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*Via Electronic Mail*

January 12, 2024

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)  
2023 Annual Visual Inspection Report for Willow Mill Dam**

Dear Mr. Fontaine:

On November 14, 2023, GE's consultants from GZA GeoEnvironmental, Inc. performed the 2023 annual visual inspection of the Willow Mill Dam (also known as Hurlbut Dam) on behalf of GE and Onyx Specialty Papers, Inc. (the dam owner and operator) in accordance with the EPA-approved Operation, Monitoring, and Maintenance Plan for this dam. Enclosed is GZA's report on this annual inspection, including photographs and the annual dam inspection checklist.

Please let me know if you have any questions about the enclosed inspection report.

Very truly yours,

Kevin G. Mooney  
Senior Project Manager – Environmental Remediation

Enclosure

Cc: (via electronic mail)

Dean Tagliaferro, EPA  
Anni Loughlin, EPA  
Tim Conway, EPA  
John Kilborn, EPA  
Alexander Carli-Dorsey, EPA  
Christopher Ferry, ASRC Federal  
Thomas Czelusniak, HDR Inc.  
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Traci Iott, CT DEEP  
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Carol Papp, CT DEEP  
Lori DiBella, CT AG  
Molly Sperduto, USFWS  
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Town Administrator, Stockbridge  
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Jim Wilusz, Tri Town Health Dept.  
Donald Zukowski, Onyx  
Andrew Silfer, GE  
Andrew Thomas, GE  
Jonathan Andrews and Seth Krause, GZA  
James Bieke, Sidley Austin  
Public Information Repository at David M. Hunt Library in Falls Village, CT  
GE Internal Repository



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## Visual Inspection

# 2023 Annual Visual Inspection Report Willow Mill Dam (MA00262) South Lee, Massachusetts

Date of Inspection: November 14, 2023

Date of Report: January 12, 2024

File No. 01.019896.70



### PREPARED FOR:

Onyx Specialty Papers, Inc.

Lee, Massachusetts

and

General Electric Company

Pittsfield, Massachusetts

### GZA GeoEnvironmental, Inc.

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## **PREFACE**

The assessment of the general condition of the dam reported herein was based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations were beyond the scope of this report unless reported otherwise.

In reviewing this report, it should be realized that the reported condition of the dam was based on observations of field conditions at the time of inspection, along with data available to the inspection team.

It is critical to note that the condition of the dam depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the reported 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 be detected.



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## 1.0 INTRODUCTION

On behalf of Onyx Specialty Papers, Inc. (Onyx) and the General Electric Company (GE), GZA GeoEnvironmental, Inc. (GZA) performed an annual visual inspection of the Willow Mill Dam (the Dam, also known as Hurlbut Dam), owned and operated by Onyx, on the Housatonic River in South Lee, Berkshire County, Massachusetts. GZA performed the inspection on November 14, 2023 and has developed this report summarizing the results of the inspection. This report is subject to the limitations in **Appendix A**.

## 2.0 PURPOSE

Annual visual inspections of Willow Mill Dam are required by the Operation, Monitoring, and Maintenance Plan (OM&M Plan) for the Dam, Revision 1, prepared by Onyx and GE and dated July 13, 2023, as conditionally approved by the United States Environmental Protection Agency (EPA) on October 11, 2023.

## 3.0 INSPECTION SUMMARY

### 3.1 GENERAL

On November 14, 2023, Jonathan Andrews, Seth Krause, and Leslie Decristofaro from GZA, representing GE, and Scott Campbell from Taconic Ridge, representing EPA, mobilized to Willow Mill Dam and performed a visual inspection of the Dam. They were accompanied for part of the inspection by Donald Zukowski and Andrew Begrowicz representing Onyx. The weather was cloudy in the high 30s / low 40s, and the upstream pool level was estimated at about 14 inches above the spillway crest.

Overall, the conditions of the Dam were generally similar to those observed during the most recent Phase I Inspection, conducted for Onyx on July 29, 2022 by Fuss & O'Neill (and described in a report provided in Attachment C to the revised OM&M Plan), and the most recent quarterly inspection, conducted on September 1, 2023 by Onyx.

A summary of observations at each structure is provided below. A site sketch and photo location map are provided on **Figure 1** and **Figure 2**, respectively. Photographs from the inspection are provided in **Appendix B** and the annual dam inspection checklist, broken down by structure, is provided in **Appendix C**.

### 3.2 MASONRY DAM / PRIMARY SPILLWAY (SPILLWAY)

The spillway was overtopping during the inspection; therefore, the downstream face of the spillway, spillway toe, and other areas downstream of the spillway were partially obstructed by water and difficult to observe. Based on discussions with Onyx, low-flow conditions when the upstream water levels drop below the spillway crest occur periodically throughout the year, allowing opportunity to observe the spillway's features.

### 3.3 RIVER OUTLET WORKS (RIVER OUTLET CONTROL STRUCTURE)

The river outlet control structure at the right abutment of the dam was observed to be in generally adequate condition. Minor cracking, efflorescence, and missing mortar joints were observed on the vertical faces of the structure. Minor cracking and surface deterioration was observed on the concrete cap slab.

Only minor leakage through the right gate (Gate #1) was observed during the inspection. Significantly greater leakage through both gates had been observed on July 29, 2022 based on the photographs contained in the above-referenced 2022 Phase I Inspection Report.



The river outlet gates were closed at the time of the inspection, and no gates were operated during the annual inspection. However, mill personnel reported that all gates were exercised in 2023 and operate smoothly. A review of the 2023 plant logbook indicated that Gate #1 had been operated eight times and Gate # 2 three times through November 2023. We understand from mill personnel that the river outlet gates were operated at least two additional times after the November inspection. GZA probed for sediment upstream of the river outlet control structure gates. No sediment was discerned during probing upstream of these gates.

An offset vertical joint in the right concrete training wall was observed just upstream of the river outlet control structure. The offset was measured to be about two inches longitudinally (perpendicular to the flow of the river). A small vertical crack in the right training wall was observed just downstream of the river outlet control structure. Both features appeared similar to those in photographs included in the 2022 Phase I Inspection Report.

Minor cracking and efflorescence were observed in the right-side training wall downstream of the river outlet control structure.

### 3.4 AUXILIARY SPILLWAY / HEADRACE WALL (AUXILIARY SPILLWAY / WASTE WEIR)

The auxiliary spillway / waste weir was observed to be in generally adequate condition. Loss of mortar joints was observed on the upstream headrace wall. Broken masonry elements and missing mortar joints were observed near the crest of the auxiliary spillway. Missing bricks in the arched entrance to the headwall tunnel were observed.

During the inspection, GZA observed the beginning of minor leakage under the left side auxiliary spillway cap stone. This condition was not present during the first half of the inspection and started towards the end of the inspection. It is likely that the water level inside the canal slightly increased, causing minor leakage through a deteriorated mortar joint. Although the canal water level was similar during the 2022 Phase I Inspection, this minor leakage was not reported at that time.

A slight angle or bulge was observed in the downstream direction in the masonry façade of the auxiliary spillway. A review of the project's record drawings<sup>1</sup> indicates that the auxiliary spillway façade was constructed with this angle/bulge. No distress, cracking, offsets, or signs of displacement or continuous movement of the auxiliary spillway were observed.

A six-inch diameter PVC canal drainpipe was observed at the right-side toe of the auxiliary spillway. Little to no flow through the drainpipe was observed. Onyx indicated that the drainpipe usually flows freely but has to be periodically cleared of debris to re-establish flow.

The left canal sluice gate was open about 6.6 feet and the right canal sluice gate was fully closed. No gates were operated during the annual inspection; however, mill personnel reported smooth operation of both gates during exercising in 2023. A review of the plant logbook indicated that both canal sluice gates had been operated over the past year in accordance with the OM&M Plan. GZA probed for sediment upstream of the canal sluice gates. Probing indicated there was about one to three inches of sediment present upstream of the canal sluice gates.

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<sup>1</sup> GZA GeoEnvironmental, Inc. (June 10, 2004). Record Drawings – Phases 1-5, “Willow Mill Dam Repairs & Improvements”.



### 3.5 DOWNSTREAM AREA / MISCELLANEOUS

The discharge channel downstream of the Dam appeared to be in generally adequate condition. Missing mortar and stone masonry were observed in the retaining wall below the bridge downstream of the Dam.

A depression was observed in the grassed area to the right of the river outlet control structure. The depression measured approximately one foot by two feet in plan area and was probed at an angle (i.e., not vertical) to a depth of three feet. A steel cable / wire rope was observed in the depression. Based on discussions with Onyx, this depression is at the former location of a utility pole guy wire that has since been removed. Onyx indicated that the area would be protected to avoid a tripping hazard.

GZA discussed flood operations with Onyx; no changes in flood operations were noted. Above-water and slightly submerged metal surfaces were observed during the inspection. No significant corrosion was observed and contacts with underlying masonry and concrete surfaces appeared intact.

## 4.0 **RECOMMENDATIONS**

The following are GZA's recommendations for continued monitoring and maintenance of the Dam.

### 4.1 MONITORING RECOMMENDATIONS

In addition to the requirements of the OM&M Plan, GZA recommends the following monitoring activities that do not require engineering design:<sup>2</sup>

1. Visually observe typically submerged structures during low-flow conditions, including looking for signs of scour at the spillway toe and the missing piece of stone masonry in the downstream spillway face noted in the 2022 Phase I Inspection Report. These observations could be made during the routine quarterly inspections, subject to flow conditions. Photographs should be taken to help document conditions during low-flow periods. [Checklist Items 1 to 4, 7 to 12, 15, 18, 19, 29, 31, 33, 34, 44, 49, 65 to 68, 93, 97, 99]
2. Monitor the left upstream training wall for missing masonry, as noted in the 2022 Phase I Inspection Report. [Checklist Item 27]
3. Monitor the leakage observed through the river outlet control structure gates. [Checklist Item 48]
4. Monitor the deteriorated mortar joints, minor cracking, and efflorescence at the outlet control structure. [Checklist Items 56, 57, 58]
5. Monitor the offset vertical joint in the right upstream concrete training wall adjacent to the outlet control structure. [Checklist Item 63]
6. Continue to monitor the flow from the six-inch canal drainpipe at the auxiliary spillway. [Checklist Item 75]
7. Monitor the leakage through the auxiliary spillway stone masonry. [Checklist Items 76, 77, 78]
8. Monitor the cracking and efflorescence in the downstream right-side concrete training wall. [Checklist Item 111]

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<sup>2</sup> GZA's recommendations are cross-referenced to the corresponding items in the inspection checklist in **Appendix C**.





9. Monitor the mortar joints and loose stone in the roadway masonry retaining wall downstream of the dam at the left-side bridge abutment. [Checklist Item 114]

#### 4.2 MAINTENANCE RECOMMENDATIONS

GZA recommends the following maintenance actions which are intended to maintain and improve the overall condition of the Dam but would not alter the current design of the Dam. These recommendations may require design by a professional engineer and construction contractor experienced in dam construction.

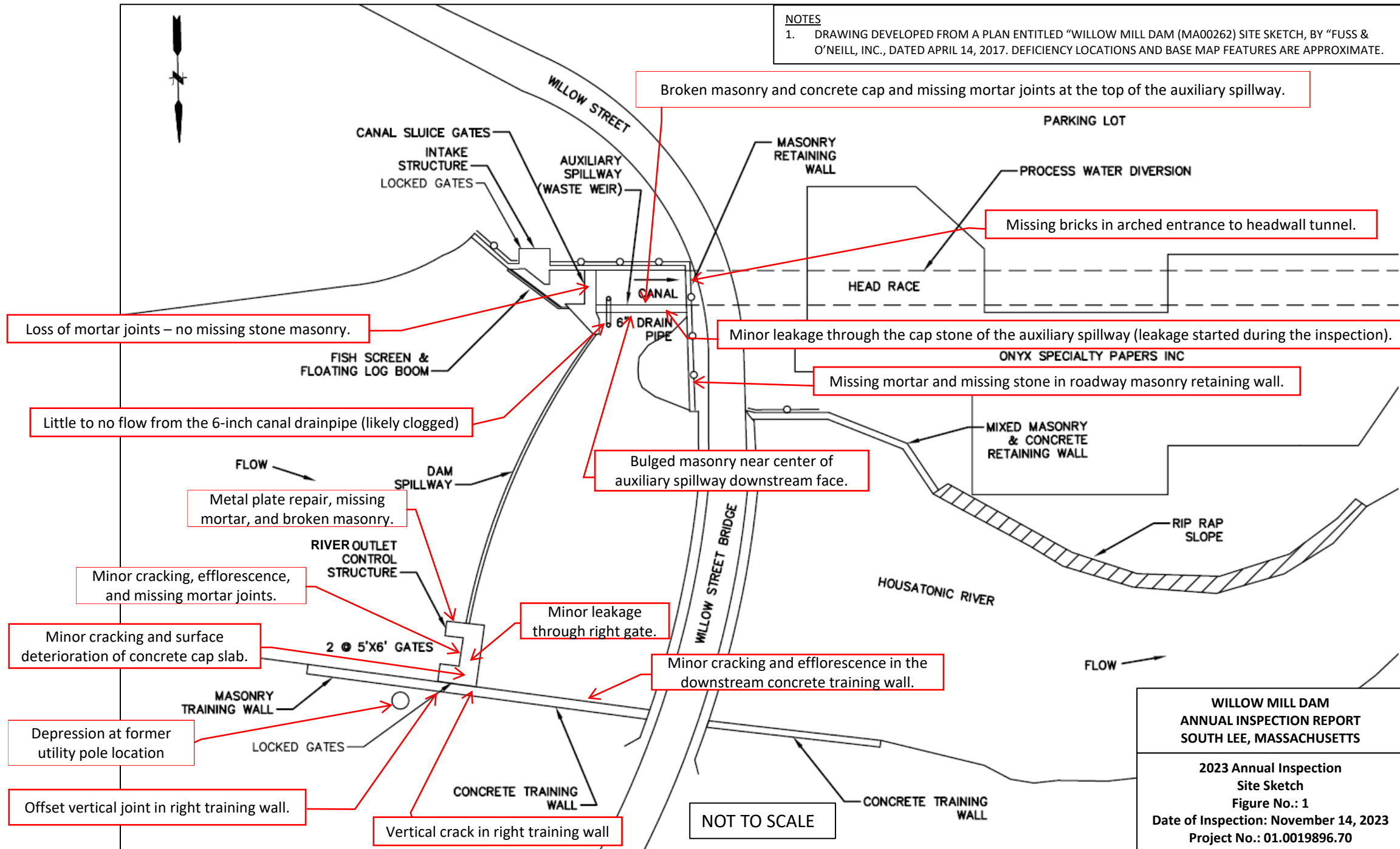
1. The masonry joints in deteriorated areas at the auxiliary spillway / headrace wall should be repointed during the next scheduled planned maintenance activities, and any missing stone masonry pieces, including missing brick at the headrace channel arched tunnel entrance, should be replaced during the planned maintenance activities. In the interim, these conditions should be monitored, and if they are observed to worsen, expedited repairs should be made on a case-by-case basis. [Checklist Items 72, 79, 82, 86, 89]
2. Since little to no flow was observed from the six-inch auxiliary spillway canal drainpipe, flow should be reestablished through the drainpipe during planned maintenance activities when there is safe access to the drainpipe, typically during the summer low flow conditions. [Checklist Item 75]
3. Trees and woody vegetation should be removed from within 20 feet of the dam, including from the crest of the auxiliary spillway, during future planned maintenance activities. [Checklist Items 84, 88, 125]



## Figures

**NOTES**

1. DRAWING DEVELOPED FROM A PLAN ENTITLED "WILLOW MILL DAM (MA00262) SITE SKETCH, BY "FUSS & O'NEILL, INC., DATED APRIL 14, 2017. DEFICIENCY LOCATIONS AND BASE MAP FEATURES ARE APPROXIMATE.



NOT TO SCALE


**WILLOW MILL DAM  
ANNUAL INSPECTION REPORT  
SOUTH LEE, MASSACHUSETTS**

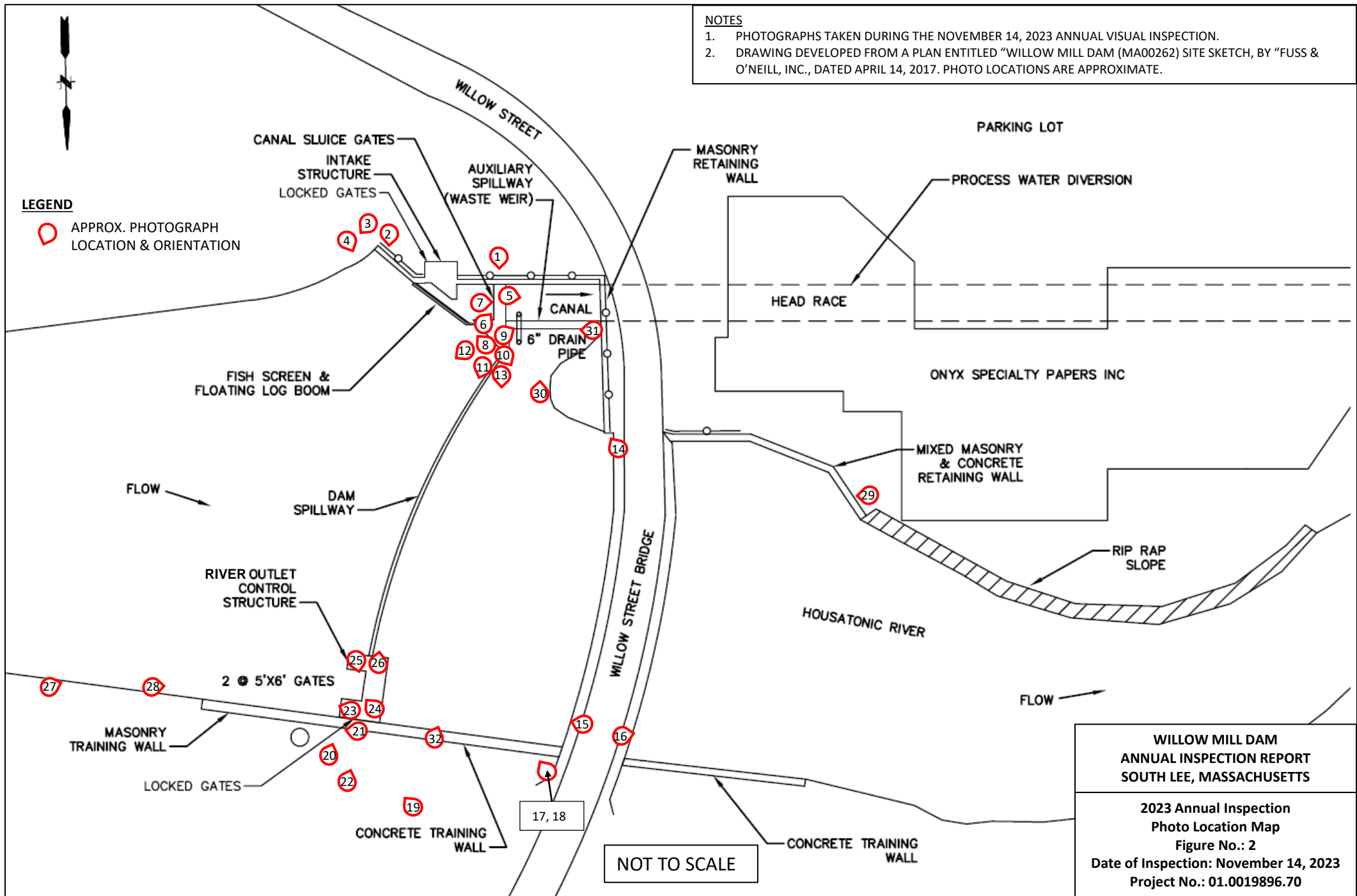
2023 Annual Inspection  
Site Sketch  
Figure No.: 1  
Date of Inspection: November 14, 2023  
Project No.: 01.0019896.70

**NOTES**

1. PHOTOGRAPHS TAKEN DURING THE NOVEMBER 14, 2023 ANNUAL VISUAL INSPECTION.
2. DRAWING DEVELOPED FROM A PLAN ENTITLED "WILLOW MILL DAM (MA00262) SITE SKETCH, BY "FUSS & O'NEILL, INC., DATED APRIL 14, 2017. PHOTO LOCATIONS ARE APPROXIMATE.

**LEGEND**

 APPROX. PHOTOGRAPH LOCATION & ORIENTATION



**WILLOW MILL DAM  
ANNUAL INSPECTION REPORT  
SOUTH LEE, MASSACHUSETTS**

2023 Annual Inspection  
Photo Location Map  
Figure No.: 2  
Date of Inspection: November 14, 2023  
Project No.: 01.0019896.70



## **Appendix A – Limitations**



## **DAM ENGINEERING REPORT LIMITATIONS**

### Use of Report

1. GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of the General Electric Company, (Client) for the stated purpose(s) and location(s) identified in the Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

### Standard of Care

2. Our findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).
3. Our services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

### General

4. The observations described in this report were made under the conditions stated therein. The conclusions presented 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 the Client.
5. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein available to GZA at the time of the evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.
6. Any GZA hydrologic analysis presented herein is for the rainfall volumes and distributions stated herein. For storm conditions other than those analyzed, the response of the site's spillway, impoundment, and drainage network has not been evaluated.
7. Observations were made of the site and of structures on the site as indicated within the report. Where access to portions of the structure or site, or to structures on the site was unavailable or limited, GZA renders no opinion as to the condition of that portion of the site or structure. In particular, it is noted that water levels in the impoundment and elsewhere and/or flow over the spillway may have limited GZA's ability to make observations of underwater portions of the structure. Excessive vegetation, when present, also inhibits observations.
8. In reviewing this Report, it should be realized that the reported condition of the dam is based on observations of field conditions during the course of this study along with data made available to GZA. 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 inspection and care can there be any chance that unsafe conditions be detected.

### Compliance with Codes and Regulations

9. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.
10. This scope of work does not include an assessment of the need for fences, gates, no trespassing signs, swimming or boating barriers, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

### Additional Services

11. It is recommended that GZA be retained to provide services during any future: site observations, explorations, evaluations, design, implementation activities, construction and/or implementation of remedial measures recommended in this Report. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.



## **Appendix B – Photographs**





<b>Client Name:</b> General Electric Company	<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, Massachusetts	<b>Project No.</b> 01.0019896.70
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<b>Photo No.</b> 1	<b>Date:</b> 11/14/2023
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**Direction Photo Taken:**  
Right.

**Description:**  
Canal sluice gates and intake structure from left abutment parking lot.



<b>Photo No.</b> 2	<b>Date:</b> 11/14/2023
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**Direction Photo Taken:**  
Right.

**Description:**  
Fish screen (trash rack) platform from left abutment parking lot.







<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 3	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream.			
<b>Description:</b> Overview of the impoundment from the parking lot adjacent to the left side of the dam.			

<b>Photo No.</b> 4	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Downstream.			
<b>Description:</b> Upstream side of the spillway from the left upstream side of the dam. Willow Street bridge and downstream channel in photo background.			






<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 5	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Downstream.			
<p><b>Description:</b> Canal and auxiliary spillway (waste weir) structure.</p> <p>Note broken masonry and concrete cap near water level at the top of the auxiliary spillway (circled – photo right) and missing bricks from arched entrance to the headrace tunnel (circled – photo left).</p>			

<b>Photo No.</b> 6	<b>Date:</b> 11/14/2023	
<b>Direction Photo Taken:</b> Downstream.		
<p><b>Description:</b> Canal sluice gates (Gate 3 to the right and Gate 4 to the left) and operators.</p> <p>Left gate was open about 6.6 feet and the right gate was closed.</p> <p>Gates are reportedly operated at least yearly, per GZA’s review of the logbooks.</p>		






<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 7	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Downstream facing down.			
<b>Description:</b> Upstream side of the canal sluice gates.  Note missing mortar between the stone masonry blocks.  Based on probing, about 1-to-3-inches of sediment was measured upstream of the gates.			

<b>Photo No.</b> 8	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream.			
<b>Description:</b> View of the fish screen (trash rack), floating log boom, and trash rack cleaning platform.			






<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 9	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Downstream to the left.			
<b>Description:</b> Overview of the auxiliary spillway (waste weir) from the canal sluice gate platform. Missing mortar observed along the horizontal joint of the concrete cap (red arrow). Also note vegetation growth in the joint. Minor flow from PVC drainpipe at downstream toe (also see photo 30).			

<b>Photo No.</b> 10	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Downstream.			
<b>Description:</b> Downstream channel from the sluice gate platform. Missing mortar and missing stone observed in the roadway masonry retaining wall (see red circle and close-up).			






<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 11	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Right.			
<b>Description:</b> Spillway and right side of the dam from the sluice gate platform.  About 14-inches of water flow over the spillway at the time of the inspection.			

<b>Photo No.</b> 12	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream and right.			
<b>Description:</b> Right abutment and outlet control structure upstream of the spillway.  Note missing mortar, and broken masonry on the outlet control structure. Steel plate on outlet control structure was placed during the 2004 repairs.			







<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 13	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Downstream and right.			
<b>Description:</b> Right downstream concrete training wall.  Minor cracking and efflorescence of the concrete observed.			

<b>Photo No.</b> 14	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream and to the left.			
<b>Description:</b> Downstream side of the auxiliary spillway from Willow Street bridge.			





<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 15	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream.			
<b>Description:</b> Downstream of the outlet control structure.  Note minor leakage through the right (photo left) gate.			

<b>Photo No.</b> 16	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Downstream.			
<b>Description:</b> Channel downstream of the Willow Street Bridge.			





<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 17	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream and left.			
<b>Description:</b> Overview of the dam from the Willow Street Bridge / downstream right abutment parking lot.			

<b>Photo No.</b> 18	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream and left.			
<b>Description:</b> Overview of the spillway and auxiliary spillway from the downstream right abutment parking lot.			





<b>Client Name:</b> General Electric Company	<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
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<b>Photo No.</b> 19	<b>Date:</b> 11/14/2023
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**Direction Photo Taken:**  
Upstream and left.

**Description:**  
Right side of right concrete training wall adjacent to the outlet control structure.



<b>Photo No.</b> 20	<b>Date:</b> 11/14/2023
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**Direction Photo Taken:**  
Left.

**Description:**  
Offset of a vertical joint in the right concrete training wall at upstream end of the outlet control structure (also see photo 21).








<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 21	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream.			
<b>Description:</b> Closeup of the offset of the vertical joint in the right concrete training wall upstream of the outlet control structure (also see photo 20).			

<b>Photo No.</b> 22	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Left.			
<b>Description:</b> Outlet control structure gated access.  Note crack in right training wall at downstream end of outlet structure (see inset and red arrow).			






<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 23	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream.			
<b>Description:</b> Overview of the impoundment from the outlet control structure.			

<b>Photo No.</b> 24	<b>Date:</b> 11/14/2023	
<b>Direction Photo Taken:</b> Upstream.		
<b>Description:</b> Outlet control structure gate operators.		






<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 25	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Downstream and right.			
<b>Description:</b> Upstream side of the outlet control structure gate operators (Gate 1 on the right and Gate 2 on the left).  Based on probing, no sediment was measured upstream of the gates.			

<b>Photo No.</b> 26	<b>Date:</b> 11/14/2023	
<b>Direction Photo Taken:</b> Left.		
<b>Description:</b> Overview of the left side of the dam including the fish screen (trash racks), canal sluice gate structure, and spillway.		






<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 27	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Downstream.			
<b>Description:</b> Area upstream of the spillway from the right upstream side of the dam.			

<b>Photo No.</b> 28	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Downstream.			
<b>Description:</b> Upstream face of the outlet control structure.  Note minor cracking and efflorescence in the concrete and missing mortar joints in the stone masonry.			







<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 29	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream.			
<b>Description:</b> Downstream access to the toe of the dam.			

<b>Photo No.</b> 30	<b>Date:</b> 11/14/2023	
<b>Direction Photo Taken:</b> Left.		
<b>Description:</b> Downstream face of the auxiliary spillway. Note wet spot near the center of the structure.  Very minor flow through the 6-inch drainpipe (red arrow).  See Photo 32 for leakage observed at the top of the auxiliary spillway (taken approximately 30 minutes after Photo 30).		





<b>Client Name:</b> General Electric Company		<b>Site Location:</b> Willow Mill Dam (MA00262) South Lee, MA	<b>Project No.</b> 01.0019896.70
<b>Photo No.</b> 31	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Upstream.			
<b>Description:</b> View parallel to the downstream face of the auxiliary spillway. Slight bulge observed in the center of the structure. No cracking of the façade was observed, indicating little to no displacement since the 2004 repairs.			


<b>Photo No.</b> 32	<b>Date:</b> 11/14/2023		
<b>Direction Photo Taken:</b> Left.			
<b>Description:</b> Auxiliary spillway.  Minor leakage through the cap stone of the auxiliary spillway began during the inspection (inset and red arrow). Leakage observed approximately 30 minutes after Photo 30 was taken with little to no leakage observed.			



## **Appendix C – Inspection Checklist**



## ANNUAL DAM INSPECTION CHECKLIST

Name of Dam:	Willow Mill Dam	I.D. No.:	MA00262																					
Location:	South Lee, Massachusetts Town, State																							
Owner:	Onyx 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:	838.0 ft NGVD (spillway crest; 839.2 ft avg. annual flow) Normal Pool	1.2 ft± over crest Pool at Inspection																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Names of Individuals at Inspection</u></th> <th style="text-align: left;"><u>Title/Position</u></th> <th style="text-align: left;"><u>Representing</u></th> </tr> </thead> <tbody> <tr> <td>Jonathan D. Andrews, P.E.</td> <td>Associate Principal</td> <td>GZA GeoEnvironmental, Inc.</td> </tr> <tr> <td>Seth D. Krause, P.E.</td> <td>Project Manager</td> <td>GZA GeoEnvironmental, Inc.</td> </tr> <tr> <td>Leslie Decristofaro, E.I.T.</td> <td>Engineer I</td> <td>GZA GeoEnvironmental, Inc.</td> </tr> <tr> <td>Scott Campbell</td> <td>Remediation Systems Manager</td> <td>Taconic Ridge (representing EPA)</td> </tr> <tr> <td>Donald Zukowski</td> <td>Operations Support Manager</td> <td>Onyx Specialty Papers, Inc.</td> </tr> <tr> <td>Andrew Begrowicz</td> <td>Operations</td> <td>Onyx Specialty Papers, Inc.</td> </tr> </tbody> </table>				<u>Names of Individuals at Inspection</u>	<u>Title/Position</u>	<u>Representing</u>	Jonathan D. Andrews, P.E.	Associate Principal	GZA GeoEnvironmental, Inc.	Seth D. Krause, P.E.	Project Manager	GZA GeoEnvironmental, Inc.	Leslie Decristofaro, E.I.T.	Engineer I	GZA GeoEnvironmental, Inc.	Scott Campbell	Remediation Systems Manager	Taconic Ridge (representing EPA)	Donald Zukowski	Operations Support Manager	Onyx Specialty Papers, Inc.	Andrew Begrowicz	Operations	Onyx Specialty Papers, Inc.
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Donald Zukowski	Operations Support Manager	Onyx Specialty Papers, Inc.																						
Andrew Begrowicz	Operations	Onyx Specialty Papers, Inc.																						
DATE OF INSPECTION:	November 14, 2023																							
WEATHER:	Cloudy	TEMPERATURE:	30s / 40s - deg F																					
<p>This is to certify that the above dam has been inspected and the following are the results of this inspection.</p> <div style="text-align: center; margin-top: 20px;">               _____              SIGNATURE OF INSPECTOR         </div>																								

Name of Dam: Willow Mill Dam

I.D. No.: MA00262

Inspection Date: November 14, 2023

AREA INSPECTED	MASONRY DAM / PRIMARY SPILLWAY 1 of 2			CHECK ( ) ACTION NEEDED		
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVEST.	REPAIR
UPSTREAM FACE	1	Surface Conditions	Generally obscured by flow and impoundment.	X		
	2	Condition of Joints	Generally obscured by flow and impoundment.	X		
	3	Unusual Movement	Generally obscured by flow and impoundment.	X		
	4	Abutment-Dam Contacts	Generally obscured by flow and impoundment.	X		
	5					
	6					
DOWNSTREAM FACE	7	Surface Conditions	Generally obscured by flow.	X		
	8	Condition of Joints	Generally obscured by flow.	X		
	9	Unusual Movement	Generally obscured by flow.	X		
	10	Abutment-Dam Contacts	Generally obscured by flow.	X		
	11	Drains	Generally obscured by flow.	X		
	12	Leakage	Generally obscured by flow.	X		
	13					
	14					
CREST	15	Surface Conditions	Generally obscured by flow.	X		
	16	Horizontal Alignment	Appeared to be in adequate alignment.			
	17	Vertical Alignment	Appeared to be in adequate alignment.			
	18	Condition of Joints	Generally obscured by flow.	X		
	19	Unusual Movement	Generally obscured by flow.	X		
	20	General	n/a			
	21					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

General (all pages): Typically submerged structures should be observed during low-flow conditions, including signs of scour at the downstream toe of the spillway. These observations can be made during routine quarterly inspections, subject to flow conditions, or during a drawn-down annual inspection (every five years per OM&M Plan Section 3.1.2). Note that the 2022 Phase I Inspection Report indicated that there was a piece of missing masonry on the right downstream face of the spillway. This area was obscured by flow during the current inspection.

Name of Dam: Willow Mill Dam

I.D. No.: MA00262

Inspection Date: November 14, 2023

AREA INSPECTED	MASONRY DAM / PRIMARY SPILLWAY 2 of 2			CHECK ( ) ACTION NEEDED		
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVEST.	REPAIR
UPSTREAM CHANNEL	22	Slide, Slough, Scarp	None observed.			
	23	Erosion	None observed.			
	24	Vegetation Condition	None observed.			
	25	Debris	None observed.			
	26	Seepage	None observed.			
	27	Left Upstream Training Wall	The 2022 Inspection Report noted missing masonry; not observed during this inspection.	X		
DOWNSTREAM CHANNEL	28	Sidewalls	See "DOWNSTREAM AREA & MISC."			
	29	Channel Floor	Generally obscured by flow.	X		
	30	Unusual Movement	None observed.			
	31	Discharge Area	Generally obscured by flow.	X		
	32	Downstream Area	Housatonic River - no unusual observations.			
	33	Sinkholes, Scour Holes, etc.	Generally obscured by flow.	X		
	34	Foundation Seepage	Generally obscured by flow.	X		
	35					
UPSTREAM TIMBER DAM	37	Exposed Portion	Not observed.			
	38	Breached Section	Not observed.			
	39					
	40					
	41					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

Items 37, 38: Based on review of previous documentation, remnants of an old timber dam exist upstream of the current dam. These remnants were not observed during this inspection. This breached upstream timber dam is no longer a water-retaining structure associated with this project.

Name of Dam: Willow Mill DamI.D. No.: MA00262Inspection Date: November 14, 2023

AREA INSPECTED	RIVER OUTLET WORKS 1 of 1			CHECK ( ) ACTION NEEDED		
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVEST.	REPAIR
SLUICE GATES & CONTROLS	42	Intake Area	Appeared clear. Probing indicated no sediment upstream of gates.			
	43	Stoplog Grooves	Appeared adequate.			
	44	Shore-side Gate #1 U/S Face	Not observed - fully submerged.	X		
	45	Shore-side Gate #1 D/S Face	Observed from bridge downstream; closeup inspection not performed.			
	46	Shore-side Gate #1 Stems	Appeared adequate.			
	47	Shore-side Gate #1 Operator	Appeared adequate.			
	48	Shore-side Gate #1 Leakage	Minor leakage through right side of the gate observed.	X		
	49	River-side Gate #2 U/S Face	Not observed - fully submerged.	X		
	50	River-side Gate #2 D/S Face	Observed from bridge downstream; closeup inspection not performed.			
	51	River-side Gate #2 Stems	Appeared adequate.			
	52	River-side Gate #2 Operator	Appeared adequate.			
	53	River-side Gate #2 Leakage	None observed.			
	54	Gate Operation	Logbook & quarterly inspection forms indicate gates exercised.			
	55					
RIVER OUTLET STRUCTURE	56	U/S Masonry Condition	Minor cracking and efflorescence and missing mortar joints.	X		
	57	D/S Masonry Condition	Minor efflorescence observed at mortar joints.	X		
	58	Concrete Cap Slab	Minor cracking and surface deterioration.	X		
	59	#1 Sluiceway Liner	Observed from bridge downstream; closeup inspection not performed.			
	60	#2 Sluiceway Liner	Observed from bridge downstream; closeup inspection not performed.			
	61	Seepage	None observed.			
	62	Discharge Area	Clear.			
	63	Right Training Wall	Offset of a vertical joint in the right concrete training wall.	X		
	64					
ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE						
Item 45: Minimal leakage observed. Significantly greater leakage was evident in photographs included in 2022 Phase I Inspection Report.						
Item 63: Offset of a vertical joint in the right concrete training wall observed just upstream of the right side river outlet structure. Offset is about two inches longitudinally (perpendicular to the flow of the river). A vertical crack in the right training wall was observed just downstream of the right side river outlet structure. These features appeared similar to those in photographs included in the 2022 Phase I Inspection Report.						

Name of Dam: Willow Mill Dam

I.D. No.: MA00262

Inspection Date: November 14, 2023

AREA INSPECTED	AUXILIARY SPILLWAY / HEADRACE WALL 1 of 2			CHECK ( ) ACTION NEEDED		
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVEST.	REPAIR
UPSTREAM FACE	65	Surface Conditions	Generally obscured by canal impoundment.	X		
	66	Condition of Joints	Generally obscured by canal impoundment.	X		
	67	Unusual Movement	Generally obscured by canal impoundment.	X		
	68	Abutment-Dam Contacts	Generally obscured by canal impoundment.	X		
	69					
	70					
DOWNSTREAM FACE/BUTTRESS	71	Surface Conditions	Appeared adequate.			
	72	Condition of Joints	Minor instances of mortar loss between masonry.			X
	73	Unusual Movement	Slight angle/bulge in the masonry façade - by design, per project record drawings.			
	74	Abutment-Dam Contacts	Appeared adequate.			
	75	Drains	6" PVC drain pipe near the right side toe. Little to no flow from drain (likely clogged).	X		X
	76	Leakage	Minor leakage under the capstone at the top left side of the auxiliary spillway.	X		
	77	Leakage (cont'd)	Leakage rate increased during inspection.	X		
	78	Leakage (cont'd)	Leakage appeared to be from joint under crest capstone.	X		
CREST	79	Surface Conditions	Deteriorated mortar joints and missing stone masonry at the crest.			X
	80	Horizontal Alignment	Appeared adequate.			
	81	Vertical Alignment	Appeared adequate.			
	82	Condition of Joints	Cracked / deteriorated mortar joints.			X
	83	Unusual Movement	None observed.			
	84	General	Minor vegetative growth in some deteriorated mortar joints.			X
	85					

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

Item 75: Clean and re-establish flow through the six-inch canal drainpipe at the right side downstream toe of the auxiliary spillway.

Items 76, 77, 78, 79, 82, 84: Repoint the deteriorated mortar joints and replace the broken masonry in the canal and auxiliary spillway (waste weir). This includes the broken masonry and area where minor leakage through the concrete cap at the top of the auxiliary spillway was observed.

Name of Dam: Willow Mill DamI.D. No.: MA00262Inspection Date: November 14, 2023

AREA INSPECTED	AUXILIARY SPILLWAY / HEADRACE WALL 2 of 2			CHECK ( ) ACTION NEEDED		
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVEST.	REPAIR
HEADRACE CHANNEL	86	Headwall Masonry	Occasional loss of mortar joints - no missing masonry stones observed.			X
	87	Slope Masonry Wall	Appeared adequate.			
	88	Vegetation Condition	Minor vegetation growth at spillway crest.			X
	89	Tunnel Entrance	Missing bricks in tunnel arch.			X
	90	Debris	None observed.			
	91	Sediment	None observed.			
	92	Seepage	None observed.			
	93	Channel Floor	Not observed - submerged.	X		
	94	Unusual Movement	Not observed.			
	95					
HEADRACE INTAKE	97	Headrace Gates	Mostly submerged - left gate (closest to parking lot) open approximately 6.6 feet.	X		
	98	Headrace Gate Operators	Appeared adequate.			
	99	Headrace Sluiceways	Not observed - submerged.	X		
	100	Bar Racks	Appeared adequate.			
	101	Pumphouse Condition	Appeared adequate.			
	102	Access Ways	Appeared adequate.			
	103	Gate Operation	Logbook & quarterly inspection forms indicate gates exercised.			
LEFT MASONRY ABUTMENT	104	Masonry Condition	Appeared adequate.			
	105	Abutment	Appeared adequate.			
	106	Concrete Cap Slab	Appeared adequate.			
	107	Seepage	None observed.			
	108	Unusual Movement	None observed.			
109						
ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE						
Item 97: Right gate was closed. Gate skin plate consists of wooden timbers. Exposed timbers appeared to be in adequate condition. Probed upstream of the canal sluice gates; probe resistance indicated approximately one to three inches of sediment.						

Name of Dam: Willow Mill Dam

I.D. No.: MA00262

Inspection Date: November 14, 2023

AREA INSPECTED	DOWNSTREAM AREA AND MISC. 1 of 1			CHECK ( ) ACTION NEEDED		
	ITEM NO.	CONDITION	OBSERVATIONS	MONITOR	INVEST.	REPAIR
DOWNSTREAM AREA	110	Abutment Seepage	None observed.			
	111	Training/Retaining Walls	Minor cracking and efflorescence in the downstream right side training wall.	X		
	112	Slide, Slough, Scarp	None observed.			
	113	Drainage System	Outlet structure, spillway, and auxiliary spillway discharge in the Housatonic River.			
	114	Willow Street Masonry Wall	Missing stone and mortar in wall below Willow Street	X		
	115					
	116	Downstream Hazard Description	WillowStreet Bridge immediately downstream of the dam; residential, commercial and Rt. 102 downstream.			
	117	Date of Last Update of Emergency Action Plan	December 31, 2019 (per July 29, 2022 Phase I Report).			
MISCELLANEOUS	118	Impoundment Banks	Appeared adequate.			
	119	Access Roads	Appeared adequate.			
	120	Boat Barrier	Not observed - removed during winter months.			
	121	Signage	Appeared adequate.			
	122	Fences / Railing	Appeared adequate.			
	123	Security / Access	Appeared adequate.			
	124	Former Utility Pole	A depression was observed in the grassed area to the right of the river outlet structure.			
125	General Vegetation	Maintain vegetation within 20 feet of the dam.			X	

ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE

Item 124: The depression was approximately one foot by two feet in plan area and was probed at an angle (i.e., not vertical) to a depth of three feet. A steel cable was observed in the depression. Donald Zukowski (Onyx) indicated that the depression was at the location of a former utility pole guy wire and would be protected to avoid a tripping hazard.



GZA GeoEnvironmental, Inc.