managed, and disposed of. If sediment analytical testing indicates the presence of PCB concentrations that do not allow unrestricted use, GE, after consultation with the Owner/Operator, will develop and submit to EPA a plan that includes the following, as required by the EPA Permit:

a. An estimate of the volume of sediment/soil to be managed and disposed of;
b. Information regarding the testing and classification of the sediment/soil;
c. Requirements for staging of the sediment/soil, covering of that material, and the length of time that the material will be stockpiled;
d. A job safety plan, including requirements for personal protective equipment and equipment decontamination, consistent with sediment/soil classification; and

e. A contractor work plan outlining the means and methods of removal, the disposal location(s), and site rehabilitation, if any.

In general, any removed sediments containing PCBs at levels exceeding those that would allow unrestricted use will be sent off-site for disposal. In such a case, the materials will be characterized for PCBs and other hazardous constituents as necessary to determine the appropriate management and off-site transport procedures and an appropriate permitted off-site disposal facility. Materials that are determined to contain PCBs at concentrations at or above 50 parts per million (ppm), which are regulated under the Toxic Substances Control Act (TSCA), will be managed as such, and transported for disposal to an authorized off-site TSCA disposal facility. Materials (if any) that are found to constitute characteristic hazardous waste under RCRA will be handled as such and transported for disposal to an authorized hazardous waste disposal facility. Materials that contain PCB concentrations less than 50 ppm and do not constitute RCRA hazardous waste will be transported for disposal to an authorized solid waste disposal facility.

5.0 EMERGENCY RESPONSE

For the purposes of this OM&M Plan, an emergency is defined as a failure or other condition at Willow Mill Dam that results in an impending or actual sudden, uncontrolled release of water. Response procedures that will be followed by the Owner/Operator in the event of such an emergency are presented in the Owner/Operator's current EAP in **Attachment B**.

In addition, as required by Section II.B.2.j.(2)(c) of the Revised EPA Permit, if there is a catastrophic failure and/or a material breach of the Dam (or any component of it) that results in a release of PCBs over the Dam that is materially greater than the PCB transport over that Dam under the normal range of flow conditions, GE will, within 30 days of notification by EPA of such failure or breach and after coordination with the Owner/Operator, submit a response plan to EPA for EPA approval. That plan will: (a) propose repairs to the Dam; and (b) propose measures to characterize and respond to the PCBs released by such failure and/or breach if necessary to maintain the Performance Standards for, or to maintain the effectiveness of, the Rest of River Remedial Action as set forth in the Revised EPA Permit. That plan will also include a proposed schedule to implement the required response actions. Following receipt of EPA's approval of the plan and schedule, GE will implement the additional response actions in coordination with the Owner/Operator and in accordance with EPA's approval, including the approved schedule.

6.0 RECORD-KEEPING

The Owner/Operator and GE will both maintain shared electronic files containing records and checklists on all quarterly, annual, Phase 1, post-storm, and other inspections. They will also maintain shared electronic records of all maintenance and repair work conducted at the Dam and annual updates to the EAP. As noted in Section 4.0, records of maintenance actions performed will be prepared and made available to the dam safety engineer as part of the facility documents available for the annual inspection and Engineering Phase 1 Inspection/Evaluation. The information to be included in that documentation is specified in Section 4.0.

7.0 REPORTING

The checklists for the quarterly inspections of the Dam will be provided to EPA upon request. Reports on the annual inspections of the Dam, including the annual inspection checklists and any recommendations for maintenance, further inspection activities, or any revisions to this OM&M Plan, will be submitted to EPA within 60 days after each annual inspection. The Engineering Phase 1 Inspection/Evaluation Reports will be submitted to EPA and the MassDCR ODS within 90 days after completion of a Phase 1 inspection. Further reporting to EPA will be on an as-needed basis, but will include any of the other proposals to EPA described in this OM&M Plan (if necessary), as well as documentation of proposed major repairs.

Annual updates to the EAP will be provided to the entities on the distribution list in the EAP, including the MassDCR ODS, as well as to GE and EPA. In addition, the Owner/Operator will, at a minimum, submit a revised version of this OM&M Plan to the MassDCR ODS, with copies to EPA and GE, every five years, as well as after any major repairs to or incidents affecting the Dam.

8.0 COMPLIANCE WITH NOTIFICATION REQUIREMENTS OF REVISED EPA PERMIT

In accordance with the Final Revised SOW, GE notes that it will also comply with Section II.B.2.j.(2)(d) of the Revised EPA Permit with respect to the Willow Mill Dam. That provision requires that: (a) GE must determine every five years whether there has been a change in ownership of the Dam; and (b) whenever there is change in ownership, as well as following implementation of response actions at the Dam or associated impoundment and at five-year intervals after any such event, GE must provide notice to the dam owner (and, for the initial notice, to the holders of any easements), with copies to EPA, the Massachusetts Department of Environmental Protection (MassDEP), the Connecticut Department of Energy and Environmental Protection (CT DEEP), and other applicable regulatory agencies (e.g. MassDCR ODS), of GE's commitment to undertake certain response actions at the Dam, including the response actions described in the second paragraph of Section 5 of this OM&M Plan[3]. That requirement and GE's plan to meet it will be described in more detail in GE's upcoming Plan for Implementing Future Projects or Work, to be submitted to EPA in December 2022.

[3] That notice must also include an identification of contact persons for GE, EPA, MassDEP, and CT DEEP, a request that the dam owner notify the relevant contact persons prior to conducting work at the Dam, and a description of the PCB contamination in the impoundment behind the Dam, including the presence of a cap if applicable.

9.0 SCHEDULE AND RESPONSIBILITIES

The schedule of activities described in this OM&M Plan and the responsible party for each are summarized in the following table. Note that the responsible party indicated for each task was agreed upon by the Owner/Operator and GE.

Inspection and Maintenance Summary

Inspection	Frequency	Responsible Party
Routine	Quarterly (with checklist)* Ice-out (with quarterly checklist)	Onyx Specialty Papers (Owner/Operator)
Routine	Annual during low-flow summer months (with checklist); partial drawdown once every 5 years	General Electric (GE)
Engineering Phase 1 Inspection/Evaluations	Every five years (with checklist)	Owner/Operator
Post-Storm	After high-flow events (3,650 cfs at Division Street gage) with limited observations during high-flow events	Owner/Operator
Post-Earthquake	After an earthquake with reported damage in Berkshire County	Owner/Operator

Monitoring	Frequency	
Headwater and tailwater	Quarterly and Annually	Owner/Operator (Quarterly) GE (Annually)
Concrete and masonry	Quarterly and Annually	Owner/Operator (Quarterly) GE (Annually)

Maintenance Type	Frequency	
Bar rack cleaning	Monthly (more often as needed, particularly in fall)	Owner/Operator
Spillway and outlet works cleaning	Annually (more frequently if flow impaired)	Owner/Operator
Gate testing/maintenance	Annual	Owner/Operator
Debris removal	As Needed	Owner/Operator
Headrace canal cleaning	As Needed	Owner/Operator
Handling, management & disposal of sediment with PCB concentrations that do not allow unrestricted use	As Needed	GE to notify EPA and submit plan
Masonry maintenance	As Needed	Owner/Operator
Repointing	As Needed	Owner/Operator
Masonry vegetation removal	As Needed	Owner/Operator
Security items	As Needed	Owner/Operator
Boat barrier installation	Annually by April 15	Owner/Operator
Boat barrier removal	Annually after November 15	Owner/Operator

* In addition, informal daily observations will be made during unusual events.

10.0 REFERENCES

Federal Emergency Management Agency (FEMA), 1987. *Dam Safety: An Owner's Guidance Manual.* FEMA No. 145. July 1987.

FEMA, 2005. *Technical Manual for Dam Owners: Impacts of Plants on Earthen Dams*. FEMA No. 534.

Fuss & O'Neill., 2017. *Willow Mill Dam Phase I Inspection/Evaluation Report*. Prepared for Onyx Specialty Papers, Inc. March 3, 2017 (FO 2017).

GZA GeoEnvironmental Inc., 2003. *Willow Mill Dam Phase I Inspection/Evaluation Report*. Prepared for MeadWestvaco Corporation (GZA 2003).

Internal Mill Procedure 911D01 Dam Failure Preparedness and Response. Revision 18, March 27, 2022 (911D01).

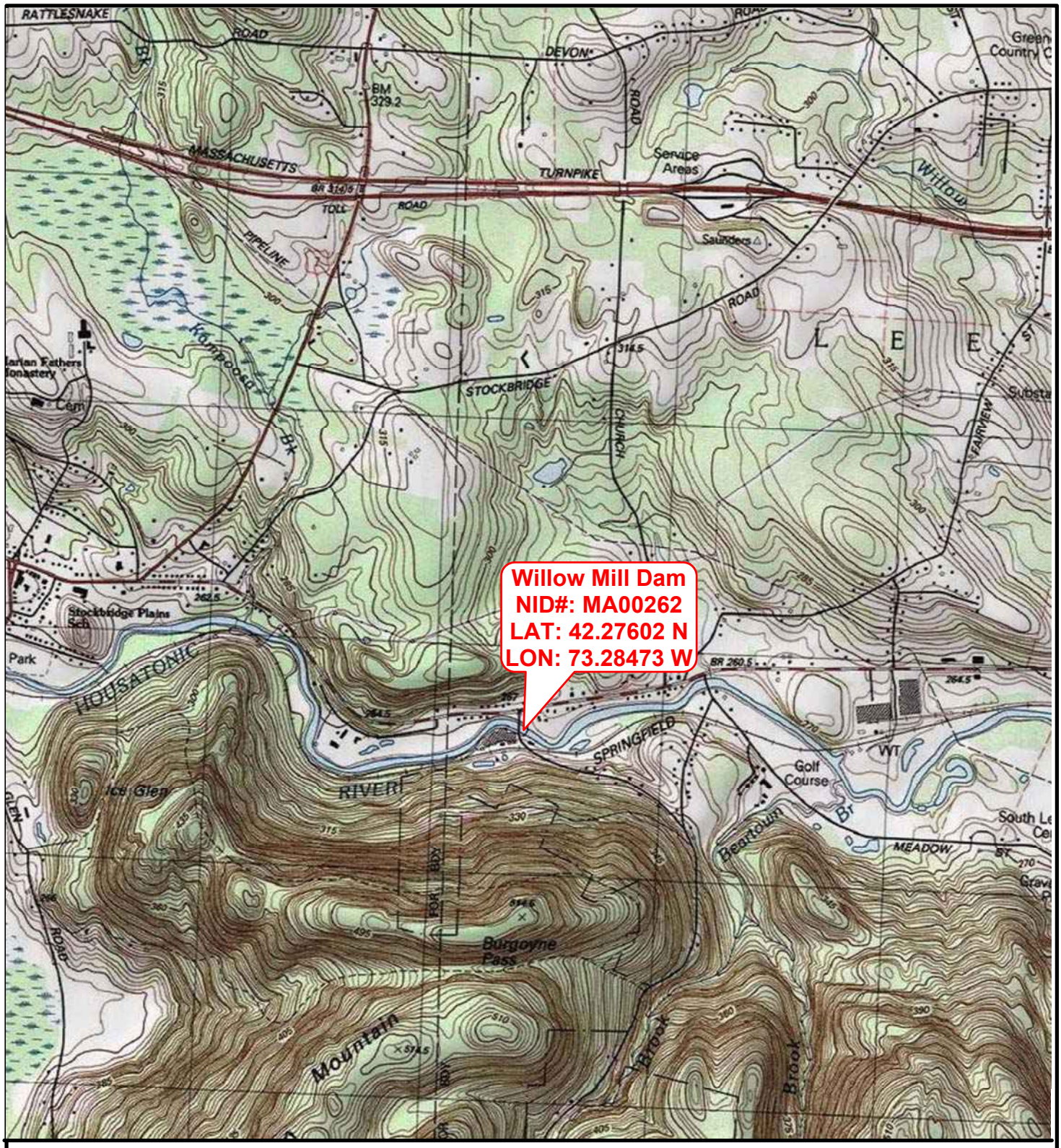
Internal Mill Procedure 911D02 Flood or Flood Warnings. Revision 4, July 19, 2021 (911D02).

TABLE

Willow Mill Dam
River Outlet Sluiceway Discharge Rating Table

Gate Opening (feet):	Total Discharge from Both Sluicegates (cfs) Impoundment (headwater) Elevation												
	836'	**837'**	**838'**	**839'**	**840'**	**841'**	**842'**	**843'**	**844'**	**845'**	**846'**	**847'**	**848'**
0.25	30	33	35	37	39	41	43	45	47	48	49	47	47
0.50	60	65	70	74	78	82	86	90	93	96	97	94	94
0.75	89	97	104	110	117	123	128	134	139	144	146	141	141
1.00	118	128	137	146	155	163	170	177	184	191	194	188	188
1.50	172	188	203	216	229	241	252	263	274	284	294	281	281
2.00	224	246	265	284	301	317	333	347	362	375	389	375	375
3.00	319	353	384	412	439	464	488	510	532	553	573	563	563
4.00	401	449	491	531	567	602	634	665	695	723	751	777	751
5.00	469	532	588	639	687	731	773	813	850	887	921	955	938
6.00	521	602	673	737	796	851	903	952	998	1042	1085	1126	1126

FIGURES

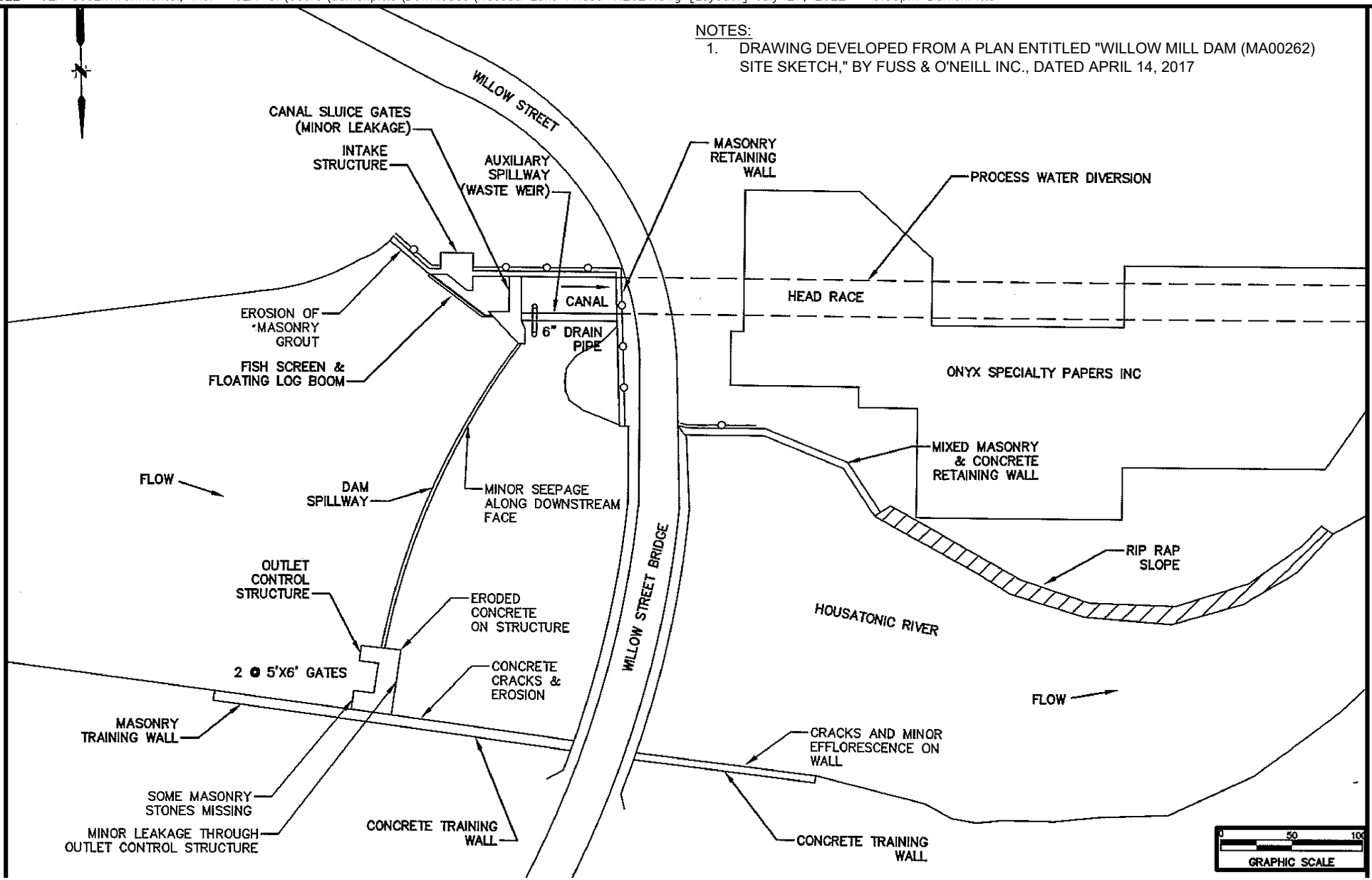


GZA	PROJ. MGR.: CJT DESIGNED BY: CJT REVIEWED BY: JDA OPERATOR: CJT DATE: 07-14-2022	LOCUS PLAN WILLOW MILL DAM LEE, MASSACHUSETTS	JOB NO. 01.019896.70 FIGURE NO. 1

<BOL>© 2022 -<CLR red="1" green="84" blue="131"> GZA GeoEnvironmental, Inc.</CLR></BOL>, J:\19,000-20,999\19896\19896 - O&M's\Willow Mill\Figures\FIG1.mxd, 7/14/2022, 12:35:04 PM, chris.tsinidis

© 2022 – GZA GeoEnvironmental, Inc. GZA–C:\Users\daniel.pitts\Downloads\Nassau Lake Phase 1.2021.dwg [Layout1] July 27, 2022 – 3:55pm Daniel.Pitts

NOTES:
1. DRAWING DEVELOPED FROM A PLAN ENTITLED "WILLOW MILL DAM (MA00262) SITE SKETCH," BY FUSS & O'NEILL INC., DATED APRIL 14, 2017



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NO.	ISSUE/DESCRIPTION	BY	DATE

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
249 VANDERBILT DRIVE
NORWOOD, MA 02602
781-278-5848

PREPARED FOR:
GENERAL ELECTRIC COMPANY

WILLOW MILL DAM OPERATIONS AND MAINTENANCE MANUAL
Lee, Massachusetts

SITE SKETCH

PROJ MGR: CJT		DATE: JULY 2022	FIGURE: 2
DESIGNED BY: DCP			
REVIEWED BY: JDA		PROJECT NO.: 19896.70	
DRAWN BY: DCP			
CHECKED BY: JDA		REVISION NO.	
SCALE: NTS			SHEET NO.

ATTACHMENT A – CONDITION DESCRIPTIONS AND DAM TERMINOLOGY

COMMON DAM SAFETY DEFINITIONS

For a comprehensive list of dam engineering terminology and definitions, refer to 302 CMR 10.00 or other reference published by FERC, Dept. of the Interior Bureau of Reclamation, or FEMA. Please note that should discrepancies between definitions exist, those definitions included within 302 CMR 10.00 govern for dams located within the Commonwealth of Massachusetts.

Orientation

Upstream – The side of the dam that borders the impoundment.

Downstream – The high side of the dam, the side opposite the upstream side.

Right – The area to the right when looking in the downstream direction.

Left – The area to the left when looking in the downstream direction.

Dam Components

Dam – Any artificial barrier, including appurtenant works, which impounds or diverts water.

Embankment – The fill material, usually earth or rock, placed with sloping sides, such that it forms a permanent barrier that impounds water.

Crest – The top of the dam, usually containing a road or path across the dam.

Abutment – That part of a valley side against which a dam is constructed. An artificial abutment is sometimes constructed as a concrete gravity section to take the thrust of an arch dam where there is no suitable natural abutment.

Appurtenant Works – Structures, either in dams or separate therefrom, including but not be limited to, spillways; reservoirs and their rims; low-level outlet works; and water conduits including tunnels, pipelines, or penstocks, either through the dams or their abutments.

Spillway – A structure over or through which water flows are discharged. If the flow is controlled by gates or boards, it is a controlled spillway; if the fixed elevation of the spillway crest controls the level of the impoundment, it is an uncontrolled spillway.

Size Classification
(as listed in Massachusetts Dam Safety Regulations, 302 CMR 10.00)

Large – Structure with a height greater than 40 feet or a storage capacity greater than 1,000 acre-feet.

Intermediate – Structure with a height between 15 and 40 feet or a storage capacity of 50 to 1,000 acre-feet.

Small – Structure with a height between 6 and 15 feet and a storage capacity of 15 to 50 acre-feet.

Non-Jurisdictional – Structure less than 6 feet in height or having a storage capacity of less than 15 acre-feet.

Hazard Classification
(as listed in Massachusetts Dam Safety Regulations, 302 CMR 10.00)

High Hazard (Class I) – Dams located where failure will likely cause loss of life and serious damage to home(s), industrial or commercial facilities, important public utilities, main highway(s) or railroad(s).

Significant Hazard (Class II) – Dams located where failure may cause loss of life and damage to home(s), industrial or commercial facilities, secondary highway(s) or railroad(s), or cause the interruption of the use or service of relatively important facilities.

Low Hazard (Class III) – Dams located where failure may cause minimal property damage to others. Loss of life is not expected.

General

Acre-foot – A unit of volumetric measure that would cover one acre to a depth of one foot. It is equal to 43,560 cubic feet. One million U.S. gallons = 3.068 acre feet.

AHPS – Advanced Hydrologic Prediction Service – a website showing Housatonic River flows and river stage at United States Geological Survey Gage No. 01197500 at Division Street in Great Barrington.

Dam safety engineer – A Professional Engineer experienced in dam safety and registered in Massachusetts.

EAP – Emergency Action Plan – A predetermined (and properly documented) plan of action to be taken to reduce the potential for property damage and/or loss of life in an area affected by an impending dam failure.

Height of dam (structural height) – The vertical distance from the lowest portion of the natural ground, including any stream channel, along the downstream toe of the dam to the lowest point on the crest of the dam.

Hydraulic height – The height to which water rises behind a dam and the difference between the lowest point in the original streambed at the axis of the dam and the maximum controllable water surface.

Maximum storage capacity – The volume of water contained in the impoundment at maximum water storage elevation.

Maximum water storage elevation – The maximum elevation of water surface which can be contained by the dam without overtopping the embankment section.

Normal pool – The elevation of the impoundment during normal operating conditions.

Normal storage capacity – The volume of water contained in the impoundment at normal water storage elevation.

OM&M Plan – Operation, Monitoring, and Maintenance Plan.

Spillway Design Flood (SDF) – The flood used in the design of a dam and its appurtenant works particularly for sizing the spillway and outlet works, and for determining maximum temporary storage and height of dam requirements.

Condition Rating

Unsafe – Major structural*, operational, and maintenance deficiencies exist under normal operating conditions.

Poor – Significant structural*, operation and maintenance deficiencies are clearly recognized for normal loading conditions.

Fair – Significant operational and maintenance deficiencies, no structural deficiencies. Potential deficiencies exist under unusual loading conditions that may realistically occur. Can be used when uncertainties exist as to critical parameters.

Satisfactory – Minor operational and maintenance deficiencies. Infrequent hydrologic events would probably result in deficiencies.

Good – No existing or potential deficiencies recognized. Safe performance is expected under all loading including SDF.

* Structural deficiencies include but are not limited to the following:

- Excessive uncontrolled seepage (e.g., upwelling of water, evidence of fines movement, flowing water, erosion, etc.).
- Missing riprap with resulting erosion of slope.

- Sinkholes, particularly behind retaining walls and above outlet pipes, possibly indicating loss of soil due to piping, rather than animal burrows.
- Excessive vegetation and tree growth, particularly if it obscures features of the dam and the dam cannot be fully inspected.
- Deterioration of concrete structures (e.g., exposed rebar, tilted walls, large cracks with or without seepage, excessive spalling, etc.).
- Inoperable outlets (gates and valves that have not been operated for many years or are broken).

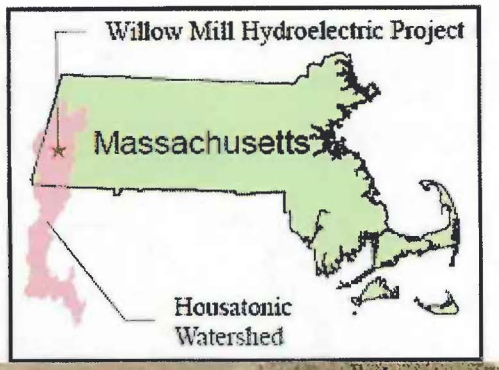
ATTACHMENT B – EMERGENCY ACTION PLAN

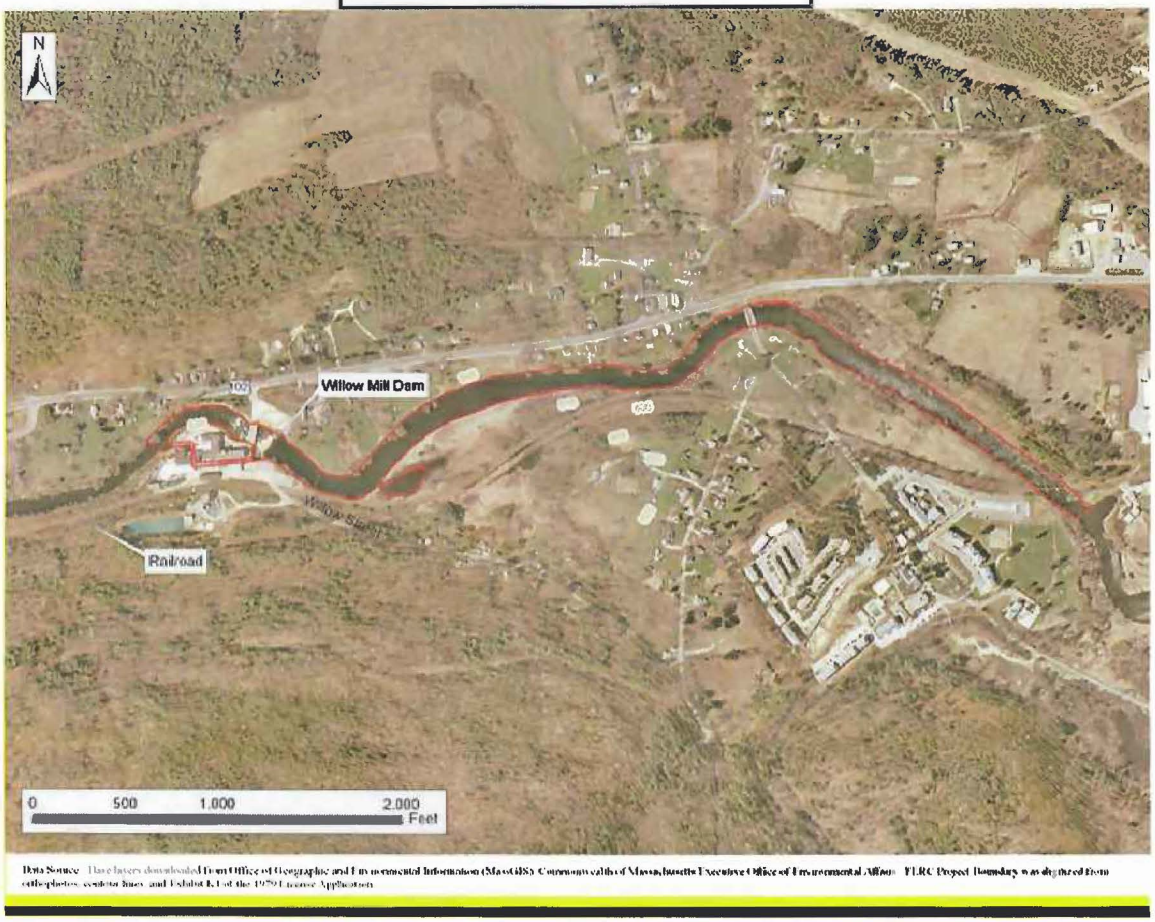
Hurlbut Dam (Willow Mill Dam)

South Lee, MA 01260

National I.D. Number: MA00262

Dam Location: 42.27590° N / -73.28444° W





Data Source: Data layers downloaded from Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs. FERC Project Boundary was digitized from orthophotos, aerial photos and Exhibit K of the 1979 License Application.

Dam Owner:

Onyx Specialty Papers, Inc.
40 Willow St., South Lee, MA 01260
Owner Daytime Phone: 413.243.1231
Owner Emergency Phone: 413.717.7607

Dam Operator:

Donald Zukowski
Lee, MA 01238
Operator Daytime Phone413.243.7421
Operator Emergency Phone413.822.7408

Plan Developed October 2002

Revision Number 11 Date 1 September 2022

WILLOW MILL DAM
NID# MA00262
LAT: 42.27602 N
LON: 73.28473 W

Certification:

State of Massachusetts
County of Berkshire:

The undersigned states that she has read the following document and knows the contents of it, and that all of the statements contained in that document are true and correct, to the best of her knowledge and belief.

Patricia C. Begrowicz
President

Sworn to and subscribed before me this _7th_ of _September_ 2022.

Emergency Action Plan (EAP)

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VIII. Appendices

A. Dam Break Analysis and Inundation Mapping
B. Plans for Training, Exercising, Updating, and Posting of the EAP
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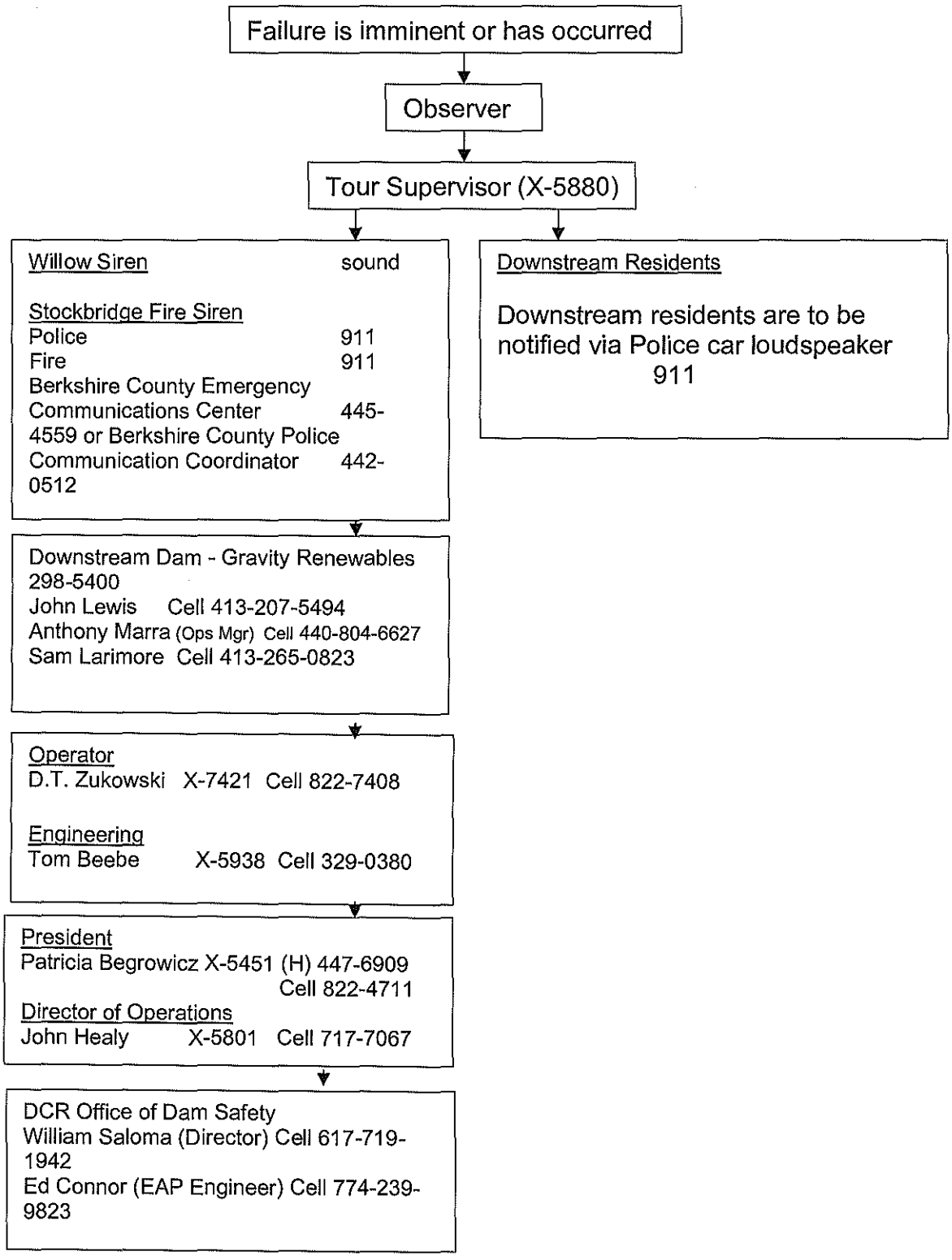
   D-2 Letter to Stockbridge EMS on Notification of downstream residents via police cruiser loudspeaker
   D-3 Mailing address of downstream residents
   D-4 Evacuation drill report and personnel accounting

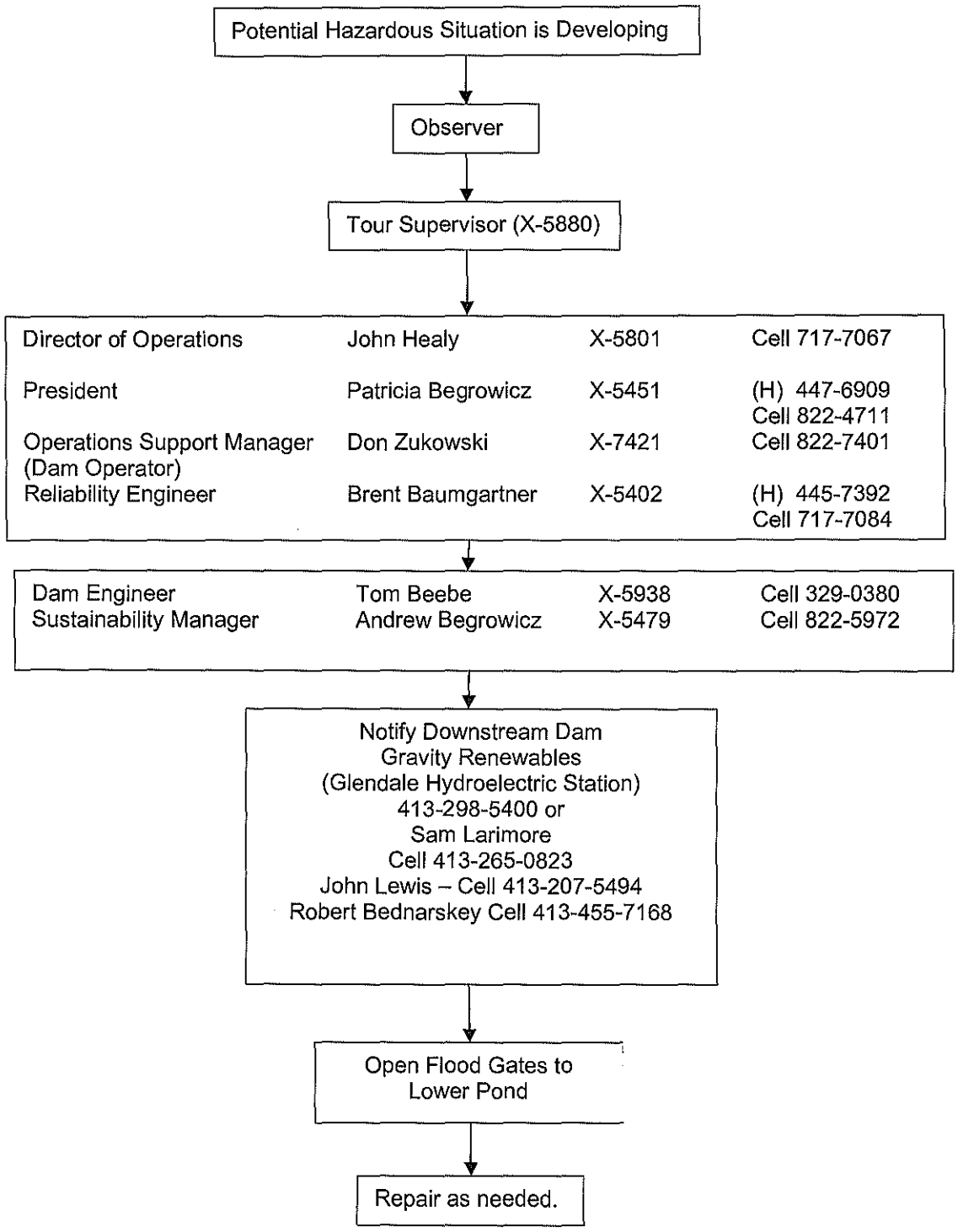
I. DAM NOTIFICATION FLOW CHART (NOTE- Calling Area Code is 413 unless otherwise indicated)

ONYX SPECIALTY PAPERS, INC.
WILLOW MILL DAM
SOUTH LEE, MA 01260
National ID No: MA00262



I. DAM NOTIFICATION FLOW CHART (cont.)(NOTE: Calling AREA code is 413 unless otherwise stated)

ONYX SPECIALTY PAPERS, INC. - SPECIALTY DIVISION
WILLOW MILL DAM
SOUTH LEE, MA 01260
National ID No: MA00262



1. Statement of Purpose

The purpose of this plan is to define responsibilities and provide procedures designed to identify unusual and unlikely conditions that may endanger the dam in time to take mitigative action and to notify the appropriate emergency management officials of possible, impending, or actual failure of the dam. The plan may also be used to provide notification when releases from the dam will create major flooding.

2. Project Description

The Willow Mill Dam is located at the mill site in South Lee, Massachusetts, 0.1 miles East of the town of Stockbridge boundary. Built of rubble masonry construction, set on bedrock, it spans the full width of the Housatonic River. Starting at the northerly bank of the river and proceeding in a southerly direction, the arrangement incorporates an abutment structure containing two manually operated flood control gates; a spillway 102 feet long and 12 feet high above the bedrock; and an abutment structure at the South bank of the river containing two manually operated gates. These gates, when open, supply water to a canal and headrace system for one turbine and one process water intake installed in the basement of the mill. The dam operates on a run-of-the-river basis. During low flow periods flood gates are closed to encourage that some water is flowing over the dam. With a river level such that a minimum flow occurs over the dam, the impoundment area between the normal banks of the river course is estimated to be 13 acres. Estimated average depth is 3 to 4 feet.

Other dams in the area that have influence on river flow are:

The Columbia Mill Dam of the Schweitzer-Maduit International, Inc. 6.5 river miles North of the Willow Dam. This is a run-of-the-river dam and has no flow control devices.

The Goose Pond dam. The discharge is into Goose Pond Brook (a tributary of the Housatonic) 8 river and brook miles North of the Willow Dam. The Goose Pond Dam has a spillway to control the maximum level in the pond, and one manually controlled gate to control the supply of water to Goose Pond Brook for pond level purposes. In normal times, the pond level is maintained below the spillway to provide some volume to accept heavy rain and watershed run-off conditions.

Gravity Renewables Dam (Glendale Hydroelectric Station) 6.8 river miles South (downstream) of the Willow Mill dam. This dam is an active hydroelectric plant that can actively pass water.

The Rising Dam (GE owned), 10.8 river miles South of the Willow Mill Dam. The hydroelectric plant has been out of operation for approximately 15 years. The dam has no flow control devices.

OPERATION

As indicated previously, the dam is operated on a run-of-the-river basis and, therefore, is normally full. It is possible to release water, but impossible to hold back water above the dam. In a typical year, there is considerable variation in river flow (as measured at a USGS gauging station 11 river miles below the mill). Values can range from a level of 150 CFS in the middle of summer to 3000-7000 CFS during the spring run-off, depending on how much snow has fallen during the winter months and how heavy the spring rains are. The Housatonic River 100-year flood limit for the course of the river through the Town of Lee, records the high-water level as 10 feet above the crest of the dam and the low water level downstream of the dam as 0.6 feet above the crest of the dam. We believe the related river flow was 12,200 CFS, recorded January 1, 1949. Under this condition, there was 3.3 feet of water in the basement of the Willow Mill, causing the mill to be shut down.

In a typical spring, flooding occurs in the flatlands above the dam and in lowlands adjacent to the river course below the dam and in Stockbridge. As the spring run-off starts to build, the floodgates at the dam are opened in an attempt to equitably distribute the flooding above and below the dam, however, after the river flow reaches a certain level, the gates have no discernible effect.

A beneficial side effect of this seasonal cycle is that as the spring run-off begins to increase, those residents and occupants of other premises that have potential for being flooded keep in touch with its progress.

3. Emergency Detection, Evaluation, and Classification

1. Signs of Possible Failure

The dam will be checked daily (more often during periods of high flow) by the Maintenance Supervisor or designee (Operator) and his observations will include:

1. Signs of unusual seepage, increased seepage, or change in the color of seepage.
2. Signs of movement, settling, cracks, or bulges.
3. Slides, rock falls, or leakage through or under structures.

a. Should any of the above be observed, the inspector (if the inspector is not the Dam Engineer) shall notify:

1. The Dam Engineer (see Section I, page 4 for name and phone numbers of the Engineer).
2. The Dam Operator (see Section I, page 4 for name and phone numbers of the Operator).

b. The Dam Engineer shall notify:

1. The Director of Operations
2. The President

c. Upon notification, the Dam Engineer or his designated representative, shall:

1. Promptly investigate the situation and take immediate action to make timely repairs through the maintenance supervisor or an outside contractor, or both.
2. Open the flood gates to drain the pond if feasible.

2. Slowly Developing Failure

Should any of the previously mentioned signs of a possible failure start increasing at a noticeable rate or other signs of a possible failure are developing, the following action will be taken:

1. The Dam Operator shall notify:

    a. The Dam Engineer, Reliability Engineer and the Sustainability Manager

2. The Dam Engineer shall notify:

    a. Director of Operations
    b. The President

3. Upon confirming that a potential failure is developing, the Dam Engineer shall:

    a. Request that the downstream dam be notified to prepare to pass extremely high flows. The downstream dam is:

        1. Gravity Renewables: 298-5400 and cell numbers listed on page 4
            (Glendale Hydroelectric Station, Glendale, MA)

    b. The Dam Engineer shall then:

        1. Arrange timely repairs.
        2. Open the flood gates to drain the pond if feasible.

3. <u>Rapidly Developing Failure</u>

Same as "Slowly Developing Failure" except that:

1. The Dam Operator, the Dam Engineer, Director of Operations, Sustainability Manager, or President shall authorize:

    a. Sound the mill siren.
    b. Notify the Berkshire County Emergency Communications Center in Pittsfield, MA, to implement pre-planned disaster plans.
    c. Notify Stockbridge Fire Department to activate their siren.
    d. Alert downstream residents via Police car loudspeaker

2. The President or Director of Operations will determine the advisability of contacting the Governor for further aid.

4. Catastrophic Failure

In the event the dam should fail without warning (sabotage, earthquake, bombing, etc.), the following course of action shall be initiated:

1. Same procedure as in "C. Rapidly Developing Failure" listed in this report.

V. General Responsibilities under the EAP

A. Licensee Responsibilities

In regard to the Emergency Action Plan:

The President or her designee shall be responsible for keeping local officials advised and for notifying local authorities of any changes in the status of the Willow Dam and shall also act as spokesperson for Onyx Specialty Papers, Inc. in matters concerning the Emergency Action Plan.

The Preparedness Team shall be responsible for coordinating any Emergency Action Plan tests and review of the Emergency Action Plan.

The Director of Operations shall be responsible for all revisions to the Emergency Action Plan.

In the implementation of the Emergency Action Plan, the Chain of Command has the following sequence (following the notification charts):

The Observer
Tour Supervisor
Director of Operations
The President

B. Responsibility of Notification and Evacuation

1. **Failure is Imminent or Has Occurred**

Immediately upon discovery of an extremely dangerous situation, the Observer shall contact the Tour Supervisor (X-5880) for authorization to implement the PLAN or, in the absence of the Tour Supervisor, the Observer shall in sequential order:

- Activate the Willow Siren.
- Report condition to Stockbridge Police Department (911) to activate the Stockbridge emergency signal.
- Request the Stockbridge Police alert Downstream Residents via Police car speaker.
- Contact Lee Emergency Mgmt. Coordinator 243-5530
- If not at work (and already alerted and present), contact Onyx's:

Dam Support	B.A. Baumgartner	(413) 717-7084
Dam Operator	D. T. Zukowski	(413) 822-7408
The President	P. C. Begrowicz	(413) 822-4711
Engineering Support	T.A. Beebe	(413) 329-0380

- Notify DCR Office of Dam Safety of the situation:

Director W. Salomaa (C) (617) 719-1942

- Members of Onyx's Fire and Emergency Teams and Plan Holders will assist in calling procedures as they become available.

- Law Enforcement Officials will be alerted by sirens, Berkshire County Emergency Communications Center, and Lee Emergency Operator.

- Notification of operators of dams not mentioned above is not applicable.

- Recreation facility manager and operator notification is not applicable.

- For names and phone numbers of other Emergency Supply and Resources see Section VI. G.

- In addition to Onyx' Fire Siren, Stockbridge fire siren, and Telephone, primary means of communication with downstream residents would be Police Cruiser Loud Speakers.

2. Potential Hazardous Situation is Developing

Immediately upon discovery of a potentially hazardous situation, the observer shall contact the Tour Supervisor (X-5880) or, in his absence, one of the following in sequential order:

Operations:

Director of Operations	J. H. Healy	X-5801	Cell 717-7067
President	P. C. Begrowicz	X-5451	Cell 822-4711
Dam Support	B. A. Baumgartner	X-5402	Cell 717-7084

AND

If Engineering is not yet involved, Operations shall contact Engineering to investigate the situation and take whatever immediate action is necessary.

Engineering:

Dam Engineer	T. A. Bebee	X-5938	Cell 329-0380
Sustainability Manager	A. S. Begrowicz	X-5964	Cell 822-5972

Minor Problem:

1. Notify downstream dam. 298-5400
2. Open flood gates.
3. Repair as needed.

Major Problem:

1. Post Observer(s)
2. Notify downstream dam. 298-5400
3. Open flood gates.
4. More detailed investigation.
5. Repair as needed.

C. Responsibility for Termination and Follow-Up

In the event that an emergency situation arises and the EAP is activated, it is the Emergency Response Coordinator's (Director of Operations), or his designee's responsibility to follow-up the situation with a post-crisis critique that will involve all participants. The results of this critique will be documented in a written report. Any action items that result from the critique will be assigned to the appropriate personnel for closure.

D. EAP Coordinator Responsibility

The Director of Operations is the designated EAP coordinator. General responsibilities include revising the EAP, ensuring that the training sessions are established, and that EAP tests are properly coordinated by the Preparedness Team.

VI. Preparedness

A. General provisions for surveillance:

Willow Dam is checked daily by the Dam Operator (maintenance supervisor) or designee. (See Section IV. Emergency Detection, Evaluation, and Classification)

During periods of adverse weather conditions or high water, the Maintenance Supervisor or his/her appointees check the Willow Dam more frequently.

B. Response during periods of darkness:

Response during periods of darkness would be the same as day time as the dam is illuminated by floodlights and the gate area is adjacent to the lighted parking lot. Contacting procedures and expected response time would be similar, and no special instructions should be necessary.

C. Access to Site:

Access to the site is via Willow Street, which is off Route 102, 3 miles west of the Massachusetts Turnpike. In the unlikely event that Willow

Street would be flooded, there would be no need to access the dam for flood control at that time.

D. Response during Weekends and Holidays:

The facility is a 24 hour, 7 days a week manned operation.

E. Response during periods of adverse weather:

During adverse weather, response to the EAP should be the same as during good weather conditions because of the proximity of the dam. Method of access would still be by foot as the dam is on Mill grounds. No special instructions are necessary.

F. Alternate systems of communication:

Primary means for Communications are by way of Willow Mill Siren, Stockbridge Siren, and telephone. The only applicable alternate communications system would be the use of Police Cruiser loudspeaker systems.

G. Emergency Supplies and Resources:

See Exhibit I – Dam Failure Call Data

Onyx Specialty Paper's Mill Management:

Title	Name	Business	Cell
President	P. C. Begrowicz	X-5451	822-4711
Director of Operations	J. P. Healy	X-5801	717-7067
Ops Support Manager	D. T. Zukowski	X-5402	822-7401
Reliability Engineer	B. A. Baumgartner	X-5402	717-7084
Engineering Manager	T. A. Beebe	X-5938	329-0380

Town Services:

Stockbridge Emergency	911 / 445-4559	
Stockbridge Police Department	298-4179	
Stockbridge Emergency Management	298-4170 ext. 112	822-4155 (cell)
Lee Emergency Phone	911 / 243-2323	
Lee Emergency Management	243-5530	
Lee Connecting All Departments	243-2100	

Berk. Cty Emergency Communications	445-4559	or
Berk. Cty Police Comm. Coordinator	442-0512	

DCR Office of Dam Safety
W. Salomaa (C) 617-719-1942

Gravity Renewables
Anthony Marra (Ops Mgr) Cell 440-804-6627
John Lewis (O) 298-5400 (C) 207-5494

Exhibit II – Area Hospitals

Berkshire Medical Center Inc.
725 North Street
Pittsfield, MA 01201 Phone: 447-2000
24 Hour Emergency Care
365 Beds, 36 Bassinets
Approximately 15 miles from Stockbridge Center

*Fairview Hospital
29 Lewis Avenue
Great Barrington, MA 01230 Phone: 528-0790
24 Hour Emergency Care
25 Beds, 10 Bassinets
Approximately 8 miles from Stockbridge Center

*Fairview has a disaster plan. Emergency Hospital will be set up at an area church and is capable of being moved to a disaster area if needed.

Suburban Medical Offices of Berkshire
Physicians and Surgeons
Stockbridge Road
Lee, MA 01238 Phone: 243-0122
24 Hour Doctor On-Call Service
No Beds
Approximately 3 miles from Stockbridge Center

Exhibit III – Ambulance Service

Action Ambulance
Pittsfield, MA (Private)
Three (3) ambulances — Phone: 911 or 445-4559

Southern Berkshire Volunteer Ambulance, Bill Hathaway
Great Barrington, MA
Two (2) ambulances — Phone: 911 or 445-4559

County Ambulance Service
Pittsfield, MA — Phone: 911 or 445-4559
Four (4) ambulances

Becket Volunteer Ambulance Squad
Becket, MA
One (1) ambulance — Phone: 911 or 445-4559

Town of Lee
Lee, MA
One (1) ambulance — Phone: 911

Town of Lenox
Lenox, MA
One (1) ambulance — Phone: 911 or 445-4559

Town of Otis
Otis, MA
One (1) ambulance — Phone: 911 or 445-4559

Town of Richmond
Richmond, MA
One (1) ambulance — Phone: 911 or 445-4559

Exhibit IV – Wrecker Service

Name	Location	Phone No.	Approximate Distance from Stockbridge Center
Stockbridge Motors	Stockbridge, MA	298-4040	4 ¼ mile
R. W.'s	Lee, Ma	243-0946	4 ½ miles
Decker's Auto Body	Gt. Barrington, MA	528-1432	4 ½ miles
Steve's Auto Rep.	Gt. Barrington, MA	528-9833	7 miles
Skyline Towing	Pittsfield, MA	499-8233	15 miles

Exhibit V – Contractor/Heavy Equipment Service

Contractor	Location	Phone
Petricca Construction Co.	Pittsfield	442-6926
Dodge Construction Co., Inc.	Pittsfield	445-4713
LB Corporation	Lee	243-1072
J. H. Maxymillian Inc.	Pittsfield	499-3050
Virgilio Construction Co., Inc.	Pittsfield	447-9755

Crane Service	Location	Phone
Berkshire Bridge & Iron	Dalton	684-3182
LB Corporation	Lee	243-1072
Berkshire Crane Services	Sandisfield	258-3378
Berkshire Crane and Logistics	Lanesboro	418-0074

Tree Service	Location	Phone
Berkshire Tree Service	Pittsfield	442-3175
Ingersol Tree & Landscaping	Sheffield	229-2290
Haupt Tree Company	Sheffield	800-874-8733
Peerless Tree Expert Co.	New Marlboro	229-8689

Exhibit VI – News Stations, Miscellaneous

News Station	Location	Phone
WBEC – WBEC FM	Pittsfield	499-3333
SBRK AM – Z101 FM	Pittsfield	442-1553 or 443-9275
WBLS FM	Sheffield	229-6683
WUPE FM	Pittsfield	499-1100
WSBS AM	Gt. Barrington	528-0860

Miscellaneous	Location	Phone
Massachusetts Military Department National Guard, Co.C 1st Btn., 104 Infantry	Pittsfield	442-4486
U.S. Army Reserve 304THTRANS Co	Pittsfield	448-2440
U.S. Navy Reserve Training Center	Pittsfield	442-5014
American Red Cross Food-Clothing-Shelter	Pittsfield	442-1506
Salvation Army Food-Clothing-Shelter	Pittsfield	442-0624
Lee Department of Public Works	Lee	243-5520

VII. Inundation Map and Dam Break Analysis Summary

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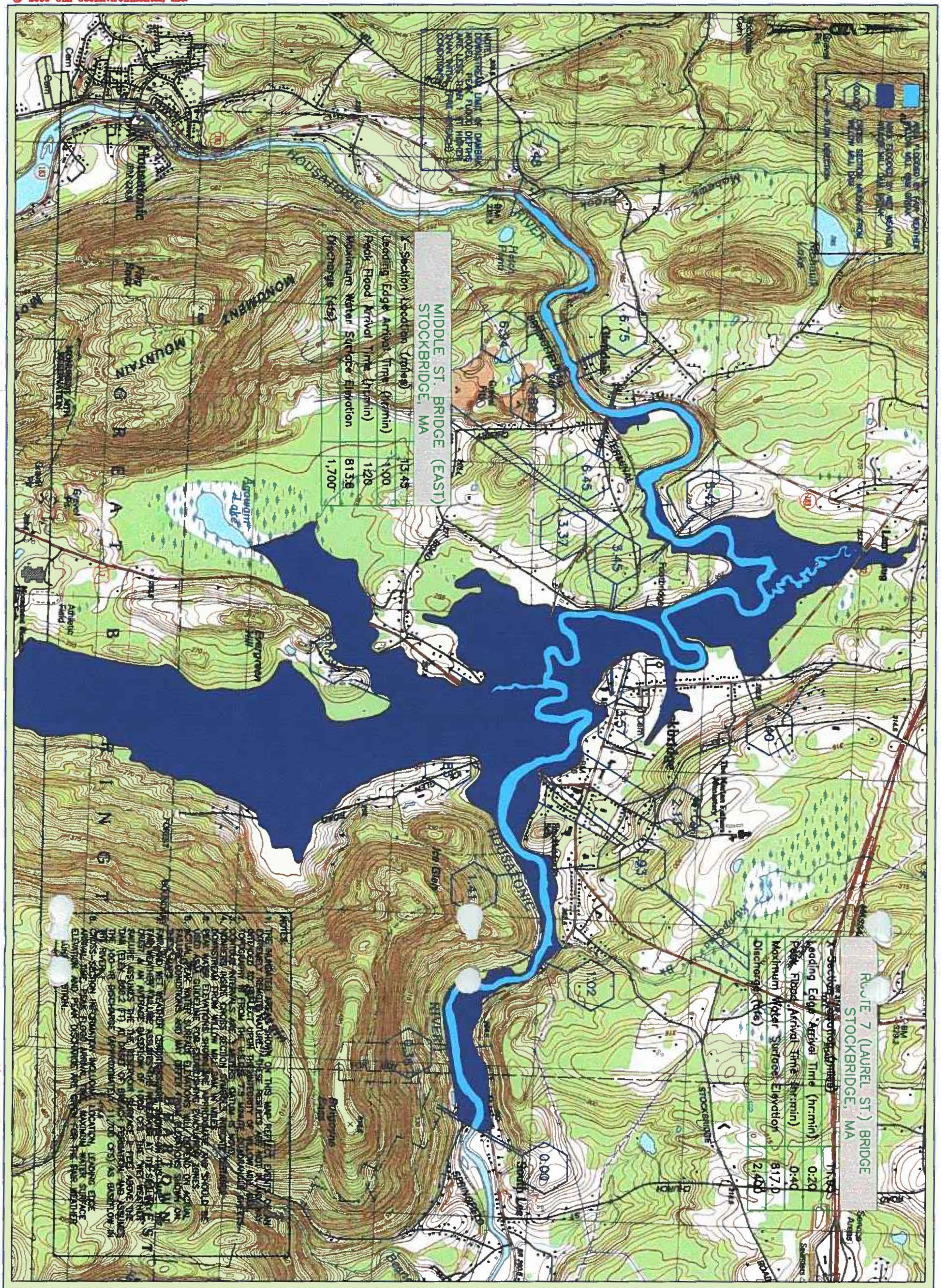

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JOB NO.	FIGURE NO.
16422.00	SHEET 1 OF 1

MEAD SPECIALTY PAPER
DAMBRK ANALYSIS
SOUTH LEE, MA

INUNDATION MAP
WILLOW MILL DAM

REV. NO.	DESCRIPTION	BY	DATE

SCALE: 1" = 2000'

0 1000 2000 4000

PROJ MGR: DML
DESIGNED BY: DML
REVIEWED BY: PHB
OPERATOR: DML
DATE: 8/14/00

GZA Mead

VIII. Appendices

Appendix A

The 1993 reprint of the EAP requires all inundation mapping to show two flood lines. These two inundation lines being the Sunny-Day failure and the Inflow Design Flood failure scenarios. The previous inundation mapping was performed by Massachusetts Municipal Engineering consultants and was based on the 100-year storm with a flow of approximately 11,200-CFS.

A study performed by Accord Engineering and Surveying, Inc. started with the computation for the probable maximum storm (PMS) for the drainage basis using HMR-51 and HMR-52 produced by the National Weather Service. The data from HMR-52 was then utilized to compute inflow hydrographs at the dam from HEC-1 software from the Army Corps of Engineers. The National Weather Service Dam Break Model software (NWS DMBRK) was used to model the dam failure with the inflow hydrograph data from HEC-1.

Several iterations of the model were executed using different hydrographs. The hydrographs were developed as increments of the total PMS (5%, 10%, 15%, etc.) to determine the Inflow Design Flood (IDF) for the dam. The model was also executed for the Sunny-Day scenario to simulate a dam failure during normal flow conditions.

The Sunny-Day failure scenario indicated the floodwaters would rise 6-7 feet above the normal water level. The flood wave will have receded by about seven miles downstream of the dam. The floodwaters would be contained within the existing flood plain, and such a failure would not endanger any downstream residents.

The results of the study yielded an IDF of 10% of the PMF. This is equivalent to an inflow of 13,131 CFS at the dam. This is slightly larger than the flood of record, which was 12,200 CFS.

As a result of comments from FERC on June 15th, 2000, Mead contracted GZA GeoEnvironmental, Inc. to rerun the IDF and sunny-day scenario models and create improved inundation maps. GZA utilized the Boss Corporation DAMBRK version 3.00 (1988-1992) software for analysis of the Willow Mill Dam. This software is an enhanced version of the 1988 NWS DAMBRK program.

The following is the report from GZA, which includes the most current Dam Break Model output for the Sunny-Day and IDF failure scenarios:

GZA
GeoEnvironmental, Inc.

Engineers and Scientists

August 28, 2000
File No. 16422.0-C, PC

Mead Specialty Paper Division
Morart Plant
Route 102
South Lee, Massachusetts 01260

Attention: Mr. Andrew Wolf

Re: Willow Mill Dam Break Analysis and Inundation Mapping

320 Needham Street
Newton Upper Falls
Massachusetts
02464-1594
617-969-0050
FAX 617-965-7769
http://www.gza.net

Gentlemen:

Pursuant to our agreement dated August 7, 2000, GZA GeoEnvironmental, Inc. (GZA) is pleased to present this letter report of dam break analysis and inundation mapping for Willow Mill Dam.

OBJECTIVES

GZA has conducted a dam break analysis of Willow Mill Dam located in South Lee, Massachusetts, for Mead Specialty Paper Division (Mead) in support of an Emergency Action Plan (EAP). The objective of the dam break modeling is to estimate the downstream inundation areas and the corresponding time to flooding, thus identifying critical downstream areas severely affected by a dam failure (i.e., sudden, uncontrolled release of water). The DAMBRK computer model calculates various flood wave characteristics such as the arrival time to peak stage, peak discharge summary, and flood crest profile, which were incorporated into the attached Inundation Map. The results of the dam break analysis and resultant Inundation Maps will be incorporated into a separate EAP document being prepared by Mead as per Federal Energy Regulatory Commission (FERC) requirements. The final product will be a vital tool used by Mead, FERC, local and state emergency management and public safety personnel to assist in the notification and evacuation of inhabitants through the identification of potential downstream flood impact areas. This report is subject to the Limitations presented in Appendix A.

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It should be clearly understood that the limits of flooding developed through the DAMBRK modeling effort and presented on the Inundation Map are approximate. The DAMBRK results shown on the accompanying Inundation Map and Profile are a function of the method, procedures, and assumptions employed for the model. Actual inundation areas will depend on actual failure conditions and may therefore differ somewhat from areas shown on the maps.

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REGULATORY CLASSIFICATION

According to The current Commonwealth of Massachusetts, Department of Environmental Management Dam Safety Regulations, the dam is **Intermediate Size** based on a height of 12 feet. The dam is also considered to have an **Significant Hazard** (Class II) potential. Significant Hazard is defined as: *"Dams located where failure or misoperation may cause loss of life and damage home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities."*

METHODOLOGY

The National Weather Service (NWS) DAMBRK computer program was used to predict the hypothetical dam break wave formation at Willow Mill Dam and downstream progression along the Housatonic River. The Boss Corporation DAMBRK version 3.00 (1988-1992) was used in the analysis for the Willow Mill Dam. Boss DAMBRK is an enhanced version of the 1988 NWS DAMBRK program. Boss Corporation has modified the original version to include convenient, user-friendly data input screen and a graphics generating package. The model uses the same FORTRAN code and algorithms as the 1988 NWS DAMBRK model. The Inundation Map is included in Appendix B; Dam breach computer simulation (DAMBRK) input and output summaries are presented in Appendix C.

DAMBRK Model Input Parameters

Hydraulic input parameters used in modeling the river valley downstream of Willow Mill Dam are described below.

Inflow Hydrograph

The fair weather scenario was performed with a reservoir pool coincident with the spillway crest elevation 838.5 feet and a baseflow of 1,000 cfs. The wet weather scenario was performed using the Inflow Design Flood (IDF) as estimated by Accord Engineering, Tyringham, Massachusetts in their 1994 memorandum to FERC. Accord estimated the IDF to be about 13,000 cfs and described the resultant inflow hydrograph to the dam in their 1994 dam break analysis. The reasonableness of the IDF methodology utilized by Accord was adequate for the purposes of the DAMBRK analysis, in GZA's opinion.

Reservoir Volume

The total volume of the reservoir in acre-feet was estimated by the DAMBRK program given the total surface area of the reservoir at selected elevations. Surface area data was gathered from the U.S. Army Corps of Engineers National Inventory of Dams database.

Riverine Description

A site visit was conducted by GZA personnel on August 8, 2000 to observe Willow Mill Dam, appurtenant structures, and downstream areas. A windshield survey of the Housatonic River, downstream of Willow Mill Dam, was conducted to observe variations in channel geometry, and closer inspection of bridges and other structures was performed.

A detailed river model for the areas downstream of Willow Mill Dam was formulated by using USGS topographic maps and computer modeling software. Riverine geometry in the form of cross sections was obtained from 7.5-minute, 1:24,000 scale USGS quadrangle maps with 3-meter contour intervals. Other cross section characteristics needed for input into the DAMBRK model include coefficients for roughness and contraction/expansion. The cross section locations were selected to approximate natural and man-made changes in the river valley geometry (i.e., bridge abutments, steep valleys, and wide flood plains). The spacing of the cross-sections ranged from 0.01 miles to 1.24 miles. Cross sections were spaced closer together in portions of the downstream valley where changes in the bed slope and the flow regime occurred (i.e., subcritical to supercritical flow) and where the river valley side slopes alternated from narrow and constricted to wide flood plains.

The riverine portion of the DAMBRK model incorporated a total of 26 cross sections covering 7.5 miles from the dam to about 0.75 miles downstream of the Glendale Dam in Stockbridge, Massachusetts. The cross section locations are referenced in miles downstream from Willow Mill Dam. The cross sections are described in terms of elevation versus top-width of the channel and overbank areas. Published Federal Emergency Management Agency (FEMA) Flood Insurance Studies for the Towns of Lee and Stockbridge were used to confirm streambed invert elevations and flow data at selected cross sections.

Mannings "n" roughness coefficients for the Willow Mill model were generally approximated at 0.035 for the channel areas, and ranged from 0.050 to 0.085 for the overbank areas. The values used are consistent with the range of values used in the FEMA Flood Insurance studies for the downstream communities.

Breach Description

GZA estimated hypothetical dam breach parameters from working drawings of Willow Mill Dam, in accordance with the recommended range of values published in the Federal Energy Regulatory Committee (FERC) guidelines. The breach width selection was based on channel geometry, dam length and dam type, with the hypothetical failure occurring at the deepest section. The average width of the breach is 85.0 feet with vertical side slopes, which represents about 80 percent of the spillway length. The time to maximum breach opening is 0.1 hours. These values are consistent with recommended values published by FERC[1] and the National Weather Service FLDWAV guidelines[2].

[1] FERC, "Engineering Guidelines for the Evaluation of Hydropower Projects", April 1991 (Revised 1997).

The maximum flood is usually produced by selecting the maximum probable average maximum breach width and the minimum probable time to failure (NWS, 1988). Selection of specific breach parameters can introduce a varying degree of uncertainty in the downstream flooding results of the DAMBRK model. However, uncertainty in the breach description and thus in the resulting peak outflow are damped-out as the flood wave advances downstream. Sensitivity simulations using a breach width of 90 percent of the spillway length (95 feet wide at the base of the breach) yield virtually identical results.

Boundary Conditions

The downstream reach below Glendale Dam (about 7.5 miles downstream of Willow Mill Dam) was selected as the downstream boundary for the DAMBRK analysis. The boundary was set downstream of Glendale Dam to accommodate the potential failure of the dam due to the dam break flood wave from Willow Mill Dam. A boundary rating curve, representing river stage versus discharge, was developed by DAMBRK based on channel characteristics downstream of Glendale Dam for the Housatonic River at Stockbridge.

Dams and bridges are considered internal boundaries by the DAMBRK program. In addition to Willow Mill Dam, several bridge deck embankments were modeled including the Route 7 (Laurel Street) Bridge, the Glendale Middle Road Bridges, and Butler Road Bridge in Stockbridge. Bridge geometry was obtained from design and as-built drawings provided by the Town of Stockbridge and from field measurements taken by GZA in August, 2000. Glendale Dam was also incorporated in the model. Information pertaining to the dam was obtained from the 1979 Army Corps Phase I Dam Inspection Report[3].

DAMBRK Model Execution

Modeling Setup and Limitations

In addition to user-input cross sections, the program generates interpolated cross sections to further refine river valley geometry between two widely spaced cross sections. User-input cross sections must be geometrically similar since the program may experience computational difficulties in solving for water levels through reaches with wide cross sections contracting to narrow cross sections (or vice-versa), and through steep reaches.

A successful modeling effort includes two major steps: an initial phase where the goal is to get the model to run to completion, and then a second phase to implement an expanded approach where complexity is added to the model. Initially, cross sections were modeled as simple prismatic channels; streambed slopes were smoothed through steep sections including falls; and dams and bridges were omitted. After the model successfully ran to

[2] Daniel L. Fread and Janice Lewis, National Weather Service, "Unsteady Flow Simulation Using NWS FLDWAV Model," NWS FLDWAV Workshop, Kansas City, MO, November, 1999.
[3] U.S. Army Corps of Engineers, "Phase I Inspection for Glendale Dam, Stockbridge, MA," April 1979.

completion, certain dams and bridges were added in succession. Streambed invert elevations were adjusted to better reflect actual conditions, especially through abrupt channel drops where dams are located. Simplified cross section geometry was then adjusted through the model to better reflect actual conditions.

The constrictive effects of bridge embankments/abutments were modeled by placing cross sections at significant bridge locations. Bridges included in the DAMBRK model were conservatively assumed to withstand the forces of the hypothetical dam break flood and were not breached. Debris dams, which may potentially be formed by objects carried by the flood wave gathering at flow constrictions, are not considered in the DAMBRK model.

The valley immediately downstream of the dam is characterized by narrow floodplains usually less than 1,500 feet in width. Valley walls along the Housatonic River are usually very steep until Stockbridge Plains, about 2 miles downstream from Willow Mill Dam. The area of downtown Stockbridge, adjacent to an approximately 3.5 mile long stretch of the river, contains relatively flat and wide floodplains, which constrict further downstream. Streambed slopes are moderate to steep and there are areas of rapids well downstream of the dam.

Potential Lateral Outflows

An inspection of the topography of the Housatonic River Valley from USGS topographic maps did not reveal any expected areas of lateral outflow. Lateral outflow occurs at topographic low points at which a portion of the dambreak flow may escape into another watershed.

Design Failure Condition

Fair Weather Scenario

The initial conditions for the Fair Weather Scenario are listed below. The Fair Weather Scenario assumes a base flow in the Housatonic River of 1,000 cfs and that the elevation of Willow Mill Dam's impoundment is at the spillway, elevation 838.5 feet. The base flow used in the DAMBRK model is about twice that of the average mean flow at the USGS stream gage in the Van Deusenville area of the Town of Great Barrington. However, due to the computational instabilities in the dam break model, a large baseflow was required. The magnitude of the baseflow is negligible when compared as a percentage of the peak dam break discharge; thus, it does not appreciably effect the accuracy of the routing results. This amount, when compared to the peak discharge after dam failure, is insignificant. The Fair Weather Scenario is believed to have the greatest potential for loss of life due to the element of surprise.

Willow Mill Dam

Base Flow:	1,000 cfs
Initial Water Surface:	838.5 ft
Top of Dam:	848.2 ft

Breach Formation

Breach Bottom Elevation:	822.5 ft
Maximum Breach Top Width:	85.0 ft
Maximum Breach Bottom Width:	85.0 ft
Final Breach Side Slope:	Vertical (0 Horizontal : 1 Vertical)
Time to Maximum Breach:	0.1 hr

Wet Weather Scenario

For the Wet Weather Scenario, the IDF previously developed by Accord Engineering[4] was used as the inflow hydrograph. The water surface elevation at the time of breach was set to the maximum water surface elevation attained during the IDF of about 851.5 feet. Base flow was assumed to be equal to the flow over the spillway coincident with the estimated 100-year flood flows as reported by FEMA at the boundary of Lee and Stockbridge, MA. Breach geometry from the Fair Weather Scenario was maintained for the Wet Weather Scenario. The remaining initial conditions are listed below:

Base Flow:	10,300 cfs
Initial Water Surface Elevation:	848.5 feet
Water Surface Elevation at Time of Breach:	851.5 feet
Top of Dam:	848.2 feet

Domino Failure: Glendale Dam

Based on the size of Willow Mill Dam, the volume of the impoundment, an estimate of the floodplain storage available within the Town of Stockbridge, and the capacity of the spillway of Glendale Dam, it is not anticipated that the flood wave resulting from the Willow Mill Dam break will cause the failure of the Glendale Dam, in GZA's opinion.

Termination of Flood Routing

Cross section input to the Willow Mill model was terminated downstream of the Glendale Dam in Stockbridge, Massachusetts, which was selected as the downstream boundary for this project. In accordance with FERC guidelines, the model was terminated at the downstream boundary, where the peak height of the dam break flood wave is less than 1 foot above pre-breach water surface levels.

[4] Accord Engineering, "Letter to FERC: Project No. 2985-MA, Willow Mill, Selection of the IDF and Hazard Analysis", January 26, 1994.

Model Calibration

The Willow Mill DAMBRK model was calibrated to the 100-year flood. Maximum water surface elevations and discharges for the 100-year flood were obtained from published FEMA studies of towns and cities within the impact zone. The DAMBRK program performs a steady-state backwater analysis to estimate initial elevations in rivers; these values were calibrated to the 100-year flood by adjusting Manning's n values, streambed invert elevations, and cross section geometries, where necessary and within a reasonable range based on the physical/hydraulic setting. Figure 1 compares the 100-year water surface elevations obtained using DAMBRK to those contained in the FEMA studies and in general shows good agreement.

DAMBRK MODEL RESULTS

The results for the Fair Weather Failure Scenario are presented on the Flood Profile (Figure 2), Peak Discharge Hydrograph (Figure 3), and Flood Wave Arrival Time Summary (Figure 4) and results for the Fair and Wet Weather Failure Scenarios are shown on the Inundation Map (Appendix B). The map depicts the expected flood zone impacted by the Fair Weather and Wet Weather Scenarios. The cross sections used in the model formulation are also shown on these maps. The Fair Weather Scenario is believed to have the greatest potential for loss of life due to the element of surprise. Summary data of the DAMBRK input and output are provided in Appendix C. DAMBRK summary results are presented in Table 1.

Fair Weather Failure

The maximum discharge through the Willow Mill Dam breach opening is approximately 14,000 cfs occurring about 0.1 hours from the beginning of breach formation. The peak flow of the dam break flood wave is between the FEMA 100-year peak discharge of 11,700 cfs and the 500-year peak discharge of 16,300 cfs. The arrival times of the leading edge of the flood for locations along the Housatonic River range from 0.3 hrs at the Route 7 Bridge, to about 1.0 hr at the first (eastern-most) crossing of Glendale Middle Road over the Housatonic River. Peak flows resulting from the Willow Mill dam break fall below the 100-year FEMA peak discharge within one-quarter mile downstream of the dam and dwindle to levels less than the 10-year FEMA peak discharge of 6,640 cfs by the time it reaches 0.6 miles downstream.

Maximum flood stage arrival times and peak water surface elevations immediately downstream of the dam are reached in less than one quarter of an hour. The arrival time for the small residential and commercial development area about ¼ mile downstream of the dam is about 0.1 hours, reaching a maximum flood depth of about 9 feet above average annual conditions. The flood wave attenuates quickly and is greatly dissipated after leaving Stockbridge Plains, reaching a maximum depth of less than 1 foot above initial conditions within 5 miles of Willow Mill Dam. The peak flow at the downstream boundary of the

DAMBRK model is about 1,400 cfs, which equates to approximately 21 percent of the FEMA-reported 10-year flood in the Housatonic River. The maximum water surface elevation at the boundary is 766.3 feet, which is about 13 feet below the maximum water surface expected for the 100-year flood. The extent of flooding appears to be confined within or slightly above the banks of the Housatonic River throughout the model extents (Inundation Map, Appendix B).

Wet Weather Failure

The Wet Weather Failure of Willow Mill Dam was assumed to occur when the reservoir reaches the peak water surface elevation expected from the IDF at about 851.5 feet. The peak IDF reservoir elevation was estimated by running the DAMBRK model under IDF flows without breaching the dam and obtaining the resultant maximum water surface elevation at the dam. The initial breach failure began at hour 6.8 from the beginning of the model, with the maximum breach width occurring 0.1 hours later. The maximum discharge through the Willow Mill Dam breach opening is about 31,600 cfs. The peak flooding times ranged from 0.5 hour at the Route 7 bridge, to 4.3 hours at the downstream boundary beyond Glendale Dam. The overall magnitude of peak flows, flood depths, leading edge and peak wave arrival times are proportionally greater than the fair weather scenario, due to higher starting reservoir level assumptions. Results of the wet weather failure are shown on the Inundation Maps.

For the wet weather failure, the flood wave overtops the river banks and spills into the Stockbridge Plains. The low, flat wetlands surrounding Konkapot Brook provide the majority of flood plain storage, although flooding approximating the 100-year event occurs in portions of downtown Stockbridge. Peak flood depths range from about 17.8 feet above average annual flow conditions at the Route 7 Bridge to 16.8 feet above average annual flow conditions at the eastern Glendale Middle Road Bridge. However, the maximum flood depths at these locations are only slightly higher than the reported FEMA 100-year flood elevations (Table 1).

CONCLUSIONS

GZA conducted DAMBRK model simulation of the flood wave resulting from the hypothetical failure of Willow Mill Dam under fair weather and wet weather conditions. The peak discharge from the dam break under fair weather conditions is about 14,000 cfs, which is somewhat less than the FEMA 500-yr peak flow estimate of 16,300 cfs for the Housatonic River in Stockbridge. The extent of flooding appears to be limited to the banks of the river, and perhaps slightly above in certain locations (see Inundation Map in Appendix B). Due to the relatively small storage volume impounded by Willow Mill Dam and the riverine geometry downstream of the dam, the flood wave dissipates quickly and diminishes to near initial flow conditions prior to reaching Glendale Dam, the closest downstream dam about 7.5 river-miles from Willow Mill Dam. Under wet weather conditions, the extent of the flooding and peak discharge from the dam are proportionally greater. Combined with the flooding from higher flows which would be occurring under

design flood conditions, the flood wave overtops the banks of the Housatonic River and inundates portions of the Town of Stockbridge and the wetlands surrounding Konkapot Brook.

Sincerely,

GZA GeoEnvironmental, Inc.

David M. Leone
Hydrologist

Peter H. Baril, P.H.
Sr. Hydrologist/Reviewer

William H. Hover, P.E.
Principal

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WILLOW MILL DAMBRK ANALYSIS
MEAD SPECIALTY PAPER DIVISION
HOUSATONIC RIVER, SOUTH LEE, MASSACHUSETTS

TABLE 1. SUMMARY OF DAMBRK MODEL RESULTS

X-SECTION (MILES + 10.00)	STREAMBED INVERT (FEET)	BASEFLOW DEPTH (FEET)	FEMA 100-YR DEPTH (FEET)	FAIR WEATHER DAMBRK			WET WEATHER DAMBRK		
				PEAK FLOW (cfs)	PEAK FLOOD ELEVATION (FEET)	PEAK FLOOD DEPTH (FEET)	PEAK FLOW (cfs)	PEAK FLOOD ELEVATION (FEET)	PEAK FLOOD DEPTH (FEET)
10	822.5	DAM	DAM	14062	838.5	16.0	31597	851.5	29.0
10.01	822.4	DAM	DAM	14062	838.5	16.1	31597	851.5	29.1
10.36	814.5	3.2	24.6	8614	826.6	12.1	24899	842.6	28.1
11.02	812.5	2.5	22.6	4772	821.0	8.5	17429	837.8	25.3
11.41	810	4	22.4	3668	819.8	9.8	16285	834.0	24.0
11.83	809.5	3.8	21.1	2612	818.2	8.7	15843	831.0	21.5
11.93	809.1	4	21.5	2435	817.1	8.0	15727	830.9	21.8
11.94	809.1	4	21.5	2435	817.1	8.0	15727	830.9	21.8
12.13	808.9	4.9	20.7	2191	816.2	7.3	15064	829.6	20.7
13.37	805	7.3	24.1	1704	813.9	8.9	12903	829.1	24.1
13.45	804.9	7.3	24.1	1688	813.8	8.9	12846	829.0	24.1
13.46	804.9	7.3	24.1	1688	813.8	8.9	12846	829.0	24.1
13.57	804.7	7.5	24.1	1664	813.7	9.0	12761	828.9	24.2
14.4	803.5	8.5	24.8	1486	813.3	9.8	11924	828.4	24.9
15.35	807	4.5	19.7	1421	812.3	5.3	11645	826.9	19.9
15.42	806.9	4.4	18.5	1421	812.0	5.1	11644	826.0	19.1
15.43	806.9	4.4	18.5	1421	812.0	5.1	11644	826.0	19.1
15.57	806.5	4.6	17.0	1419	811.6	5.1	11644	823.9	17.4
16.33	798	12.9	19.7	1415	811.2	13.2	11642	818.1	20.1
16.45	796.5	14.4	20.5	1415	811.1	14.6	11642	817.4	20.9
16.46	796.5	14.4	20.5	1415	811.1	14.6	11642	817.4	20.9
16.66	788	22.9	28.1	1414	811.1	23.1	11642	816.5	28.5
16.75	781.7	29.2	34.3	1414	811.1	29.4	11642	816.4	34.7
16.76	781.7	29.2	34.3	1414	811.1	29.4	11642	816.4	34.7
16.94	778	2.1	11.8	1414	781.3	3.3	11641	792.0	14.0
17.48	763		12.7	1414	766.3	3.3	11641	779.1	16.1

* BASEFLOW DEPTH FROM BACKWATER ANALYSIS OF 530 CFS THROUGH REACH

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FIGURES

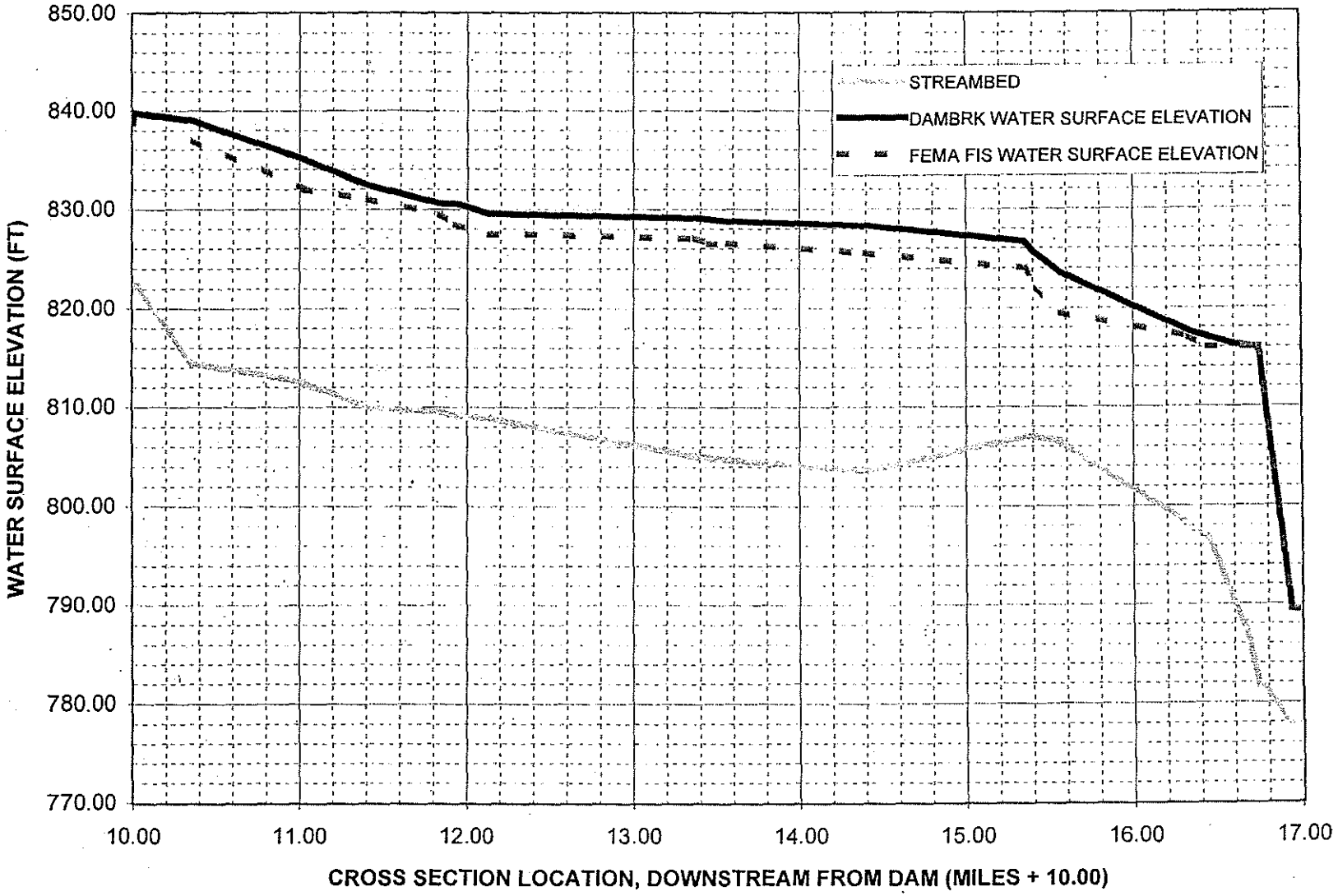

FIGURE 1. RESULTS OF 100-YEAR FLOOD CALIBRATION

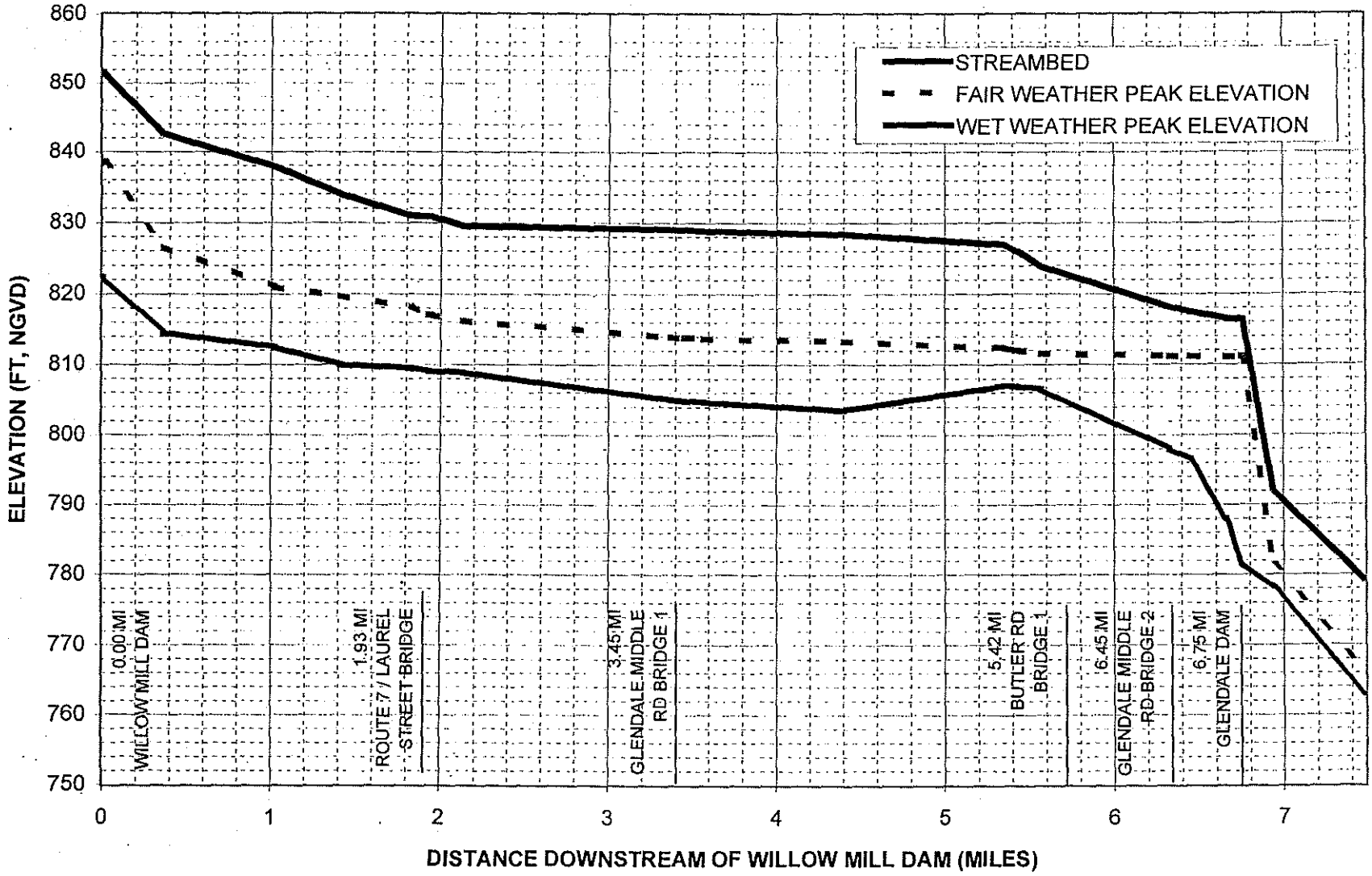

FIGURE 2. DAMBRK FLOOD PROFILE

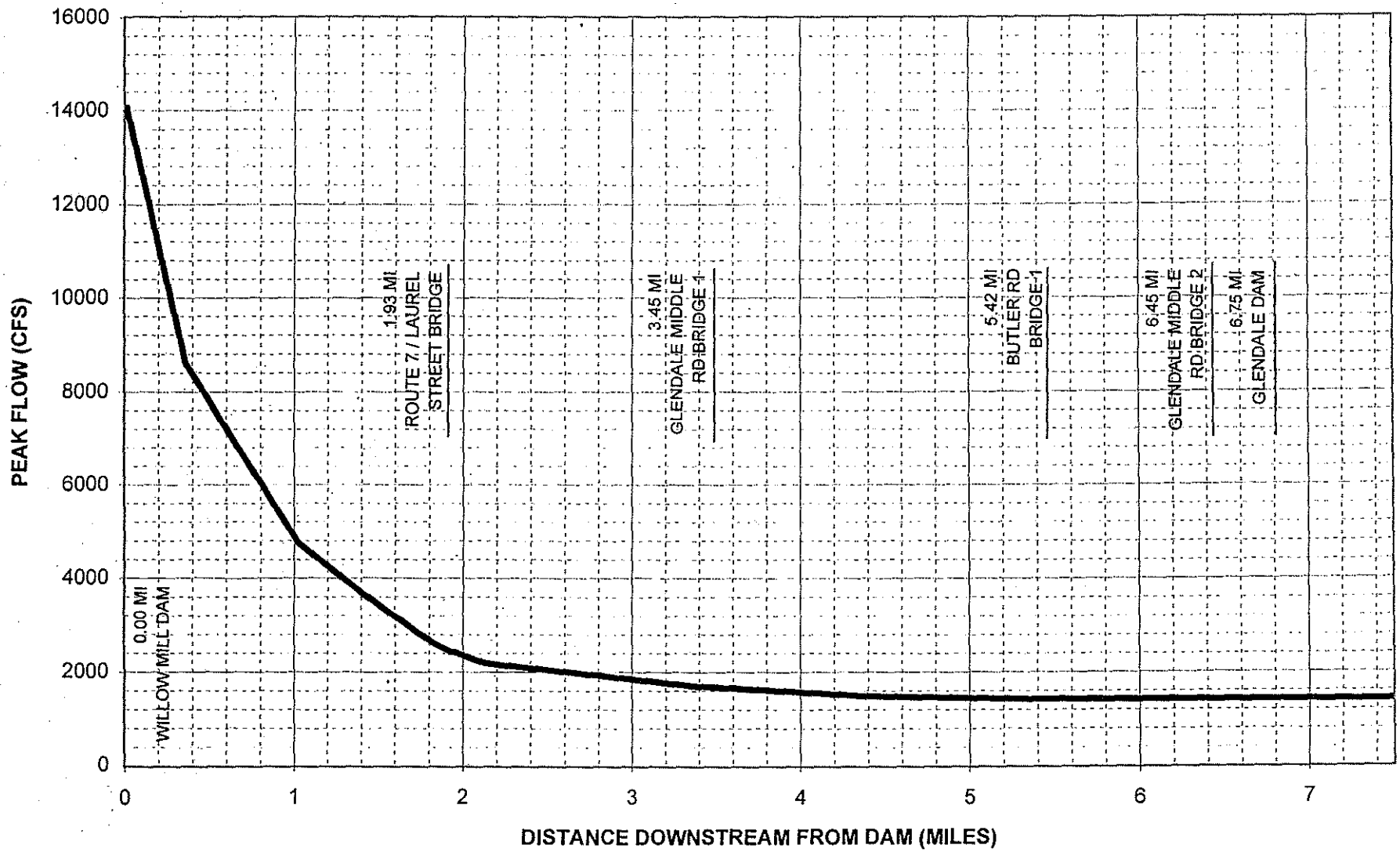

FIGURE 3. FAIR WEATHER DAMBRK PEAK DISCHARGE HYDROGRAPH

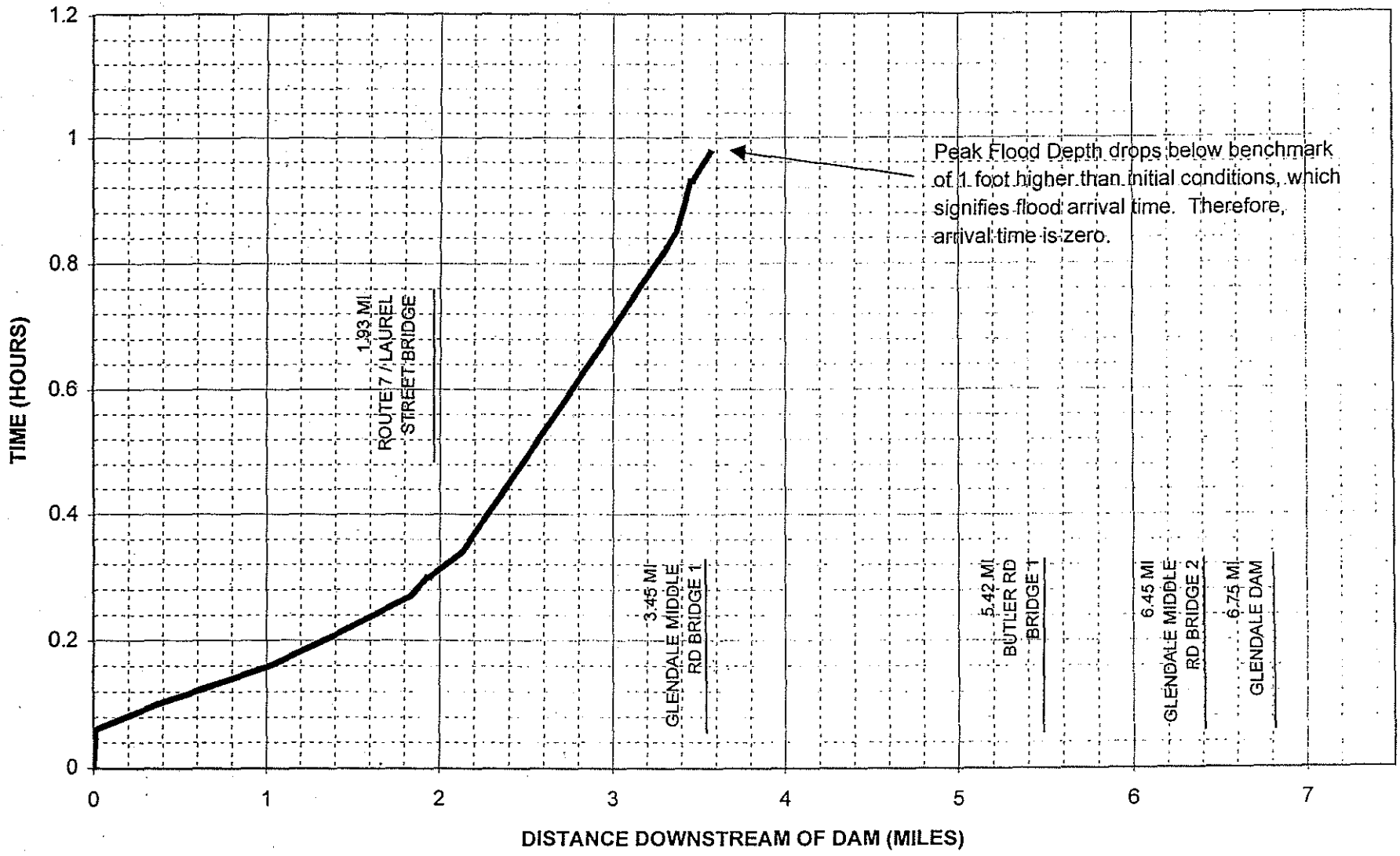

FIGURE 4. DAMBRK FLOOD ARRIVAL TIME (Based on 1 ft increase in flood depth)

APPENDIX A

LIMITATIONS

APPENDIX A

LIMITATIONS

1. The observations described in this report were made under the conditions stated herein. The conclusions presented in the report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services or the time and budgetary constraints imposed by Client.

2. In preparing this report, GZA GeoEnvironmental, Inc. (GZA) has relied on certain information provided by state and local officials and other parties referenced therein, and on information contained in the files of state and/or local agencies available to GZA at the time of the site evaluation. Although there may have been some degree of overlap in the information provided by these various sources, GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this work.

3. In preparing this report, GZA GeoEnvironmental, Inc. (GZA) has relied upon topographic survey data prepared by the USGS and FEMA. GZA did not independently verify the accuracy of that data.

4. GZA based the hydrologic analysis of existing conditions on the site plans made available to GZA as of the date of this report. In the event that any changes in the nature, design, or location of the outlet structures at Willow Mill Dam are planned, the conclusions and recommendations contained in this Report shall not be considered valid unless the changes are reviewed and conclusions of this Report modified or verified by GZA.

5. It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions may be detected.

6. This Report has been prepared for the exclusive use of the Mead Paper Specialty Division for specific application to the Willow Mill Dam located in South Lee, Massachusetts, in accordance with generally dam engineering practices. No other warranty, express or implied, is made.

7. It should be clearly understood that the limits of flooding developed through the DAMBRK modeling effort and presented on the Inundation Map is approximate and should be used by public safety personnel as a guideline for establishing emergency notification and evacuation zones. The DAMBRK results shown on the accompanying Inundation map and Profile are a function of the method, procedures, and assumptions employed for the model. Actual inundation areas will depend on actual failure conditions and may therefore differ somewhat from areas shown on the maps.

Appendix B

Posting of Notification Flowcharts

Notification Flowcharts shall be posted in the following locations at Willow Mill:

- Tour Supervisor's Office
- Maintenance Office
- Boiler Room

Distribution of Plan

See Section VIII, Appendix D-2, for a list of Plan Holders.

Training

Onyx emergency action plan procedure 911D (Flood/Dam Failure), which contains the response actions for slowly and rapidly developing failures and notification contact numbers, is reviewed by all members of the Onyx Emergency Response Team annually.

Testing

Annually, changes to the Plan shall be reviewed in a face to face meeting with the Emergency Planning Coordinators for Lee and Stockbridge. Scheduling of this meeting will be done by the Environmental Manager.

Review

The Environmental Manager shall conduct a complete review of the EAP annually. Changes to the EAP will be forwarded to Office of Dam Safety and the other plan holders.

Appendix C - Other Concerns and Actions

A. Coordination of Flows

Need for advanced coordination of flows: Not applicable

Surveillance at Remotely Controlled or Unattended Dams: Not Applicable.

Actions to be taken to lower reservoir surface elevation:

Except in emergency situations, Flood Gates can only be opened under the direction of the Dam Engineer, Maintenance Supervisor, Director of Operations, or President.

Actions to reduce flow: Not applicable

Actions to reduce downstream flows: Not applicable

Other actions to consider: None

B. Alternative sources for power for spillway gate operation: Not applicable

C. Other actions devised to mitigate the extent of possible emergencies: None

D. Other concerns and actions: None

Appendix D-1 – Plan Holders

Onyx Specialty Papers, Inc. – Specialty Division – South Lee

Name	Title
D. T. Zukowski	Dam Operator
J. P. Healy	Director of Operations

Massachusetts Office of Dam Safety

W. Salomaa	Director

Town of Lee

Police Chief / Emergency Management Director

Town of Stockbridge

Emergency Management Director

Other

John Lewis	Gravity Renewables, (Glendale Hydro Stat.)
Ben Hiltunen	MA Emergency Mgmt. Headquarters

Plan Holder's Address

1. Gravity Renewables
   Rt. 183, Housatonic Road
   Glendale, MA 01262 — 413-298-5400 – Stockbridge Plant
   Send Plan Updates to:
   John Lewis

2. Emergency Management Coordinator – Town of Stockbridge
   50 Main Street
   Stockbridge, MA 01262
   413-298-4170

3. Police Chief / EMD – Town of Lee
   Main Street
   Lee, MA 01238
   413-243-5530

4. Massachusetts Emergency Management Agency
   Ben Hiltunen 508-820-2043
   400 Worcester Road, Framingham, MA 01702

Appendix D-2

MeadWestvaco

Specialty Paper Division
40 Willow Street
South Lee, MA 01260

Gentlemen:

In reference to Emergency Action Plan in Event failure of Willow Mill Dam, MW Custom Papers, LLC – Specialty Division (formerly the Mead Corporation) South Lee, Massachusetts, Project 2985:

As a requirement of the Federal Energy Regulatory Commissions (FERC) request, and in order for our Plan to conform to current FERC criteria, the following information is offered:

In the event of rapidly Developing or Catastrophic Failure of the Willow Mill Dam, residents within two miles of the Dam should be alerted by way of Police Patrol car loud speakers should the fire siren alarm at the Willow Mill fail to alert them.

Other residents living more than 2 miles downstream of the Willow Mill Dam are at a greater distance from the structure and, in all probability, would not be effected in the event of the dam's failure.

Please call me at 413-243-5964 if you have questions or concerns about the dam or the Emergency Action Plan.

Sincerely,

Daniel V. Grant
Division Environmental Engineer

Appendix D-3

CHERRY STREET

LEFT		RIGHT	
NO.		NO.	
1	STOCKBRIDGE GOLF CLUB P.O. Box 659	2	LIPPMANN, Paul (3862) P.O. Box 357
3	GOLF CLUB GARAGE (4041) P.O. Box 859	4	CABRAL, Maria (4338) KAPLAN, Robert P. O. Box 69
5	LEFFERMAN, Elias T. 7917 Vicksburg Ave 310-641-0178 (Trustee of the Lefferman Fam Nom Tr) Los Angeles, CA 90045	6	HUGHES/ffrench, Sofia (5173) P.O. Box 889
7	CAHILL, Patricia (Lot)	8	DISKAVICH, Charles & Ruth Huhtanen P.O. Box 673 Stockbridge, MA 01262
9	CAHILL, Patricia (Lot)	10	KIRCHDORFER, Henry & (5253) Melanie J. P.O. Box 115
11	ANDREW, Patricia (0234) P.O. Box 146	12	LOIODICE, John A. (nlist) P.O. Box 482
13	FARLEY, William Trustee (4292) William J. Farley, Est. Tr. P. O. Box 1350	14	ALDEN, Elinor Beane P.O. Box Stockbridge, MA 01262
15	MILLS, Mark & Nancy (5190) P. O. Box 65	16	Mass. Electric Manager P.O. Box 60040 Northhampton, MA 01060-0040
		16A	SWANN
17	RATHBUN, Mark & Diane (4949) Eric P Miner P.O.Box 1343	18	LINSCOTT, Wendy Ttee Chf Real Estate Trust 22 Elm Street (528-1040) Gt. Barrington, MA 01230
19	LINSCOTT, Wendy Ttee CHF Real Estate Tr 22 Elm St Great Barrington, MA 01230	20	LINSCOTT, Wendy, Trustee CHF Real Estate Tr. 22 Elm Street (528-1040) Great Barrington, MA 01230

11/17

DEPOT STREET

LEFT		RIGHT	
NO.		NO.	
1	LAROCQUE, Peter (Ttee Great White Real Estate Tr.) (3000) P.O. Box 660 (637-1927)	2	HIGH MEADOW FDN INC c/o Berk Scenic Railway Museum P. O. Box 2195 Lenox, MA 01240

08/17

EAST MAIN STREET

LEFT NO.		RIGHT NO.	
		56	PILLING, Gregory (429-1483) P.O. Box 177
		58	MORRIS, Susan (4725) P.O. Box 326 Anapolis Junction, MD 20701
		60	FLOWER, Robert P. & Laurie(5292) Box 479
61	LEVI, Joel TEDESKI, John P.O. Box 252 413-931-7019	62	MILLER, Warren K & Joanna T P.O. Box 1099 Stockbridge, MA 01262-1099
63	KERICHENKO, Michael (4095) P.O. Box 1049	64	BROWN, Robert D. (3393) P.O. Box 1354
65	CONSOLE, Brian & Audrey PO Box 1676 Stockbridge, MA 01262	66	MURRAY, Charles & Aiko Y. P.O. Box 212 (4598)
67	SHANAHAN, Julie A. 1220 Country Road Becket, MA 01223	68	HOUSATONIC Arborvitae LLC. 400 East 85th Street #6A New York, NY 10028
69	BAER, Mark P O Box 1346	70	ARIENTI, Thomas & Margaretha P.O. Box 850
71	PILLING, Anna B. (3945) P.O. Box 446 c/o Jorja Marsden	72	ARIENTI, Per & Kari J .& SLOANE, Todd & Elizabeth. 251 Franklin Tpke Allendale, N. J. 07401

07/17

LEFT NO.		RIGHT NO.	
73	WESTON, Susan (3618) P.O. Box	74	COTTER, Joseph 485 Putnam Ave Greenwich, CT 06830
75	BOHRER, Jan B. 144 W 86th Street Apt. 9D New York, NY 10024	76	STEVEN, Donald & Ann PO Box 294 Stockbridge, MA 01262
77	SCHARFENORTH, Frances E c/o Steinert Frances 1438 Riverside Station Blvd Secausus, NJ 07094	78	ELMER, Jeffrey & BURNS, Patricia 303 West 66th St., Apt. 6BE N.Y., N. Y. 10023
79	O'BRIEN, Nancy A. (0091) P.O.Box 1166	80	ZAFFANELLA, Anna B (3367) P.O. Box 1019 Stockbridge, MA 01262-1019
81	SOSSNER (Lot) c/o Thomas Haver 356 Park Street Upper Montclair, NJ 07043	82	HYATT, Gordon S. (Trustee of the S. Cordon Hyatt Rev Tr) . 7 West 81st New York, NY 10024
83	BERKSHIRE THEATER (5536) P.O.Box 797	84	HOOD, Frank G. Jr. (5262) 2130 Stanmore Drive Houston, TX 77019
85	ORR, Rosemary B (Trsts Orr Nominee Rlty Trust) 12 Harleston Green Road Hilton Head, SC 29928	86	LANE, David (4671) P.O. Box 463
87	MARY MOTT LAND TRUST P.O. Box 477	88	GUNN, David, Jr (nlist) P.O. Box 1313
89	WEISS, Edward R.E. 2071 Route 32 Kingston, NY 12401	90	PIERCE, Christi (3975) P. O. Box 136

LEFT NO.		RIGHT NO.	
91	Weiss, Edward R.E. Corp 2071 Route 32 Kingston, NY 12401	92	BRADWAY, Richard (3581) P.O. Box 92
93	MARY MOTT LAND TRUST See #91	94	SNYDERMAN, Leonard (5351) 241 Jerusalem Road Cohasset, MA 02025
95	WEISS, Edward Reality (Lot) See #97	96	PETRELLA, Victor & (4367) MCKEE, Timothy 96 East Main Street P.O. Box 1142
97	WEISS, Edward Real Est. Corp c/o Marvin Weiss 2071 Route 32 Kingston, N.Y. 12401	98	INGLIS, Elizabeth Shaker (528-6416) SHAKER, Andrea P 86 Castle Street Great Barrington, MA 01230
99	WEISS, Edward Reality (Lot) L see #97	100	NOEL, Normi L. (5597) P.O. Box 539 Stockbridge, MA 01262
101	WEISS, Louise Reality (Lot) see #97	102	ZABIAN, Mohmaed Jr. 29 Lee Road Lenox, MA 01240
103	MARKHAM, Philip J. Jr. (3421) c/o Hattie E. P.O. Box 1322 San Francisco, CA 94116	104	ZABIAN, Mohmaed Jr. c/o Wendy McBrian 1983 29th Aveneu San Francisco, CA 94116
		106	WHEELER, James F. & (3085) Anna M. (941)750-8087 2709 17th Street Ct. W Bradenton, FL 34205

ICE GLEN ROAD

LEFT		RIGHT	
NO.		NO.	
1	BAUM, Robert R. & (3713) Paul R. Herman (Tr RE Baum Res T) P.O. Box 1518	2	BAUM, Robert E. & Paul R. Herman See #1 (Lot) (3713)
3	Yathrib Ltd. c/o Dennis G. Welch Real Estate 48 Main St. (637-1709) Lenox, MA 01240	4	RIVERBROOK SCHOOL (4926) c/o Daniel & Joan Burkhard P.O.Box 478 (4773)
3A	See Lot 3		
5	RAAB, Gail (3524) c/o Jonathan Raab 10 West Riding St. (781-239-3352) Wellesley, MA 02482 Gail=300E 74th, Apt 25G, NY 10021	6	ADLER, Marion (3394) P.O. Box 627
7	SIEGAL, Frederick & Carol Crigler Ttees Siegal Family Tr 65 East 96th St –Apt.15C New York, NY 10128	8	YATHRIB - See Lot 3
9	PACKER, Christina R. & (3951) Dennis Krausnick P.O. Box 14	10	DOLSON, FRANK (3488) P. O. Box 102
11	SHERMAN, Peter (Lot) (4934) P.O. Box 759	12	GORETTI, Christine E. (0165) PO Box 22
13	Stockbridge Boulder Farm LLC c/o Patricia Weber P.O. Box 832 Lake Wales, FL 33859	14	SHAPIRO, Michael & Jessica 170 Duane St. #2 New York, NY 10013
15	FINNERTY, J. James (3065) P. O. Box 628 Stockbridge,MA 01262	16	SHERMAN, Peter (4923) P. O. Box 759 Home – 914-723-5159 Work – 212-683-6210 (24 hours)

07/17

LEFT NO.		RIGHT NO.	
17	MEYERHOFF, Eva (3317) c/o Ava Sierecki P. O. Box 529	18	GOODMAN, I. Michael 242 East 72nd St. (3701) New York, N. Y. 10021
19	BURNES, Frank & Kevin Truex. P. O. Box 188 (5255) Stockbridge, MA 01262	20	KALM, Anthony & Dennis Downing Tsts of Vera Kalm 2011Rev Trust P.O. Box 1113 Stockbridge, MA 01262-1113
21	WHITE, Christopher M.& Jane (0090) 60 Webster Rd. Weston, MA 02493	22	WEBBER, Neel B.& (5539) POMERANTZ, Judith L. P. O. Box 473
23	WHITE, Christopher 60 Webster Road Weston, MA 02493	24	HELFER, Ricki T. (5374) 3410 N St. NW Washington, DC 20007
23A	CAMIRAND, Scott & Jodie P.O. Box 58 Stockbridge, MA 01262		
25	COMMONWEALTH of Mass. 100 Cambridge Street	26	SCHILLER, Leonard & Alice P. O. Box 1253 (5566) (0157)
		28	SCHILLER, Leonard & Alice P. O. Box 1253 (5566) 0157)
		30	BOOKSPAN, David (0045) 2020 Walnut St., #31F Philadelphia, PA 19103

MADISON'S WAY

LEFT		RIGHT	
NO.		NO.	
1	(Lot 3) WHITE, Julie & Lesley Arlein (Trts The Trust F/B/O Carole –Ann Schonberger) 1050 Park Ave Apt 1D New York, NY 10028	2	ARONOFF, Jonathan (4788) P. O. Box 1530
		4	(Lot 2) MOYER, Robin 103 USS Amesbury Drive Hingham, MA 02043 781-749-7502 Robin cell 914-282-8052

8/18

PARK STREET

LEFT			RIGHT		
NO.			NO.		
1	SAIA, Pamela P.O. Box 1326 Stockbridge, MA 01262	(4405)	2	AYARI, Abderrahman P.O. Box 451	(5380)
3	THORNE-CONQUEST,Laurie P.O. Box Stockbridge	(3811)	4	MENNETT, Deborah A. P..O. Box 1330	(4211)
5	NEARY, Amale & McCarron, Georgson, N. Nejaime, L. Nejaime, & F Yan 780 Dalton Division Road Pittsfield, MA 01201		6	NOBLE, Edmund W c/o Barbara Noble P. O. Box 234 Stockbridge, MA 01262	(4810)
7	ROY, Meredith P.O. Box Stockbridge, MA 01262				
9	CHAMORO, Mario Rental (617-895-7038) P.O. Box 51060 Boston, MA 02205-1060				
11	NEJAIME, Nabih & Marilyn P.O. Box 497	(4970)			
13	NEJAIME, Nabih & Marilyn P.O. Box 497				
15	KATO, Miyo 15 Park St. P.O. Box 1058	(0145)			
17	BESAW, Donna Ttee (Donna M Besaw Revoc Tr 2006) P.O. Box 1705	(5213)			
19	BUFFONI, Catherine A. & Mark J (Trustees of the Park St. Realty Trust) P.O. Box 714	(3540)			
21	MORSE, Christopher D. & MORSE, Margaret A. P. O. Box 508	(0199)			
23	WRIGHT, Wilson A Jr. P. O. Box 2	(3032)			

8/18

LEFT NO.			RIGHT NO.
25	SPARKS, William P.O. Box 851	(4816)	
27	FLINN, Patricia (Trustee) P.O. Box 373	(5595)	
29	HERMAN, Deborah & Jeff P.O. Box 1522	(3165)	
31	DINERMAN, Ruth E P.O. Box 1105		
31A	JACOBS,Pam & Ivan Rosa 511 West 235th Street, Apt. 2C Bronx, NY 10463		

PARK STREET

LEFT		RIGHT	
NO.		NO.	
1	SAIA, Pamela (4405) P.O. Box 1326 Stockbridge, MA 01262	2	AYARI, Abderrahman (5380) P.O. Box 451
3	THORNE-CONQUEST,Laurie P.O. Box Stockbridge (3811)	4	MENNETT, Deborah A. (4211) P..O. Box 1330
5	NEARY, Amale & McCarron, Georgson, N. Nejaime, L. Nejaime, & F Yan 780 Dalton Division Road Pittsfield, MA 01201	6	NOBLE, Edmund W (4810) c/o Barbara Noble P. O. Box 234 Stockbridge, MA 01262
7	ROY, Meredith P.O. Box Stockbridge, MA 01262		
9	CHAMORO, Mario Rental (617-895-7038) P.O. Box 51060 Boston, MA 02205-1060		
11	NEJAIME, Nabih & Marilyn (4970) P.O. Box 497		
13	NEJAIME, Nabih & Marilyn P.O. Box 497		
15	KATO, Miyo (0145) 15 Park St. P.O. Box 1058		
17	BESAW, Donna Ttee (5213) (Donna M Besaw Revoc Tr 2006) P.O. Box 1705		
19	BUFFONI, Catherine A. & Mark J (Trustees of the Park St. Realty Trust) (3540) P.O. Box 714		
21	MORSE, Christopher D. & (0199) MORSE, Margaret A. P. O. Box 508		
23	WRIGHT, Wilson A Jr. (3032) P. O. Box 2		

LEFT NO.			RIGHT NO.
25	SPARKS, William P.O. Box 851	(4816)	
27	FLINN, Patricia (Trustee) P.O. Box 373	(5595)	
29	HERMAN, Deborah & Jeff P.O. Box 1522	(3165)	
31	DINERMAN, Ruth E P.O. Box 1105		
31A	JACOBS,Pam & Ivan Rosa 511 West 235th Street, Apt. 2C Bronx, NY 10463		

Appendix D-4

EMERGENCY EVACUATION DRILL
OFFICIAL REPORT

MILL: _____
DRILL #, YEAR, SHIFT: _____
DATE: _____
WEATHER COND.: _____
TIME: _____

TYPE OF DRILL: FIRE DRILL____ DAM FAILURE____
EVACUATION_____

LOCAL SERVICE RESPONDING: FIRE_____ POLICE_____
NONE_____

NUMBER OF VEHICLES: FIRE_____ POLICE_____

TIME DRILL STARTED:_____

EVERYONE OUT:_____

ALL CLEAR:_____

NUMBER OF ASSOCIATES ACCOUNTED FOR:_____

NUMBER OF ASSOCIATES OUT OR AWAY:_____

NUMBER OF ASSOCIATES MISSING:_____

Comments:

_____
_____
_____
_____
_____
_____

EMERGENCY EVACUATION OFFICIAL
DEPARTMENT COUNT

DATE:_____
No. Present and Accounted for:_____
No. Missing:_____

Departments	**Accounted For**	**Missing**
Administration		
Technology Group		
Accounting		
Beater Room		
Boiler Room		
Building 13		
Technical Services		
Shipping/Pre-Wrap		
Quality Assurance/Quality Control		
Environmental, Purchasing, & Process Control		
Machine Room		
Marketing and Customer Service		
Human Resources		
Shop		
Superintendent's Office		
Q.C. Technicians		

ATTACHMENT C – QUARTERLY INSPECTION CHECKLIST

WILLOW MILL DAM
South Lee, Massachusetts

Quarterly Observation Checklist

Make thorough observations of the dam and appurtenant structures once per quarter. If condition cannot be observed due to flow or other factors, please note.
Forward completed Checklist to Donald Zukowski for inclusion in Dam OM & M Folder.

Date:_____ Weather Conditions:_____

Inspector(s):_____

No.	Condition	Observations
1.	Impoundment water level (approximate inches of flow over the dam - note unexplained changes)	
2.	Flow in river (fast, normal, slow - note unexplained flow or flow below minimum requirements)	
3.	Leakage through masonry (note new or increased leakage and describe location)	
4.	Masonry/Concrete Condition (all stones or bricks present and intact, absence of gaps in mortar around the stones and bricks)	
a.	River outlet structure	
b.	Primary spillway	
c.	Left masonry abutment	
d.	Auxiliary spillway	
5.	Water Controls (exercise all four gates or note the last known date of movement for each gate)	
a.	River outlet sluicegates	
b.	Headrace sluicegates & bar racks	
6.	Access & Safety	
a.	Fences and signage (fences free from damage or penetrations, doors closed and locked)	
b.	Boat barrier (barrier in place, buoys upright, cable firmly anchored on both banks)	
7.	Toe of Dam (note seepage and condition of bedrock in splash zone)	
8.	Debris & Vegetation (note location, type, amount)	

Recommended Maintenance/Repair Actions:_____

Other Notes:_____

*Copy form as needed

ATTACHMENT D – ANNUAL OBSERVATION CHECKLIST

ANNUAL DAM INSPECTION CHECKLIST

		MassDEM I.D. No.:	MA00262
Name of Dam:	Willow Mill Dam		
Location:	South Lee, Massachusetts Town, State		
Owner:	Onxy Specialty Papers, Inc.	River / Stream:	Housatonic River
MassDEM Classification Data:	Intermediate Size		Significant Hazard

PHYSICAL DATA:	Stone Masonry, Run-of-River Type of Dam	14 feet to Primary Spillway Crest Height of Dam	50 acre-feet Normal Pool Storage Capacity
ELEVATIONS:	839.2 ft (at average annual flow) Normal Pool	 Pool at Inspection	

Names of Individuals at Inspection	Title/Position	Representing

DATE OF INSPECTION: _____

WEATHER: _____ TEMPERATURE: _____

This is to certify that the above dam has been inspected and the following are the results of this inspection.

_____
SIGNATURE OF INSPECTOR

Name of Dam: Willow Mill Dam I.D. No.: MA00262 Inspection Date: _____

AREA INSPECTED	ITEM NO.	CONDITION	OBSERVATIONS	CHECK ( ) ACTION NEEDED: MONITOR	INVESTIGATE	REPAIR
MASONRY DAM / PRIMARY SPILLWAY 1 of 2						
UPSTREAM FACE	1	Surface Conditions				
	2	Condition of Joints				
	3	Unusual Movement				
	4	Abutment-Dam Contacts				
	5					
	6					
DOWNSTREAM FACE	7	Surface Conditions				
	8	Condition of Joints				
	9	Unusual Movement				
	10	Abutment-Dam Contacts				
	11	Drains				
	12	Leakage				
	13					
	14					
CREST	15	Surface Conditions				
	16	Horizontal Alignment				
	17	Vertical Alignment				
	18	Condition of Joints				
	19	Unusual Movement				
	20	General				
	21					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

Name of Dam: Willow Mill Dam I.D. No.: MA00262 Inspection Date: _____

AREA INSPECTED	ITEM NO.	CONDITION	OBSERVATIONS	CHECK ( ) ACTION NEEDED: MONITOR	INVESTIGATE	REPAIR
		MASONRY DAM / PRIMARY SPILLWAY 2 of 2				
UPSTREAM CHANNEL	22	Slide, Slough, Scarp				
	23	Erosion				
	24	Vegetation Condition				
	25	Debris				
	26	Seepage				
	27					
DOWNSTREAM CHANNEL	28	Sidewalls				
	29	Channel Floor				
	30	Unusual Movement				
	31	Discharge Area				
	32	Downstream Area				
	33	Sinkholes, Scour Holes, etc.				
	34	Foundation Seepage				
	35					
	36					
U/S TIMBER DAM	37	Exposed Portion				
	38	Breached Section				
	39					
	40					
	41					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

Name of Dam: Willow Mill Dam I.D. No.: MA00262 Inspection Date: _____

AREA INSPECTE	ITEM NO.	CONDITION	OBSERVATIONS	CHECK ( ) ACTION NEEDED: MONITOR	INVESTIGATE	REPAIR
		RIVER OUTLET WORKS 1 of 1				
SLUICE GATES & CONTROLS	42	Intake Area				
	43	Stoplog Grooves				
	44	Gate #1 U/S Face				
	45	Gate #1 D/S Face				
	46	Gate #1 Stems				
	47	Gate #1 Operator				
	48	Gate #1 Leakage				
	49	Gate #2 U/S Face				
	50	Gate #2 D/S Face				
	51	Gate #2 Stems				
	52	Gate #2 Operator				
	53	Gate #2 Leakage				
	54					
	55					
RIVER OUTLET STRUCTURE	56	U/S Masonry Condition				
	57	D/S Masonry Condition				
	58	Concrete Cap Slab				
	59	#1 Sluiceway Liner				
	60	#2 Sluiceway Liner				
	61	Seepage				
	62	Discharge Area				
	63					
	64					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

Note: Gate #1 is the shore-side gate and Gate #2 is the river-side gate.

Name of Dam: Willow Mill Dam I.D. No.: MA00262 Inspection Date: _____

AREA INSPECTED	ITEM NO.	CONDITION	OBSERVATIONS	CHECK ( ) ACTION NEEDED: MONITOR	INVESTIGATE	REPAIR
		AUXILIARY SPILLWAY / HEADRACE WALL 1 of 2				
UPSTREAM FACE	65	Surface Conditions				
	66	Condition of Joints				
	67	Unusual Movement				
	68	Abutment-Dam Contacts				
	69					
	70					
DOWNSTREAM FACE / BUTTRESS	71	Surface Conditions				
	72	Condition of Joints				
	73	Unusual Movement				
	74	Abutment-Dam Contacts				
	75	Drains				
	76	Leakage				
	77					
	78					
CREST	79	Surface Conditions				
	80	Horizontal Alignment				
	81	Vertical Alignment				
	82	Condition of Joints				
	83	Unusual Movement				
	84	General				
	85					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

Name of Dam: Willow Mill Dam I.D. No.: MA00262 Inspection Date: _____

AREA INSPECTE	ITEM NO.	CONDITION	OBSERVATIONS	CHECK ( ) ACTION NEEDED: MONITOR	INVESTIGATE	REPAIR
AUXILIARY SPILLWAY / HEADRACE WALL 2 of 2						
HEADRACE CHANNEL	86	Headwall Masonry				
	87	Slope Masonry Wall				
	88	Vegetation Condition				
	89	Tunnel Entrance				
	90	Debris				
	91	Sediment				
	92	Seepage				
	93	Channel Floor				
	94	Unusual Movement				
	95					
	96					
HEADRACE INTAKE	97	Headrace Gates				
	98	Headrace Gate Operators				
	99	Headrace Sluiceways				
	100	Bar Racks				
	101	Pumphouse Condition				
	102	Access Ways				
	103					
LEFT MASONRY ABUTMENT	104	Masonry Condition				
	105	Abutment				
	106	Concrete Cap Slab				
	107	Seepage				
	108	Unusual Movement				
	109					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

Name of Dam: Willow Mill Dam I.D. No.: MA00262 Inspection Date: _____

AREA INSPECTED	ITEM NO.	CONDITION	OBSERVATIONS	CHECK ( ) ACTION NEEDED: MONITOR	INVESTIGATE	REPAIR
		DOWNSTREAM AREA AND MISC. 1 of 1				
DOWNSTREAM AREA	110	Abutment Seepage				
	111	Training/Retaining Walls				
	112	Slide, Slough, Scarp				
	113	Drainage System				
	114					
	115					
	116	Downstream Hazard Description				
	117	Date of Last Update of Emergency Plan				
MISCELLANEOUS	118	Impoundment Banks				
	119	Access Roads				
	120	Boat Barrier				
	121	Signage				
	122	Fences / Railing				
	123	Security / Access				
	124					
	125					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

ATTACHMENT E – PHASE 1 INSPECTION/EVALUATION CHECKLIST

DAM SAFETY INSPECTION CHECKLIST

NAME OF DAM: Willow Mill Dam

STATE ID MA00262

REGISTERED: ☐ YES ☐ NO

NID ID #: MA00262

STATE SIZE CLASSIFICATION: Intermediate

STATE HAZARD CLASSIFICATION: Significant

CHANGE IN HAZARD CLASSIFICATION REQUESTED?: No

TION INFORMATION

CITY/TOWN: Lee

COUNTY:

DAM LOCATION: 40 Willow Street
(street address if known)

ALTERNATE DAM NAME: Hurlbut Dam

USGS QUAD.: Stockbridge

LAT.: 42.27602 LONG.: -73.28473

DRAINAGE BASIN: Housatonic

RIVER: Housatonic

IMPOUNDMENT NAME(S): Housatonic River

GENERAL DAM INFORMATION

ESENT AT INSPECTION

TYPE OF DAM: Stone Masonry, Run-of-River

OVERALL LENGTH (FT): 150

PURPOSE OF DAM: Industrial

NORMAL POOL STORAGE (ACRE-FT 50

YEAR BUILT: 1872

MAXIMUM POOL STORAGE (ACRE-F 250

STRUCTURAL HEIGHT (FT): 24

EL. NORMAL POOL (FT): 839.0

HYDRAULIC HEIGHT (FT): 14

EL. MAXIMUM POOL (FT) 848.0

FOR INTERNAL MADCR USE ONLY

FOLLOW-UP INSPECTION REQUIRED: ☐ YES ☐ NO ☐ YES ☐ NO

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

INSPECTION SUMMARY

DATE OF INSPECTION: DATE OF PREVIOUS INSPECTION:

TEMPERATURE/WEATHER: ARMY CORPS PHASE I: ☐ YES ☐ NO If YES, date

CONSULTANT: PREVIOUS DCR PHASE I: ☐ YES ☐ NO If YES, date

Hurlbut Dam

BENCHMARK/DATUM:

OVERALL PHYSICAL CONDITION OF DAM: #N/A DATE OF LAST REHABILITATION:

SPILLWAY CAPACITY: #N/A

EL. POOL DURING INSP.: EL. TAILWATER DURING INSP.:

PERSONS PRESENT AT INSPECTION

NAME	TITLE/POSITION	REPRESENTING

EVALUATION INFORMATION

	Click on box to select E-code
E1) TYPE OF DESIGN	
E2) LEVEL OF MAINTENANCE	
E3) EMERGENCY ACTION PLAN	
E4) EMBANKMENT SEEPAGE	
E5) EMBANKMENT CONDITION	
E6) CONCRETE CONDITION	
E7) LOW-LEVEL OUTLET CAPACITY	

	Click on box to select E-code
E8) LOW-LEVEL OUTLET CONDITION	
E9) SPILLWAY DESIGN FLOOD CAPACITY	
E10) OVERALL PHYSICAL CONDITION	
E11) ESTIMATED REPAIR COST	
ROADWAY OVER CREST	NO
BRIDGE NEAR DAM	YES

NAME OF INSPECTING ENGINEER: SIGNATURE:

NAME OF DAM:	Willow Mill Dam	STATE ID #:	MA00262
INSPECTION DATE:	January 0, 1900	NID ID #:	MA00262

OWNER:		CARETAKER	
ORGANIZATION	Onyx Specialty Papers	ORGANIZATION	Onyx Specialty Papers
NAME/TITLE	Donald Zukowski, Operation Mar	NAME/TITLE	Donald Zukowski, Operation Manager
STREET	40 Willow Street	STREET	40 Willow Street
TOWN, STATE, ZIP	Lee, MA 01260	TOWN, STATE, ZIP	Lee, MA 01260
PHONE	413-243-7421	PHONE	413-243-7421
EMERGENCY PH. #	413-822-7408	EMERGENCY PH. #	413-822-7408
FAX	413-243-5471	FAX	413-243-5471
EMAIL	dzukowski@onyxpapers.com	EMAIL	dzukowski@onyxpapers.com
OWNER TYPE	Private		

PRIMARY SPILLWAY TYPE	Broad-crested concrete		
SPILLWAY LENGTH (FT)	110	SPILLWAY CAPACITY (CFS)	13,200 (Inflow Design Flood)
AUXILIARY SPILLWAY TYPE	Broad-crested concrete	AUX. SPILLWAY CAPACITY (CFS	Unknown
NUMBER OF OUTLETS	2	OUTLET(S) CAPACITY (CFS)	Unknown
TYPE OF OUTLETS	Control strucutre for canal and flood gates	TOTAL DISCHARGE CAPACITY (CFS)	Unknown
DRAINAGE AREA (SQ MI)	243	SPILLWAY DESIGN FLOOD (PERIOD/CFS)	PMF / 132,000 cfs

HAS DAM BEEN BREACHED OR OVERTOPPED ☐ YES ☐ NO IF YES, PROVIDE DATE(S)

FISH LADDER (LIST TYPE IF PRESENT) No

DOES CREST SUPPORT PUBLIC ROAD? ☐ YES ☐ NO IF YES, ROAD NAME:

PUBLIC BRIDGE WITHIN 50' OF DAM? ☑ YES ☐ NO IF YES, ROAD/BRIDGE NAME: Willow Street Bridge

MHD BRIDGE NO. (IF APPLICABL

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

EMBANKMENT (CREST)

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
CREST	1. SURFACE TYPE			
	2. SURFACE CRACKING			
	3. SINKHOLES, ANIMAL BURROWS			
	4. VERTICAL ALIGNMENT (DEPRESSIONS			
	5. HORIZONTAL ALIGNMENT			
	6. RUTS AND/OR PUDDLES			
	7. GRASS COVER CONDITION			
	8. WOODY VEGETATION (TREES/BRUSH)			
	9. ABUTMENT CONTACT			

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

EMBANKMENT (D/S SLOPE)

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
D/S SLOPE	1. WET AREAS (NO FLOW)			
	2. SEEPAGE			
	3. SLIDE, SLOUGH, SCARP			
	4. EMB.-ABUTMENT CONTACT			
	5. SINKHOLE/ANIMAL BURROWS			
	6. EROSION			
	7. UNUSUAL MOVEMENT			
	8. GRASS COVER CONDITION			
	9. WOODY VEGETATION (TREES/BRUSH)			

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

EMBANKMENT (U/S SLOPE)

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
U/S SLOPE	1. SLIDE, SLOUGH, SCARP			
	2. SLOPE PROTECTION TYPE AND COND.			
	3. SINKHOLE/ANIMAL BURROWS			
	4. EMB.-ABUTMENT CONTACT			
	5. EROSION			
	6. UNUSUAL MOVEMENT			
	7. GRASS COVER CONDITION			
	8. WOODY VEGETATION (TREES/BRUSH)			

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

INSTRUMENTATION

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
INSTR.	1. PIEZOMETERS			
	2. OBSERVATION WELLS			
	3. STAFF GAGE AND RECORDER			
	4. WEIRS			
	5. INCLINOMETERS			
	6. SURVEY MONUMENTS			
	7. DRAINS			
	8. FREQUENCY OF READINGS			
	9. LOCATION OF READINGS			

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

DOWNSTREAM AREA

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
D/S AREA	1. ABUTMENT LEAKAGE			
	2. FOUNDATION SEEPAGE			
	3. SLIDE, SLOUGH, SCARP			
	4. WEIRS			
	5. DRAINAGE SYSTEM			
	6. INSTRUMENTATION			
	7. VEGETATION WITHIN 15 FT			
	8. ACCESSIBILITY			
	9. DOWNSTREAM HAZARD DESCRIPTION			

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

MISCELLANEOUS

AREA INSPECTED	CONDITION	OBSERVATIONS		
MISC.	1. RESERVOIR DEPTH (AVG)			
	2. RESERVOIR SHORELINE			
	3. RESERVOIR SLOPES			
	4. ACCESS ROADS			
	5. SECURITY DEVICES			
	6. WATER PUBLIC HAZARDS & PROTECTION			
	7. LAND-SIDE PUBLIC HAZARDS & PROTECTION			
	7. VANDALISM OR TRESPASS	☐ YES	☑ NO	WHAT:
	8. AVAILABILITY OF PLANS	☐ YES	☐ NO	DATE:
	9. AVAILABILITY OF DESIGN CALCS	☐ YES	☐ NO	DATE:
	10. AVAILABILITY OF EAP/LAST UPDATE	☐ YES	☐ NO	DATE:
	11. AVAILABILITY OF O&M MANUAL	☐ YES	☐ NO	DATE:
	12. CARETAKER/OWNER AVAILABLE	☐ YES	☑ NO	DATE:
	13. CONFINED SPACE ENTRY REQUIRED	☐ YES	☐ NO	PURPOSE:

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

PRIMARY SPILLWAY

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
SPILLWAY	SPILLWAY TYPE			
	WEIR TYPE			
	SPILLWAY CONDITION			
	TRAINING WALLS			
	SPILLWAY CONTROLS AND CONDITION			
	UNUSUAL MOVEMENT			
	APPROACH AREA			
	DISCHARGE AREA			
	DEBRIS			

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

AUXILIARY SPILLWAY

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
SPILLWAY	SPILLWAY TYPE			
	WEIR TYPE			
	SPILLWAY CONDITION			
	TRAINING WALLS			
	SPILLWAY CONTROLS AND CONDITION			
	UNUSUAL MOVEMENT			
	APPROACH AREA			
	DISCHARGE AREA			
	DEBRIS			

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

OUTLET WORKS

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
OUTLET WORKS	TYPE			
	INTAKE STRUCTURE			
	TRASHRACK			
	PRIMARY CLOSURE			
	SECONDARY CLOSURE			
	CONDUIT			
	OUTLET STRUCTURE/HEADWALL			
	EROSION ALONG TOE OF DAM			
	SEEPAGE/LEAKAGE			
	DEBRIS/BLOCKAGE			
	UNUSUAL MOVEMENT			
	DOWNSTREAM AREA			
	MISCELLANEOUS			

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

CONCRETE/MASONRY DAMS (CREST)

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
CREST	TYPE			
	SURFACE CONDITIONS			
	CONDITIONS OF JOINTS			
	UNUSUAL MOVEMENT			
	HORIZONTAL ALIGNMENT			
	VERTICAL ALIGNMENT			

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

CONCRETE/MASONRY DAMS (DOWNSTREAM FACE)

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
D/S FACE	TYPE			
	SURFACE CONDITIONS			
	CONDITIONS OF JOINTS			
	UNUSUAL MOVEMENT			
	ABUTMENT CONTACT			
	LEAKAGE			

ADDITIONAL COMMENTS:

NAME OF DAM: Willow Mill Dam STATE ID #: MA00262

INSPECTION DATE: January 0, 1900 NID ID #: MA00262

CONCRETE/MASONRY DAMS (UPSTREAM FACE)

AREA INSPECTED	CONDITION	OBSERVATIONS	MONITOR	REPAIR
U/S FACE	TYPE			
	SURFACE CONDITIONS			
	CONDITIONS OF JOINTS			
	UNUSUAL MOVEMENT			
	ABUTMENT CONTACTS			

ADDITIONAL COMMENTS:

GZA GeoEnvironmental, Inc.