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December 19, 2024 – *Via Electronic Mail*

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)
Revised Operation, Monitoring, and Maintenance Plan for Woods Pond Dam

Dear Mr. Fontaine:

GE's current Operation, Monitoring, and Maintenance (OM&M) Plan for Woods Pond Dam, which was submitted to and approved by EPA in June 2019 and amended in September 2020, provides that that plan will be revised and submitted to EPA, as well as the Massachusetts Department of Conservation and Recreation Office of Dam Safety, every five years. Enclosed for EPA's review and approval is a revised version of the OMM&M Plan for Woods Pond Dam, prepared for GE by GZA GeoEnvironmental, Inc. (GZA). This revised plan includes as appendices an updated Emergency Action Plan, the 2020 topographic and bathymetric survey maps, and revised inspection checklists.

This revised plan and its appendices include numerous changes from the current plan for several reasons: to be consistent with the most recent Phase 1 inspection/evaluation of the dam; to clarify and organize better the descriptions of the required inspections and other surveillance and monitoring activities; to reflect the 2020 amendment to the current plan; to clarify and update the required maintenance and repair activities based on recent experience (including separation of the tracking tables into monitoring and maintenance); and to update the schedule. However, these revisions have not made substantive changes to the previously approved elements of the OM&M program except in a couple of cases, where such changes are considered justified. Given the extent of the revisions, I am also enclosing a separate matrix prepared by GZA which explains the rationale for the main changes and provides a justification for any substantive changes to the elements of the current approved OM&M Plan.

Please let me know if you have any questions about the enclosed revised OM&M Plan or its appendices.

Very truly yours,

Kevin G. Mooney
Senior Project Manager

Enclosures
Cc: (via electronic mail)
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OPERATION, MONITORING, AND MAINTENANCE PLAN
WOODS POND DAM – MA00731

Lee & Lenox, Massachusetts

Revised December 2024
GZA File No.: 01.0019896.80

PREPARED FOR:
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Pittsfield, Massachusetts

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1.0 INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This Operation, Monitoring, and Maintenance (OM&M) Plan for Woods Pond Dam (Dam) has been prepared for the General Electric Company (GE) by GZA GeoEnvironmental, Inc. (GZA). It describes operation, inspection, and maintenance procedures that GE will implement for Woods Pond Dam, which is located on the Housatonic River on the border of Lenox and Lee, Massachusetts, and which is owned and operated by GE.

This OM&M Plan constitutes a revision of the current OM&M Plan, which was submitted on June 17, 2019 and approved by the United States Environmental Protection Agency (EPA) on July 17, 2019, and the subsequent amendment to it, which was submitted on September 4, 2020 and approved by EPA on September 22, 2020.

This revised OM&M Plan is submitted pursuant to Section II.H.21 of the Revised Permit issued by EPA on December 16, 2020 under the Resource Conservation and Recovery Act (RCRA) for the Rest of River portion of the GE-Pittsfield/Housatonic River Site. It presents GE's plan to comply with Sections II.B.2.j.(1)(a) and (2)(a) of the Revised Permit insofar as those requirements apply to Woods Pond Dam. Section II.B.2.j.(1)(a) requires GE to minimize the releases of polychlorinated biphenyls (PCBs) from the Woods Pond impoundment by "ensuring inspection, monitoring, and maintenance" of the Dam and impoundment. Section II.B.2.j.(2)(a) similarly requires GE to "operate, inspect, monitor, and maintain" Woods Pond Dam. It specifies that such activities "shall include, (i) maintaining the integrity of the dam to contain contaminated sediments and (ii) conducting materials handling and off-site disposal and engineering controls related to dam maintenance, repair, upgrades, and enhancement activities (including, but not limited to, addressing sedimentation in sluiceways, conveyances, and other channels that transport water over, through or around the dam); and (iii) . . . all other related activities."

The procedures described herein have been developed in consideration of those requirements, as well as the guidance provided in the Federal Emergency Management Agency (FEMA) publication entitled *Dam Safety: An Owner's Guidance Manual* (FEMA, 1987) and the Massachusetts Department of Conservation and Recreation (MassDCR) regulations in 302 CMR 10 on dam safety.

In addition, GE's program for monitoring the releases of PCBs from Woods Pond Dam will be included in GE's general plans for surface water monitoring in the Rest of River, including GE's Second Revised Baseline Monitoring Plan (submitted by GE on January 30, 2023 and conditionally approved by EPA on February 16, 2023) and future monitoring plans for the Rest of River, as approved by EPA.

Elevations used in this OM&M Plan are referenced to the National Geodetic Vertical Datum of 1929 (**NGVD29**).

1.2 PURPOSE

The purpose of this OM&M Plan is to describe the procedures to be followed by GE to operate, monitor, and maintain Woods Pond Dam. The overall objective of the OM&M program is to minimize releases of PCBs in sediments and surface water in Woods Pond 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 MassDCR 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 misoperation of a dam."

Definitions of commonly used terms associated with dams and/or used in this OM&M Plan are provided in **Appendix A**. This plan also contains visual inspection checklists for the quarterly and biennial inspections discussed in Section 3.0. The current Emergency Action Plan (EAP) addressing emergency dam safety conditions is provided in **Appendix B**. Note that the attached EAP represents the current EAP as of the date of this OM&M Plan. Updates to the EAP are made annually.

1.3 DESCRIPTION OF THE WOODS POND DAM

1.3.1 Dam Location

Towns: Lee and Lenox

County: Berkshire

The left (east) abutment of Woods Pond Dam is located off Valley Street in Lee and can be accessed by vehicle. Valley Street extends through an industrial complex into a parking lot. A locked chain link fence controls access from the parking lot to the raceway embankment which leads to the Dam. The right (west) abutment is off Crystal Street in Lenox, adjacent to a set of railroad tracks.

The location of the Dam is shown on the United States Geological Survey (USGS) East Lee, MA topographic map (see **Figure 1**). The approximate coordinates are:

Latitude: 42.347173 N Longitude: 73.244588 W

1.3.2 Owner/Caretaker, Dam Safety Engineer, and Dam Contractor

GE is the owner of the Woods Pond Dam and is responsible for overseeing the operations and maintenance of the Dam. The current caretaker on GE's behalf is:

Kevin Mooney
GE Aerospace
1 Plastics Avenue
Pittsfield, MA 01201
Daytime Phone: (413) 448-6610
Cell Phone: (413) 441-4619

The current alternate caretaker on GE's behalf is:

Matthew Calacone
GE Aerospace
1 Plastics Avenue
Pittsfield, MA 01201
Daytime Phone: (413) 553-6614
Cell Phone: (413) 822-0082

GE has retained a professional engineer experienced in dam safety and engineering to perform routine inspections of the Dam, including inspections following flooding or storm events as needed, conduct biennial Phase 1 inspections/evaluations, and review other dam issues on an as-needed basis. The current consulting dam safety engineer is:

GZA GeoEnvironmental, Inc. (Jonathan D. Andrews, P.E., or other qualified dam safety engineer)
249 Vanderbilt Avenue
Norwood, Massachusetts 02062
Office: (781) 278-5808
Cell: (781) 983-2881

GE has retained a licensed contractor experienced with operation and maintenance of dams to perform routine maintenance and operation activities at the Dam, as well as to respond to dam safety issues on an as needed basis. The current contractor is:

LB Corporation (Steve Garrity)
95 Marble Street
Lee, Massachusetts 01238
Office: (413) 243-1072
Cell: (413) 441-1412

In the event that the caretaker, alternate caretaker, consulting dam safety engineer, or dam contractor changes, GE will advise EPA of those changes.

1.3.3 Purpose of the Dam

There have been two dams impounding Woods Pond at this location. The original Woods Pond Dam was a timber crib dam built between 1876 and 1882. It was located about 80 to 250 feet upstream of the current Dam. The purpose of the original dam was to divert water to an adjacent mill. The purpose of the current Dam (circa 1989) is to impound Woods Pond reservoir, including impounding existing sediments that are impacted by PCBs.

1.3.4 Description of the Dam and Appurtenances

Woods Pond Dam is a run-of-the-river structure consisting of the following (moving from right/west to left/east) a concrete section as the right abutment, a primary spillway, sheetpile cells filled with concrete as the left abutment section, and a raceway closure structure which controls flow into the raceway channel. Additionally, a raceway embankment extends both upstream and downstream of the left abutment cellular sheetpiles. Outflow at the downstream end of the raceway channel is controlled by the raceway stoplog sluice structure. The raceway channel is no longer used to feed the downstream mill, and the raceway embankment no longer impounds the reservoir or serves a functional role in the current Dam. An aerial photograph of the Dam and its appurtenances is shown below.

Source: GZA ArcGIS Mapper Tool

The right abutment section is a concrete gravity structure that extends approximately 60 feet between the railroad tracks and the spillway with a top elevation of 954.0 feet. The right abutment section is referred to as the non-overflow gravity section on the record drawings. Although this structure is termed “non-overflow,” the right abutment section of the Dam is designed to overflow during the applicable Spillway Design Flood (SDF).

The spillway is an uncontrolled, ogee-shaped concrete weir with a top elevation between 948.2 and 948.4 feet. The spillway is approximately 140 feet long.

The left abutment section extends approximately 60 feet between the spillway and the raceway closure structure and consists of steel sheetpile cells filled and capped with concrete. The sheetpiles were driven to bedrock during construction. The top elevation of the left abutment section is 954.0 feet and it is about 21 feet wide. Similar to the right abutment section, the left abutment section is designed to overflow during the applicable SDF.

The raceway closure structure is located on the left side of the Dam between the left abutment and riverbank. It is a formed concrete control structure that can hold up to five two-foot-high steel and concrete stoplogs that are lifted into place using a gantry crane and hoist. The stoplogs are used to control flow into the raceway channel that extends parallel to the river downstream of the Dam for approximately 350 feet. A one-inch spacer is typically located between the second and third stoplogs at about elevation of 948.0 feet to provide flow into the raceway channel to mitigate downstream water stagnation.

The raceway embankment extends parallel to the river for approximately 450 feet, extending both upstream and downstream of the Dam's left abutment section. Although structurally connected to the current Dam, the raceway embankment serves no functional role in the current Dam and no longer impounds the reservoir. The upstream section is the left abutment of the previous upstream dam. The right (river) embankment slopes are protected by grouted riprap and the left side has vertical stone masonry walls that line the raceway channel upstream of the raceway closure structure. The downstream section forms the 350-foot boundary between the raceway channel and the river. Immediately downstream of the left abutment, the raceway embankment slopes are protected by grouted riprap on both sides of the embankment for approximately 25 feet. The remainder the raceway embankment slopes are surfaced with riprap. The raceway embankment ends at the downstream raceway channel outlet (raceway stoplog sluice structure).

The downstream outlet of the raceway channel is a controlled concrete and masonry structure referred to as the raceway stoplog sluice structure. The purpose of the raceway stoplog sluice structure is to control water levels in the raceway channel and in the downstream Valley Mill Pond. The controls consist of up to seven 14-inch-high steel stoplogs. A truck-mounted crane can be mobilized to install and remove the stoplog controls. Three of the stoplogs are typically left in place to maintain the raceway and Valley Mill Pond level between the Woods Pond impoundment and river tailwater levels.

Instrumentation at the Dam consists of a staff gage on the right upstream training wall. An additional staff gage is located at the downstream raceway stoplog sluice structure. Downstream raceway embankment instrumentation consists of three open standpipe observation wells (historically referred to as piezometers). These wells are labeled (from downstream to upstream) B-1, B-2, and B-3. GE is in the process of installing automated pond water sampling equipment at the right and left training walls. The sampling equipment serves no dam-related function.

1.3.5 MassDCR Size Classification

Woods Pond Dam has a height of approximately 17.6 feet and a maximum storage capacity of 5,300 acre-feet. Refer to **Appendix A** for definitions of height of dam and storage. In accordance with the classification procedures of the MassDCR Office of Dam Safety (ODS), under the Massachusetts dam safety regulations in 302 CMR 10.00, Woods Pond Dam is a **Large** size structure based on maximum storage above 1,000 acre-feet.

1.3.6 MassDCR Hazard Potential Classification

In accordance with MassDCR ODS classification procedures, under the Massachusetts dam safety regulations, Woods Pond Dam is classified as a dam with **Significant Hazard** potential. This hazard class assessment is consistent with the hazard class for the Dam on record with the MassDCR ODS.

1.4 PERTINENT ENGINEERING DATA

1.4.1 Drainage Area

The drainage area for Woods Pond Dam is approximately 170 square miles and encompasses land within the Housatonic River Valley Wildlife Management Area. The drainage area is hilly with marshes and bogs.

1.4.2 Reservoir Storage Volume

Reservoir surface area and storage volume data presented below are based on previous analyses, as well as data developed for the 2007 *Structural Integrity Assessment and Inspection/Evaluation Report* (MWH, 2007). They are:

Condition	**Elevation (feet)**	**Storage Volume (acre-feet)**
Normal Pool	948.8±	460
Maximum Pool	955.8	5300
SDF Pool	955.8	5300

1.4.3 Discharges at the Dam Site

Woods Pond Dam's spillway continuously discharges water unless the raceway stoplogs are removed to adequately divert and convey the full flow of the Housatonic River through the raceway channel. A low volume of water also consistently discharges, via one-inch spacers between the closure structure stoplogs, through the raceway channel and through the downstream raceway sluice structure stoplogs back to the river downstream of the Dam.

The estimated 500-year SDF event pool elevation is about 955.8 feet, which would overtop the Dam by 1.8 feet. The Dam was designed to overtop and act as a broad-crested weir outside of the ogee-weir spillway, safely passing flood flows downstream. See Section 2.1 of this report for more detail.

1.4.4 General Elevations (feet, NGVD29) [1]

A.	Top of Dam	954.0
B.	SDF Pool	955.8 (designed to overtop during SDF)
C.	Normal Pool	948.8±
D.	Spillway Crest	948.2 to 948.4
E.	Low Level Outlet Invert	944.0
F.	Streambed at Toe of the Dam	936.4 to 942.0
G.	Low Point along Toe of the Dam	936.5

1.4.5 Main Spillway Data

A.	Type:	Concrete, ogee-shaped, uncontrolled
B.	Weir Length:	140.0 feet
C.	Weir Crest Elevation:	948.2 to 948.4 feet, NGVD29
D.	Upstream Channel:	Housatonic River/Woods Pond
E.	Downstream Channel:	Housatonic River

[1] These elevations have been updated based on the 2020 topographic and bathymetric survey.

F. Channel Bottom Elevation: 934.7 feet, NGVD29

1.4.6 Outlet Structure

A. Type: Stoplog-controlled reinforced concrete (raceway closure structure)

B. Opening Width: 8.0 feet

C. Operating Elevation at Structure: 944.4 to 954.0 feet, NGVD29

D. Upstream Control: Stoplogs at raceway closure structure

E. Downstream Control: Stoplogs at raceway stoplog sluice structure

1.4.7 Key Elevations to be Monitored

The following list is a table of elevations at key points that are required to be monitored by topographic survey. Locations are shown on the most recent topographic and bathymetric plan (October 2020), which is presented in **Appendix C**.

Point	Location	Elevation, feet NGVD29
A	Right side spillway abutment (chiseled square)	954.06
B	Left side spillway abutment (center of concrete)	954.20
C	BH-1 (on raceway embankment)	952.80
D	BH-2 (on raceway embankment)	953.70
E	BH-3 (on raceway embankment)	953.80
F	Spillway Midpoint	948.40
G	Sill of Raceway Stoplog Sluice Structure	941.60
H	Sill of Raceway Closure Structure	944.40
I	Right Side Platform (chiseled square TBM 2)	954.22
J	Downstream End of Raceway (chiseled square)	951.83

1.4.8 Dam Construction History

The current Dam was constructed in two phases in 1989 and in 1991 to replace the previous dam that was about 80 to 250 feet upstream of the current Dam. The first phase included the construction of the raceway closure structure, and the second phase was the replacement of the spillway and non-overflow gravity section. Drawings and construction records are available from GE.

A pre-construction geotechnical exploration program conducted in 1988 determined that the Dam and appurtenant structures are founded on shallow “marbleized” bedrock, which is vertically bedded and is generally finely grained, hard with variable medium to close joint spacing. Details of the subsurface field investigation can be found in the Design Report for Woods Pond Dam Rehabilitation (Harza Engineering, 1989).

At EPA’s direction, GE installed warning signs at Woods Pond Dam in November and December of 2020, with the format, wording, and locations of those signs approved by EPA.

In spring 2021, the area just upstream of the left abutment near Valley Street was found to have missing soil from underneath the grouted riprap, and from between the two sets of upstream sheetpiles. One of those sets of sheetpiles, oriented from left to right, comprises the Dam; and the other set, oriented diagonally, is not integral to the dam structure and seems to have been constructed to provide protection to Valley Street. The size of the area missing soil was about five feet wide, five feet deep, and one to three feet high. The upstream-most sheetpile was not in contact with the old raceway training wall, which may have contributed to soil erosion. Although this was not a condition of the Dam itself and would not have affected the safety of the Dam, GE excavated the area, replaced the soil, and slush grouted the surface in September 2021.

1.4.9 Most Recent Inspection

The most recent Phase 1 engineering inspection/evaluation of Woods Pond Dam was conducted by GZA on November 14, 2023 and is described in GZA's revised July 23, 2024 *Woods Pond Dam Phase I Inspection/Evaluation Report* (GZA, 2024). Based on the results of that inspection, Woods Pond Dam was found to be in **Satisfactory Condition** and in compliance with the MassDCR dam safety regulations.

2.0 OPERATIONS

This section describes the operation of Woods Pond Dam under normal and flood conditions. It also discusses the potential for dewatered conditions for dam inspection and maintenance.

2.1 PRIOR HYDROLOGIC ANALYSIS AND RIVER FLOW INFORMATION

Previous engineering hydrologic and hydraulic (H&H) evaluations have indicated that Woods Pond Dam is able to safely pass the regulatory 500-year SDF for a dam of its size and hazard classification.[2] A summary of the previous H&H evaluations is presented in the following table.

Flood Return Period	Estimated Peak Flow at Dam (in cubic feet per second [cfs])	Estimated Peak Water Surface Elevation at Dam (ft, NGVD)
100-Year	11,700	--
500-Year	12,100	955.8

The estimated flood elevation for a 500-year flood event is about 955.8 feet, which would overtop the Dam by 1.8 feet (top of Dam = 954.0 feet). The duration of overtopping was estimated to be about 37.5 hours. The Dam was designed to act as a broad-crested weir at the left and right abutment sections outside of the ogee-weir spillway; thus, anticipated overtopping was not considered to be a deficiency. Some bypass flooding to the west of the inundated non-overflow right section would occur during flooding events. The 2007 MWH Inspection/Evaluation Report (cited above) noted that the evaluation of flood flows along this railroad bed area indicated that the bypass flow should not result in the failure of the project structures.

There are three USGS stream gages near Woods Pond Dam: (1) the Coltsville USGS No. 01197000 gage about 16 river miles upstream of the Dam on the East Branch of the Housatonic River; (2) the Great Barrington USGS No. 01197500 gage about 20 river miles downstream of the Dam at Division Street; and (3) the Lenoxdale USGS No. 01197145 gage about ¼ mile downstream of the Dam at Valley Street. The Lenoxdale gage has approximately the same watershed area as Woods Pond Dam and closely corresponds to river flows at the Dam. The Coltsville gage has approximately one-third the watershed of Woods Pond Dam. The Great Barrington gage has approximately 1.6 times the watershed of Woods Pond Dam. Thus, compared to actual flows at Woods Pond Dam, the Coltsville gage would tend to show smaller peak river flows and the Great Barrington gage would tend to show larger peak river flows. Information regarding these three gages is provided in the table at the end of this section.

Current and historical river flows for the East Branch of the Housatonic River at the Coltsville gage can be found at the National Water Prediction Service (NWPS) website. Predicted river flows for the Coltsville gage are added to the website during high flow periods.

Current, historical, and predicted Housatonic River flows for the Great Barrington gage can also be found at the NWPS website. The NWPS-predicted flows can be compared to the estimated peak flows for the 100-year and 500-year flood return periods to help plan flood operations and responses.

Similarly, current and historical Housatonic River flows for the Lenoxdale gage can be found at the USGS website.

[2] Refer to the July 23, 2024 Phase 1 Inspection/Evaluation Report (GZA, 2024) for additional details regarding these evaluations.

USGS Gage	Distance from the Dam (River Miles)	Flood of Record (cfs)
Lenoxdale, 01197145	About ¼ mile downstream	2,850 (December 19, 2023; note 1)
Coltsville, 01197000	About 16 river miles upstream	6,410 (August 28, 2011)
Great Barrington, 01197500	About 20 river miles downstream	12,200 (1949)

Note 1: Available data record for Lenoxdale gage started on September 14, 2022.

2.2 NORMAL OPERATIONS

No operator action is required for normal dam operations. The uncontrolled run-of-the river overflow spillway conveys flow downstream. During normal operations, three stoplogs are typically installed in the raceway closure structure with a one-inch spacer between the second and third stoplogs, placing the top of stoplogs at elevation 954.0± feet NGVD. The downstream raceway stoplog sluice structure is normally operated with three stoplogs in place. Stoplogs will not be removed or added without consulting GE's dam safety engineer.

2.3 FLOOD OPERATIONS

No operator action is required for river flow corresponding to a 100-year to 500-year return period flood event.

As a routine matter, as discussed in Section 4.0, GE will keep the spillway and raceway approach and discharge areas clear of debris that could hinder flow during such an event. As previously mentioned, floods on the order of a 500-year return period flood event may result in about 1.8 feet of overtopping of the abutment (non-spillway) sections of the Dam; however, overflow resiliency is a design feature of the Dam. Increased monitoring will be undertaken if and when the abutment sections of the Dam are overtopped.

Although the raceway embankment no longer impounds the reservoir, GE will monitor raceway channel water levels and raceway embankment instrumentation should the water level in the raceway approach the top of the raceway embankment. If the raceway water elevation rises to El. 952 feet or slightly over halfway up the raceway embankment riprap, GE will verify that three stoplogs are in place in the upstream raceway closure structure and remove stoplogs from the downstream raceway stoplog sluice structure to reduce the potential for raceway embankment overtopping, at the direction of GE's dam safety engineer.

Actions during an actual or potential emergency are set forth in the Woods Pond Dam EAP provided in **Appendix B** (or subsequent versions of the EAP).

2.4 DEWATERED OPERATIONS

Lowering the reservoir to dewater the spillway may be required to allow for an unobstructed view of the downstream face of the spillway during a dam safety inspection (see Section 3.0) or to perform maintenance or repair activities of the project structures. At least one week before any planned lowering of the water level in the impoundment, GE will provide a plan to EPA for doing so and diverting flow off the spillway.

That plan will include following information:

- What structures will be opened;
- The timing for opening of the closure structures;
- Details regarding the removal of the stoplogs;
- Procedures for monitoring the outflow after the closure structures have been opened, including who will conduct the monitoring and what will be monitored; and
- The length of time that the closure structures are anticipated to be open.

2.5 EQUIPMENT OPERATION

All equipment operations will be performed by GE's dam contractor unless otherwise noted. Stoplogs will not be added or removed without consulting GE's dam safety engineer. Details on operating the equipment at Woods Pond Dam are as follows:

1. Raceway Closure Structure

   The five stoplogs will be inserted and removed from the raceway closure structure using the chainfall hoist and frame that are permanently positioned above the stoplogs. To operate the chainfall hoist, two five-foot-long lifting chains will be attached to the hoist using a masterlink. Each of the lifting chains will be attached to a Swift-Lift P-5 lifting eye using a connecting link. The chains will consist of ¼-inch Taylor-Made alloy steel chain manufactured by Joseph T. Ryerson, or equivalent. Chains and links will be constructed of alloy steel and have a minimum safe working capacity of three tons. The two lifting eyes will be attached to two Swift-Lift F-52 SL anchors embedded in the top of each stoplog. The chains can also be attached to four lifting lugs on each stoplog. The lifting lugs are hook-shaped protrusions located in pairs – one lug upstream and one lug downstream. Stoplogs will be lifted using the chainfall hoist. Care will be exercised to lift the stoplogs in a level manner so as to prevent damage to the stoplog slots on each side. Stoplogs will be replaced in the same manner with the neoprene pad on each stoplog facing down.

   The spacers between the second and third stoplogs will be monitored during quarterly inspections and reset if damaged or missing. Debris will be removed from the raceway closure structure (using hand tools) if it is determined to be impeding flow. When possible, the debris will be immediately removed from the site so that it does not re-enter the raceway.

2. Raceway Stoplog Sluice Structure

   The raceway stoplog sluice structure will be operated by moving the steel deck plate and inserting or removing stoplogs. An excavator or truck-mounted crane will be used to lift and place stoplogs and steel plates from the top of the embankment. Prior to operation, GE will clear debris from the stoplogs. The stoplogs or steel plates will be attached to the lifting equipment using four chains. The chains will be attached to four lifting lugs on each stoplog. The lifting lugs are hook-shaped protrusions located in pairs – one lug upstream and one lug downstream. Each pair of lifting lugs is located approximately 24 inches from each end of the stoplog. Care will be exercised to lift the stoplogs in a level manner so as to prevent damage to the stoplog slots on each side. Stoplogs will be replaced in the same manner with the neoprene pad on each stoplog facing downstream.

3. Instrumentation

   See Section 3.3 for instructions on reading instrumentation.

3.0 MONITORING PROGRAM

This section describes GE's monitoring program for Woods Pond Dam. The monitoring program includes visual inspections, topographic and bathymetric surveys, and instrumentation and monitoring. Refer to Section 4.0 for maintenance and repair requirements. Monitoring activities will be documented and reported to EPA as described in Section 7.2.

3.1 VISUAL INSPECTIONS

3.1.1 Quarterly Maintenance Inspections

Maintenance inspections will be conducted by GE's dam safety engineer once every quarter (e.g., four times per year). The purpose of quarterly maintenance inspections is to observe the performance of the Dam between the biennial Phase 1 inspections/evaluations (described below) and to identify maintenance activities required to maintain the Dam in proper working order. Quarterly inspections are tentatively scheduled as follows:

Inspection	Timeframe	Target Inspection Month
First Quarterly Inspection	January through March	February
Second Quarterly Inspection	April through June	May
Third Quarterly Inspection*	July through September	August
Fourth Quarterly Inspection	October through December	November

* Note: The third quarterly inspection will be replaced by the biennial inspection when scheduled.

Prior to performing a quarterly maintenance inspection, the inspector(s) will review the most recent Phase 1 Inspection/Evaluation Report as well as past recent quarterly inspection reports to be familiar with the overall condition of the Dam and any conditions of note that should be observed during the inspection.

During the inspection, the inspector will visually observe the primary project structures listed in Section 1.3 of this OM&M Plan, including the right abutment section, spillway, left abutment section, raceway closure structure, and raceway stoplog sluice structure, along with the raceway embankment. In general, the structures will be observed for signs of movement, misalignment, sloughing, settlement, leakage, seepage, erosion, and deterioration. Observations at material interfaces (e.g., earthen embankment/concrete wall interface) and of the condition of the existing warning signage will be included in the inspections. Obstructions preventing full observation of a project feature (e.g. snow, vegetation, spillway flow, etc.) will be noted. Known conditions of note, based on past inspections, will be observed for change in condition. New conditions of note will also be recorded. The inspector(s) will also take and record water level measurements of the reservoir, tailwater, and raceway, and will collect instrumentation readings for the observation wells, as discussed in Section 3.3.2 of this OM&M Plan.

The results of the quarterly maintenance inspections will be documented on the quarterly maintenance inspection checklist included in **Appendix D**. These checklists will also be accompanied by monitoring and maintenance tracking tables (included in Appendix D), which list the conditions requiring follow-up monitoring or maintenance that were observed at the Dam during any of the prior inspections and that had not been addressed as of the date of the last prior inspection, and which summarize the status of any such follow-up activities.

3.1.2 Biennial Engineering Phase 1 Inspections/Evaluations

The Massachusetts dam safety regulations (302 CMR 10.00) require owners of dams to retain a qualified engineer to inspect their dams and report the results every two years for High Hazard Potential dams, every five years for Significant Hazard Potential dams, and every 10 years for Low Hazard Potential dams. These inspections are referred to as Phase 1 inspections/evaluations.

Since Woods Pond Dam is classified as a dam with **Significant Hazard** potential (reference Section 1.3.6 of this OM&M Plan), Phase 1 inspections/evaluations are required to be performed every five years. However, GE has previously proposed, and EPA has approved, the performance of Phase 1 inspections/evaluations of Woods Pond Damon a biennial basis (i.e., every two years). Therefore, Phase 1 inspections/evaluations of this Dam will be conducted by GE's dam safety engineer every two years. Phase 1 inspections/evaluations will typically take place during the third quarter of the year, replacing the third quarterly inspection as noted above.

The purpose of the Phase 1 inspections/evaluations is to verify and supplement the results of the quarterly maintenance inspections. The Phase 1 inspections/evaluations will be conducted in accordance with the MassDCR requirements.

Prior to performing the Phase 1 inspection/evaluation, the inspecting engineer will review the previous Phase 1 Inspection/Evaluation Report and prior quarterly inspection reports along with any additional inspection information or observations collected by GE since the previous Phase 1 inspection/evaluation.

To aid in observations of the spillway under both normal-flow and dry conditions, the biennial Phase 1 inspections/evaluations of Woods Pond Dam will be conducted on a schedule that alternates between normal-flow and low-flow conditions, with each occurring every four years. During the inspections conducted under normal-flow conditions, the inspecting engineer will look for seepage and other conditions with a full operating pool. During the inspections under low-flow conditions, the impoundment water level will be lowered and flow diverted off the spillway prior to the inspection to allow visual observation of the spillway in the dry.[3] During these inspections, the inspecting engineer will be able to observe conditions and defects (if any) in the spillway that would be obscured by flow during normal-flow conditions.

The results of the Phase 1 inspection/evaluation will be documented in a Phase 1 Inspection/Evaluation Report. That report will follow the standard MassDCR Phase I Inspection/Evaluation Report format. It will include an inspection checklist, which has been developed, and is regularly updated, by MassDCR. The latest iteration of the checklist, which is available on the MassDCR website, will be used by the inspecting dam safety engineer. This latest version of the checklist, updated in June 2021, is included as **Appendix E** to this OM&M Plan. The report will also include monitoring and maintenance tracking tables similar to the ones included with the quarterly inspection reports (see Section 3.1.1).

[3] As described in Section 2.4, at least one week before a planned low-flow inspection, GE will provide a plan to EPA for lowering the water level in the impoundment and diverting flow off the spillway. The information to be included in the plan is listed in Section 2.4.

3.1.3 Post-Storm Inspections

Inspections of the dam will be performed after high-flow events. For this purpose, a high-flow event is defined as a flow event with a measured peak river flow at or above 1,500 cfs at the Coltsville gage (USGS Gage No. 01197000) or 3,650 cfs at the Great Barrington gage (USGS Gage No. 01197500), which correspond to the "Action Stage" of four feet above streambed at the Coltsville gage and seven feet above streambed at the Great Barrington gage, as determined by the National Water Prediction Service (NWPS). Action Stages have not been established for the new Lenoxdale gage. However, on December 19, 2023, the Action Stage at the Great Barrington gage was exceeded (3,880 cfs mean discharge) and the Lenoxdale gage reported flow ranged from 1,900 to 2,880 cfs.[4]

Post-storm Inspections will be conducted when flood water conditions have subsided, and conditions allow safe access to the dam. Post-storm inspections will follow the procedure for quarterly maintenance inspections, as described in Section 3.1.1. When appropriate based on timing, a post-storm inspection may replace the quarterly maintenance inspection for the quarter in which the high-flow event occurs.

3.1.4 Ice-Out Observations

Ice-out observations will be made during the second quarterly inspection. During these inspections, particular attention will be paid to the concrete structures. Particular care will be taken to look for damage to the concrete of the spillway, training walls, non-overflow gravity section, raceway closure structure, and raceway stoplog sluice structure, as well as debris that may reduce spillway or raceway channel flow capacity. The results of this inspection will be recorded on the second quarterly inspection checklist.

3.1.5 Post-Earthquake Inspections

Inspections of the Dam will be performed after significant seismic events. For these purposes, a significant seismic event is defined as an earthquake that causes reported damage in Berkshire County.

Post-earthquake inspections will be conducted when conditions allow safe access to the Dam. Post-earthquake inspections will follow the procedure for quarterly maintenance inspections, as described in Section 3.1.1. When appropriate based on timing, a post-earthquake inspection may replace the quarterly maintenance inspection for the quarter in which the earthquake occurs.

3.2 TOPOGRAPHIC AND BATHYMETRIC SURVEYS

GE will conduct periodic topographic and bathymetric surveys of the Dam to monitor for signs of movement, settlement, erosion, and scour at the Dam. The potential scour hole noted at the toe of the spillway will be monitored during the periodic topographic and bathymetric surveys.

The surveys will be conducted every five years. GE will retain a licensed Professional Surveyor to perform the topographic and bathymetric surveys. The latest topographic and bathymetric survey was conducted in 2020 (by

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[4] The previous requirement to conduct a specific additional inspection prior to forecasted large storms so as to identify debris in the spillway has been deleted given that the quarterly inspections will identify such debris. However, GE has retained the requirement in Section 4.1 to make best efforts to remove debris from the spillway, if present and if practicable, when a high-flow event is forecasted. In addition, the previous requirement to conduct dam observations during major storms has been deleted for safety reasons.

Foresight Land Services), and the results are provided in **Appendix C** to this OM&M Plan. The next topographic and bathymetric survey will be conducted in 2025.

The results of the topographic and bathymetric surveys will be reviewed by GE's dam safety engineer and documented in a topographic and bathymetric survey memorandum. The results of subsequent surveys will be compared to the baseline (2020) survey to help evaluate changed conditions such as potential structure settlement or deformation, or bedrock scour downstream of the spillway.

3.3 INSTRUMENTATION

Active instrumentation at Woods Pond Dam consists of two staff gages installed near the spillway and downstream raceway stoplog sluice structure, along with three monitoring wells installed in the raceway embankment. See Section 4.2.3 for instrumentation maintenance and repair requirements.

3.3.1 Staff Gages

The three staff gages at Woods Pond Dam are located (1) on the left upstream spillway training wall, (2) on the left wall of the approach to the raceway stoplog sluice structure, and (3) on the right training wall of the raceway closure structure, downstream of the stoplogs. The staff gages are used to measure the reservoir and downstream river levels during visual inspections.

As a secondary method, surface water readings will be measured during visual inspections by measuring from a known elevation point down to the top of the water. The procedure used to measure the surface water elevations is included in Section 1 of the quarterly inspection checklist, provided in **Appendix D** to this OM&M Plan.

3.3.2 Observation Wells

There are three active observation wells, B-1, B-2, and B-3, in the raceway embankment downstream of the Dam. These wells are accessed by walking along the top of the raceway embankment. The wells are constructed as open PVC standpipes contained within locked protective casings. The internal standpipes are marked with the observation well labels, and the locations are marked with traffic cones for visibility. The locations of the wells are shown on the figures attached to the quarterly inspection checklist in **Appendix D**.

Water levels in the observation wells will be measured during all visual inspections. Measurements will be taken by measuring from the top of the PVC riser pipe (a known/surveyed elevation) to the top of the water surface within each well using a water level meter. This measurement in each well will be compared to the expected water level range based on data collected from 2010 to 2024. If the measurement is outside of the expected water level range, the measurement will be repeated for verification.

Monitoring for a buildup of silt within the wells will also be performed during water level measurements by measuring ("sounding") from the top of the PVC riser pipe to the top of the silt or bottom of well using a plumb bob or water level meter, along with noting the subjective feel of the soundings (hard, firm or soft). This measurement will be compared to previous bottom-of-well-depth measurements. If more than 12 inches of sediment are measured in the well, actions to flush well are performed, as described in Section 4.0.

The tables used to record the measured water levels and sediment buildup within the wells are included in Section 4 of the quarterly inspection checklist, provided in **Appendix D** to this OM&M Plan.

A time-history plot of the observation well data will be maintained by GE's dam safety engineer. The time-history plot allows for evaluation of long-term trends in the measured water levels within the wells. The time-history plot will be included in the biennial Phase 1 Inspection/Evaluation Reports.

3.4 CONDITIONS OF NOTE

If conditions at the Dam requiring follow-up actions are observed during visual inspections, topographic and bathymetric surveys, or instrumentation readings, GE's dam safety engineer will review those conditions, as well as the overall condition of the Dam as it relates to the observed condition of note. This review will be informed by past inspection findings, visual inspection, and instrumentation readings, as applicable. The dam safety engineer will evaluate the need for additional monitoring or maintenance activities to address the conditions of note. The dam safety engineer will provide recommendations regarding such follow-up activities to GE, and GE will provide any such recommendations to EPA in the relevant inspection reports.

4.0 MAINTENANCE AND REPAIRS

This section describes the maintenance and repair activities that GE will perform at Woods Pond Dam. There are two types of such maintenance and repair activities: (1) routine maintenance and repairs; and (2) other maintenance and repairs.

Routine maintenance and repairs are activities that are performed periodically throughout the year by GE's contractor and do not typically require input or oversight by GE's dam safety engineer (e.g., vegetative cutting). Other maintenance and repair activities are performed on an as-needed basis by GE's contractor (or other contractor as needed) and typically require input from GE's dam safety engineer (or another qualified engineer) before they are implemented (e.g., concrete repairs).

These maintenance and repair activities will be described in reports submitted to EPA, as described in Section 7.2.

4.1 ROUTINE MAINTENANCE AND REPAIR ACTIVITIES

Routine maintenance and repair activities will be performed periodically throughout the year to maintain the Dam in proper working order and to facilitate effective visual inspections. The frequency of the routine maintenance and repair activities will vary but will typically be performed several times per year by GE's contractor. Routine maintenance and repair activities will include the following:

Vegetative Cutting – GE will cut the vegetative cover on the raceway embankment, the area on the slope to the left (east) of the raceway closure structure, and the right (west) abutment section whenever the grass cover reaches a maximum height of 12 inches to prevent the growth of trees or brush and to facilitate an effective visual inspection. Woody or intrusive vegetation will be removed from the areas on GE's property around the right abutment section on the west side of the river, and from and from riprap areas. The areas that will be subject to vegetation maintenance on both sides of the river are shown on **Figure 2**.

Typically, vegetative cutting will be performed before each quarterly inspection. Vegetative cutting will also be performed before the topographic survey. When the topographic survey of the site is conducted, the areas that will be subject to vegetative cutting and removal on both sides of the river will be surveyed and marked in the field under the direction of GE's dam safety engineer.

Spillway and Raceway Cleaning – GE will maintain the spillway approach area, raceway channel, and the upstream and downstream raceway control structure areas clear of debris to provide full hydraulic capacity. GE will remove debris annually, and more frequently as necessary if the free flow of water is being impacted. In addition, GE will make best efforts to remove debris from the spillway, if present and if practicable, when a high-flow event, as defined in Section 3.1.3, is forecasted.

4.2 OTHER MAINTENANCE AND REPAIR ACTIVITIES

Other maintenance and repair activities will be performed by GE's contractor (or other contractor as needed) when necessary in response to observations made during the visual inspections (or other observations, if any), as described below. In each of these cases, based on observations during an inspection, the need for and type of maintenance or repairs will be determined in consultation with GE's dam safety engineer. The dam safety engineer will recommend to GE the need for maintenance or repair actions and work with GE to develop and plan and schedule to address the maintenance or repair items. GE will include its plans for maintenance or repair and a schedule for conducting those activities in the relevant inspection report to EPA.

The documentation of these maintenance actions will be made available to the dam safety engineer as part of the facility documents available for the biennial Phase 1 inspections/evaluations. Such documentation will include, where relevant, pertinent 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.

Other maintenance and repair activities include the following:

4.2.1 Embankments

Repair of Sparse Vegetation and Erosion – In the event that areas of missing or distressed grass cover or local erosion are identified on the raceway embankment top or slopes, those areas will be repaired, regraded, and loamed and seeded as necessary.

Tree Removal – Tree stumps greater than six inches in diameter will be removed and backfilled with suitable compacted fill using procedures outlined in FEMA's *Technical Manual for Dam Owners: Impacts of Plants on Earthen Dams* (FEMA, 2005). For trees of this size or greater, the primary and secondary root system will be removed, and the resulting holes properly filled. Tree removal will be performed under the observation of the dam safety engineer. Backfill material and compaction needs will be specified by the dam safety engineer.

Rodent Damage Control – Rodents, such as groundhogs, muskrats, and beavers, are naturally attracted to the habitats created by dams and reservoirs and can endanger the structural integrity and proper performance of the embankments. If rodent burrow holes are observed, the rodents will be removed if practicable and the burrow holes will be repaired. Where the damage consists of shallow holes scattered across the embankment, tamping of earth into the rodent holes is generally sufficient repair. Large burrows on an embankment will be filled using the following procedure: (a) Placement of a piece of metal stove or vent pipe vertically over the entrance to the burrow with a tight seal between the pipe and burrow; (b) preparation of a mixture consisting of approximately 90 percent earth, 10 percent cement, and water added to produce a thin slurry; (c) pouring the slurry mixture into the hole; and (d) once the hole is filled, removal of the pipe and tamping additional dry earth into the entrance.

Slope Traffic Damage Control – Pedestrian and wildlife traffic on the embankment top or slopes can cause ruts which allow water to collect, causing saturation and softening of the embankment. Mowing equipment can also cause "mower scars" by cutting into slopes and vegetative cover. Significant ruts or mower scars that develop will be repaired as soon as noticed, or at a minimum, as a follow-up action after a scheduled inspection that identifies such ruts or scars.

Seepage Damage Control – If seepage becomes evident in the Dam, the dam safety engineer will be contacted to determine appropriate monitoring and repair. If evidence of seepage is observed, the location(s) will be marked in the field with pin flags or flagged stakes and the location(s) will be surveyed and mapped by a licensed surveyor and maintained as part of the inspection and maintenance records. The seepage will then be evaluated by the dam safety engineer.

Riprap Damage Control – GE will maintain the riprap by periodically adding riprap to areas where inspections show that the riprap has become displaced by ice, clogged with debris or eroded material, or otherwise disturbed, so as to restore the area to a continuously armored slope. GE will also replenish the grout infill in slush grouted riprap areas when inspections note significant deterioration. Riprap placement will be specified and directed by the dam safety engineer.

4.2.2 Spillway and Raceway Structures

Sediment Removal – Where observations of conveyances indicate build-up of excess sediment within the conveyances that interferes with the flow of water, that excess sediment will be removed. Handling, management, and disposition of removed sediments and soils are described in Section 4.3.

Raceway Structure Maintenance – GE will exercise the raceway structure controls to ensure that they are properly functioning. This exercise will include removing and re-inserting the stoplogs into the structures and will be performed every four years in conjunction with the biennial Phase 1 inspection/evaluation conducted under low-flow conditions. The stoplogs and grooves will be inspected after stoplog removal for signs of deterioration. Necessary repairs will be completed immediately, and records of the repairs will be kept. Exercising will be conducted in stages to reduce the impact of reservoir discharges. Lower stoplogs are expected to remain in place to reduce the potential for excessive pool lowering and sediment disturbance.

Concrete and Masonry Maintenance – Where observations indicate damage to or deterioration of concrete and/or masonry surfaces, the damaged or deteriorated areas will be repaired. Specifically, GE will: (a) grout and fill any significant cracks that develop or open with time, as soon as they become evident; and (b) replace and repoint loosened blocks or significant mortar loss in the training walls. Concrete and masonry maintenance and repairs will be specified and directed by the dam safety engineer.

Metal Component Maintenance – Periodic maintenance will be performed on all exposed metal that is submerged or exposed to air if determined to be necessary by GE's dam safety engineer based on the amount of corrosion observed during monitoring activities. In addition, GE will ensure the integrity of all contact surfaces between concrete and metal and, where necessary, re-grout those surfaces to preclude the build-up of water in the interface. Metal components may require sandblasting and applications of corrosion inhibitors to preclude the build-up of rust; such actions will be performed when recommended by the dam safety engineer.

4.2.3 Other

Instrumentation Repair – The instrumentation installed at the Dam will be maintained and repaired, as necessary, such that it can serve its intended purpose. Potential damage to the instrumentation could include missing, damaged, or faded staff gage numbering, damage to the observation well protective casings, missing locks, broken or chipped PVC riser pipes, excessive sediment/silt accumulation inside the well, other obstructions inside the casing, settlement around the well, or other unusual conditions or vandalism. Repairs to the instrumentation will be discussed with the dam safety engineer.

Security Item Repair – Where observations indicate a need for repair of the chain-link fence, gates, fence fabric, locks, chains, warning buoys, and/or platform railing, such repairs will be made.

Signage – GE will maintain warning signs that have been installed at and near Woods Pond Dam. In the event that the visual inspections indicate that the posted signs are not in place or intact or that other sign repair or replacement activities are needed, the necessary sign repair or replacement activities will be conducted as part of the regularly scheduled maintenance program.

Other Repairs or Dam Upgrades – In the event that the inspections indicate the need for other repairs or dam upgrades not identified above, those repairs or upgrades will be made in consultation with the 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 Woods Pond Dam involve the handling, management, and/or disposition of sediments in Woods Pond or of soils adjacent to the dam, GE will take steps to ensure that those materials are properly handled, managed, and disposed of. In the event that such activities are planned, GE will develop and submit to EPA a plan that includes the following:

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 sediments/soils removed during such activities 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.

In the event that GE should wish to re-use some of all of the removed materials on-site, it will provide a specific proposal to EPA for approval, describing the sediments/soils proposed for re-use, the chemical and physical characteristics of those materials, the volume of those materials, the locations and depths for the proposed re-use, and other relevant information.

5.0 EMERGENCY RESPONSE

For the purposes of this OM&M Plan, an emergency is defined as a failure or other condition at Woods Pond Dam that results in an impending or actual sudden, uncontrolled release of water. Response procedures that will be followed in the event of such an emergency are presented in the EAP, the current version of which is provided in **Appendix B**.

6.0 TRAINING

All monitoring activities described in Section 3.0 of this OM&M Plan will be conducted by or performed under the supervision of GE's lead dam safety engineer (see Section 1.3.2), who is a licensed Professional Engineer experienced with dam safety practice and regulations. GE's dam safety engineer is familiar with this OM&M Plan. Beyond maintaining professional licensure and experience in dam safety practice and regulations, no job-specific training is required of GE's dam safety engineer at this time.

GE's contractor is a licensed general contractor experienced with maintaining and repairing dams and is familiar with this OM&M Plan. GE's contractor maintains close communication with GE's dam safety engineer. Beyond maintaining licensure, experience with maintaining and repairing dams, and maintaining communication with GE's dam safety engineer, no job-specific training is required of GE's contractor at this time.

7.0 RECORD-KEEPING AND REPORTING

7.1 RECORD-KEEPING

GE will maintain a file containing all project records discussed in this OM&M Plan including inspection reports, survey files, instrumentation data, maintenance/repair records, EAP updates, and relevant correspondence related to dam safety.

7.2 REPORTING

Quarterly maintenance inspection reports will be submitted to EPA within 30 days after the completion of each quarterly inspection. This timeline will also be followed for the post-storm and post-earthquake inspection reports.

Biennial Engineering Phase 1 Inspection/Evaluation Reports will be submitted to EPA and to MassDCR within 90 days after the completion of the Phase 1 inspection.

Updates to the topographic and bathymetric surveys will be provided to EPA and to MassDCR within 90 days after the completion of the surveys.

Routine and other maintenance activities will be documented in the appropriate visual inspection reports (e.g., quarterly, Phase 1, etc.).

Annual updates to the EAP will be provided to the entities on the distribution list in the EAP, including EPA and the MassDCR. These updates will typically be provided near the end of the calendar year.

In addition, GE will, at a minimum, submit a revised version of this OM&M Plan to EPA and the MassDCR every five years, as well as after any major repairs to or incidents affecting the Dam.

Further reporting to EPA will be on an as-needed basis.

8.0 SCHEDULE

The schedule of activities described in this OM&M Plan is summarized in the following table.

Inspection and Maintenance Summary

Inspection	Frequency
Maintenance Inspections	Quarterly (four times per year)
Engineering Phase 1 Inspection/Evaluations	Biennial (every two years), alternating between normal-flow and low-flow conditions
Ice Out	Annual (in conjunction with the second quarterly inspection)
Post-Storm	After high-flow events (1,500 cfs at Coltsville or 3,650 cfs at Great Barrington) (possibly in conjunction with a quarterly inspection, depending on timing); limited observations during high-flow events
Post-Earthquake	After an earthquake with reported damage in Berkshire County
Topographic and Bathymetric Surveys (including potential scour hole at downstream toe of spillway)	Every five years

Monitoring	Frequency
Headwater and Tailwater	Quarterly
Groundwater Levels	Quarterly
Concrete and Masonry	Quarterly
Metal Components	Quarterly

Maintenance Type	Frequency
Vegetative/Grass Cutting	Whenever grass reaches maximum height of 12 inches (typically prior to a growing season quarterly inspection)
Other Brush/Woody Vegetation Removal	As needed
Spillway and Raceway Structure Cleaning	As needed to maintain free flow of water over or through the discharge structures
Repair of Sparse Vegetation & Erosion	Per Section 4.2.1
Tree Removal	Per Section 4.2.1
Rodent Damage Control	Per Section 4.2.1
Slope Traffic Damage Control	Per Section 4.2.1
Seepage Damage Control	Per Section 4.2.1
Riprap Damage Control	Per Section 4.2.1
Sediment Removal from Conveyances	Per Section 4.2.2
Raceway Structure Testing & Maintenance	Every four years (in conjunction with the biennial Phase 1 inspection/evaluation under low-flow conditions)
Concrete and Masonry Maintenance	Per Section 4.2.2
Metal Component Maintenance	Per Section 4.2.2
Instrument Maintenance	Per Section 4.2.3
Security Item Maintenance	Per Section 4.2.3
Signage	Per Section 4.2.3
Other	Per Section 4.2.3

9.0 REFERENCES

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

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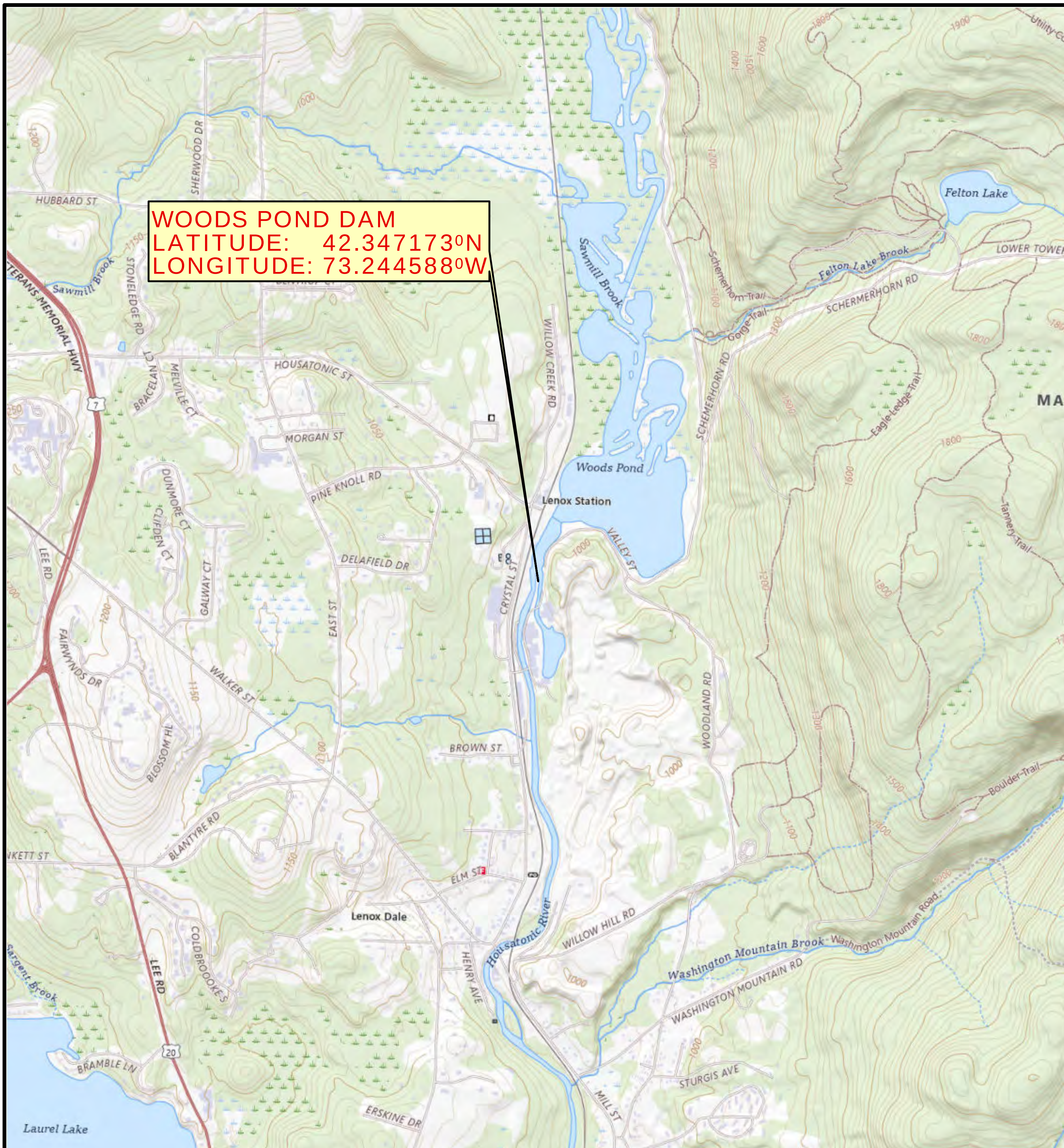
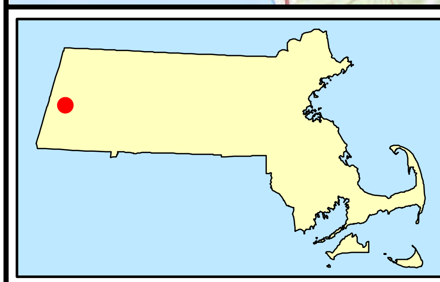
FIGURES





SOURCE : THIS MAP CONTAINS THE USGS NATIONAL TOPOGRAPHIC MAP SERVICE: NATIONAL BOUNDARIES DATASET, 3DEP ELEVATION PROGRAM, GEOGRAPHIC NAMES INFORMATION SYSTREM, NATIONAL HYDROGRAPHY DATASET, NATIONAL LAND COVER DATABASE, NATIONAL STRUCTURES DATASET AND NATIONAL TRANSPORTATION DATASET; USGS GLOBAL ECOSYSTEMS; US CENSUS BUREAU TIGER/LINE DATA; USFS ROAD DATA; NATURAL EARTH DATA; U.S. DEPARTMENT OF STATE HUMANITARIAN INFORMATION UNIT; AND NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION, U.S. COASTAL RELIEF MODEL. DATA REFRESHED APRIL, 2023.

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SCALE IN FEET

Data Supplied by :

esri USGS

N W E S

GZA

PROJ. MGR.: SDK
DESIGNED BY: SDK
REVIEWED BY: JDA
OPERATOR: AJP

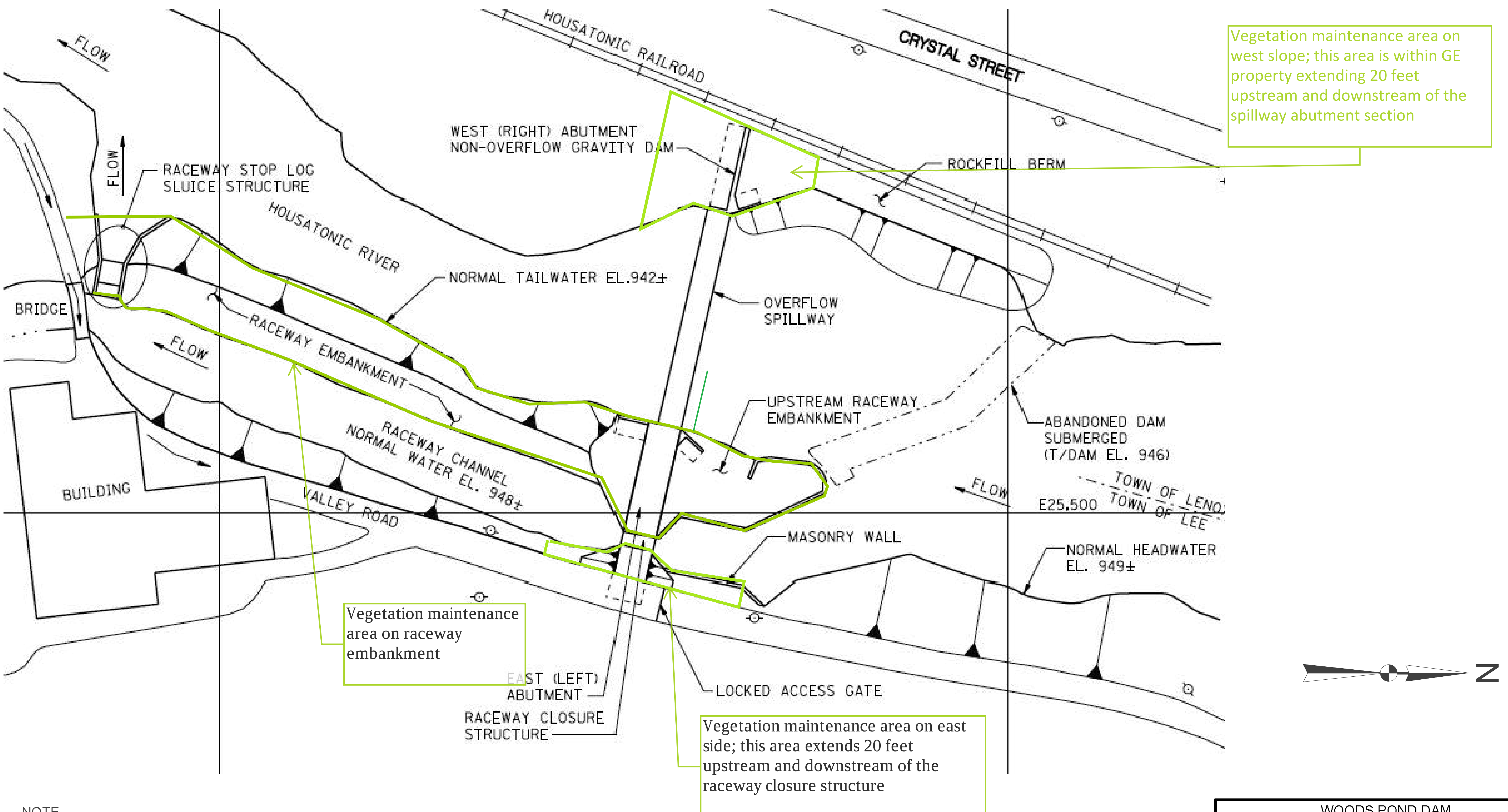
DATE: 07-22-2024

LOCUS PLAN

WOODS POND DAM
LEE / LENOX, MASSACHUSETTS

JOB NO.
01.0019896.50

FIGURE NO.
1



NOTE

1. BASE PLAN TAKEN FROM A PLAN TITLED "SITE PLAN" DATED OCTOBER 2001 AND PREPARED BY MWH AS PART OF A REPORT TITLED "EMERGENCY ACTION PLAN FOR WOODS POND DAM", UPDATED JULY 2008.

WOODS POND DAM
PHASE I VISUAL INSPECTION

LEE AND LENOX, MASSACHUSETTS

SITE PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists, 249 VANDERBILT AVENUE, NORWOOD, MA 02062, 781-278-3700

PREPARED FOR: GENERAL ELECTRIC COMPANY

PROJ MGR: JDA	REVIEWED BY: ABB	CHECKED BY: JDA	FIGURE
DESIGNED BY: LAG	DRAWN BY: LAG	SCALE: NTS	2
DATE: MARCH 2017	PROJECT NO. 19896.30	REVISION NO.	SHEET NO. 1-OF-1

APPENDIX 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.

NWPS – National Water Prediction Service (formerly Advanced Hydrologic Prediction Service or AHPS) – a website showing Housatonic River flows and river stage at United States Geological Survey (USGS) Gage No. 01197000 at Coltsville and USGS 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).

APPENDIX B – EMERGENCY ACTION PLAN

EMERGENCY ACTION PLAN
Woods Pond Dam

Updated December 2024 (Rev. 6)

LEE/LENOX, MASSACHUSETTS
NID # MA00731

PREPARED FOR:
GENERAL ELECTRIC COMPANY

***PREPARED BY*:**
GZA GEOENVIRONMENTAL, INC.
Norwood, Massachusetts
GZA File No.01.00019896.80

Dam Failure EAP-Controlled Copy Distribution:

Copy#	Rev#	Rev. Date	LOCATION	Accessible to:
1	6	12/2024	General Electric Company Global Operations, Environment, Health & Safety 1 Plastics Avenue Pittsfield, Massachusetts 01201	Dam Caretaker/Alternate Caretaker
2	6	12/2024	Town of Lenox Police 6 Walker Street Lenox, Massachusetts 01240	Chief of Police, Emergency Response Personnel
3	6	12/2024	Town of Lee Police 32 Main Street Lee, Massachusetts 01238	Chief of Police, Emergency Response Personnel
4	6	12/2024	Town of Stockbridge Emergency Management 50 Main Street / PO Box 417 Stockbridge, Massachusetts 01262-0417	Chief of Police, Emergency Response Personnel
5	6	12/2024	Massachusetts Emergency Management Agency 400 Worcester Road (Route 9 East) Framingham, Massachusetts 01702-5399	Response and Field Services Section Chief
6	6	12/2024	Massachusetts DCR – Office of Dam Safety 180 Beaman Street, West Boylston, Massachusetts 01583	Chief of Staff
7	6	12/2024	GZA GeoEnvironmental, Inc. 249 Vanderbilt Ave Norwood, Massachusetts 02062	Consulting Dam Safety Engineer & Support Staff

When these copies are revised, the revised sections should be forwarded to the above locations by the **Responsible Individual** for replacement.

Document Control: The **Responsible Individual** will oversee the document control system. When sections of Dam Failure EAP are revised, all pertinent information and authorizations are managed in terms of notifications and distribution.

*** Responsible Individual**: is the person responsible for managing and overseeing the revisions and updates to this document. The Caretaker will be the Responsible Individual for this document.

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1.0 SUMMARY OF EMERGENCY ACTION PLAN RESPONSIBILITIES

This Emergency Action Plan (EAP) for the Woods Pond Dam addresses the roles and responsibilities of the General Electric Company (GE) (the Dam owner), the Towns of Lenox and Lee, Massachusetts, and other entities for potential and actual emergency conditions at the Dam. This section provides a brief overview of the critical EAP responsibilities of those entities.

Ultimately, the Town of Lenox Fire Chief and the Town of Lee Police Chief will act as joint Incident Commanders in the event of an emergency at Woods Pond Dam. The following is a brief summary of critical responsibilities. An expanded discussion of roles and responsibilities is included in **Section 6.0.**

Dam Owner/ Operator - General Electric Company:

- Activate appropriate notifications in accordance with the Notification Flowchart in **Section 2.0** of this EAP.
- Request assistance, as needed.
- Receive condition status reports and share with the Incident Commanders and emergency responders.
- Provide updates to Massachusetts Department of Conservation and Recreation (MassDCR) Office of Dam Safety (ODS).

Towns of Lenox and Lee Police Department, Fire Department, and Emergency Management:

- Activate appropriate notifications in accordance with the Notification Flowchart in **Section 2.0** of this EAP.
- Verify and assess emergency conditions.
- Determine the level of the emergency (e.g., Condition A, Condition B, etc., as described in **Section 5.3**).
- Activate the Lenox and Lee Emergency Operations Centers (EOCs).
- Take corrective action at the Dam (for Condition B and Non-Emergency Condition).
- Order evacuation of response personnel from the potential hazard area at the Dam (for Condition A).
- Receive condition status reports from GE, the Massachusetts Emergency Management Agency (MEMA), and other on-site personnel.
- Notify the downstream public.
- Conduct evacuation from inundation areas within Town limits.
- Declare termination of the emergency at the Dam.

The following agencies will support the Towns of Lenox and Lee and emergency responders by providing personnel and equipment (as requested by the Incident Commanders and as available):

- MEMA
- Massachusetts State Police (Troop B-1 Lee, MA)
- Berkshire County Sheriff

2.0 NOTIFICATION FLOWCHART

2.1 INTRODUCTION

Emergency situations are herein defined as conditions at Woods Pond Dam which have or could potentially lead to a sudden, uncontrolled release of water. **Figure 1 - Notification Flowchart**, attached to the end of this section, summarizes the key operational, governmental, and public safety personnel to be notified in the event of an emergency condition at the Woods Pond Dam. The objective of this flowchart is to outline clear, concise, and concurrent notifications. The organization of the flowchart is based on review of existing communication networks and discussions with the Towns of Lenox, Lee, and Stockbridge and Commonwealth of Massachusetts personnel. The flowchart shows the contact information for Emergency Conditions A and B, as described in **Section 5.0**. The contact procedures show will not be necessary for Non-Emergency Conditions or Non-Failure Emergency Conditions, as also described in **Section 5.0**.

2.2 LIMITATIONS

The **Figure 1 - Notification Flowchart** should be considered a "top-down" system for initial notifications. Other means and avenues of communication between and among key local and state emergency personnel that may develop may not be specifically depicted in the referenced flow chart as an emergency progresses. Also, as the emergency condition intensifies, normal telephone lines and some two-way radio frequencies may be overloaded or otherwise unavailable.

The Notification Flowchart is to be used as a guide during an emergency condition. For clarity and brevity, not all possible emergency phone numbers have been shown. However, additional names and notification information of persons are provided in the Contact Lists in **Tables 1 through 7**. Each notification "cell" on the flowchart may have its own subset of emergency numbers and procedures.

This EAP does not suggest that GE personnel take over the established responsibilities of other governmental and institutional elements (such as the police, fire and emergency management departments in the downstream communities) to enact their own emergency preparedness plans and to evacuate people.

However, the flowchart and outlined duties and responsibilities described herein provide a means for initial notification. It is assumed that state public safety entities and local police departments in potentially affected downstream communities will activate their own specific procedures for evacuation, sheltering, and mobilization of resources, once the initial warning is provided.

- The Notification Flowchart relies heavily on the use of the dispatch/call centers of the Towns of Lenox and Lee.
- Massachusetts State Police Barracks B-1/Lee Dispatch is the local State Police dispatch center and is located at 215 Laurel Street (Route 20) in Lee, MA.
- The Town of Lenox dispatches emergency personnel from the Berkshire County Sheriff's Communication center, which is located at 467 Cheshire Road in Pittsfield, MA.
- The Town of Lee dispatches emergency personnel from the Berkshire County Sheriff's Communication Center, which is located at 467 Cheshire Road in Pittsfield, MA.

- The Town of Stockbridge Emergency Dispatch Center is the dispatch center for the town and is located at 50 Main Street in Stockbridge, MA.

All dispatch centers are staffed 24 hours a day, 7 days a week and are responsible for contacting the Lenox and Lee Emergency Management, Police, and Fire Departments, the Department of Public Works (DPW) contact, and the specified government official for their respective towns. The Towns of Lenox, Lee, and Stockbridge are responsible for providing warning messages to their own residents.

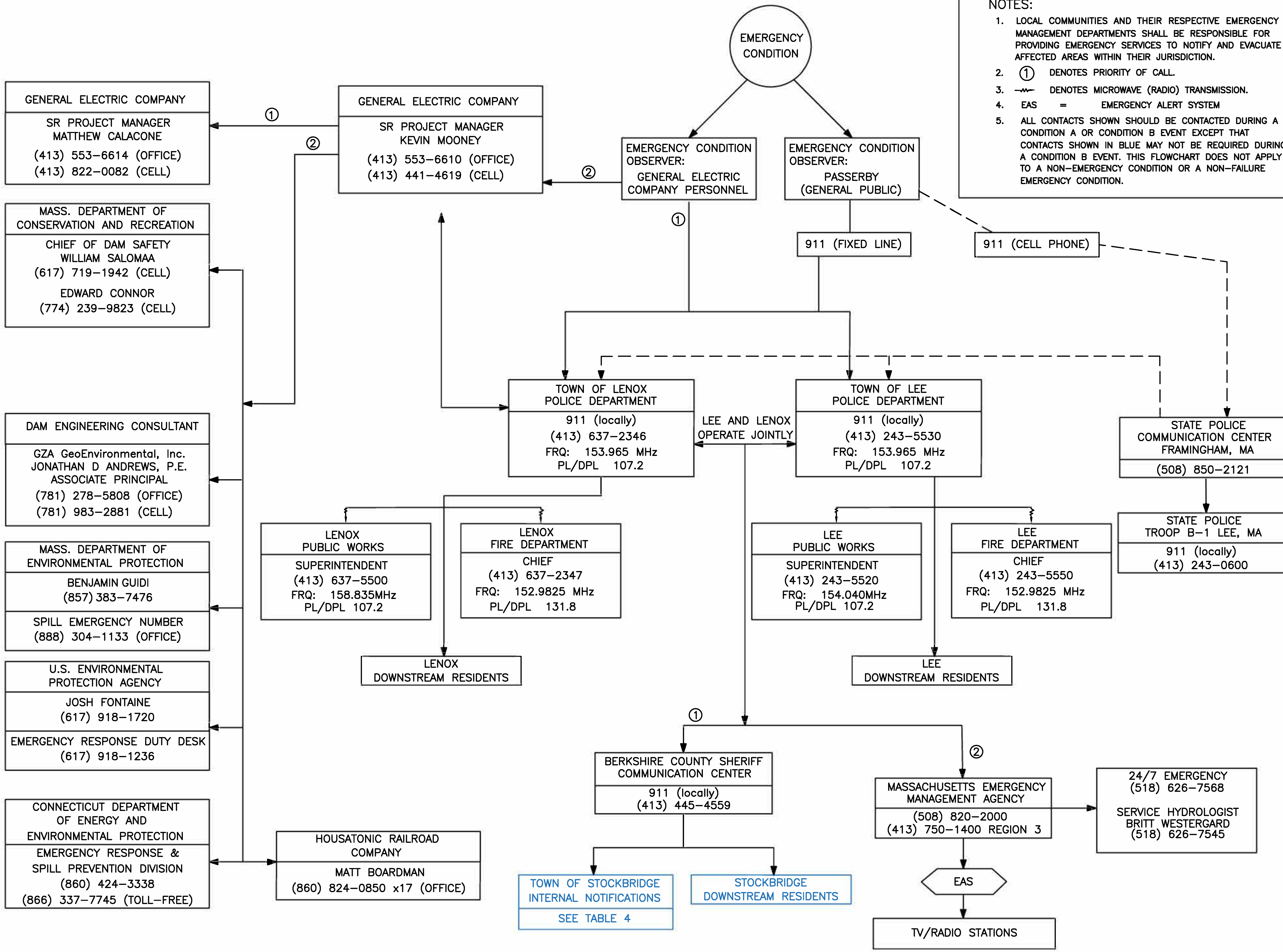
2.3 SUPPLEMENTAL EMERGENCY CONTACT LISTS

Tables 1 through 7 provide detailed Alert Lists which present names, position, title, telephone number, etc. for the following entities:

Table 1	General Electric Company Contact List
Table 2	Town of Lee Community Alert List
Table 3	Town of Lenox Community Alert List
Table 4	Town of Stockbridge Community Alert List
Table 5	State Agency Alert List
Table 6	Major Utilities List
Table 7	Emergency Response Contractor List

These lists are considered to be a supplement to the information provided on **Figure 1 - Notification Flowchart**. The telephone numbers provided are often listed numbers. Some numbers are serviced 24 hours or have a call forwarding capability. However, as the emergency condition intensifies, all listed telephone lines may be in use with incoming calls and thus be unavailable.

Table 6 lists major utilities within the potential downstream impact area and includes telephone numbers for the applicable utility companies. The table has been provided for general reference purposes and is not intended to be an all-inclusive list. Primary responsibility for notifying key utilities, rail lines, etc. will rest with the individual community public safety agencies.



NOTES:

1. LOCAL COMMUNITIES AND THEIR RESPECTIVE EMERGENCY MANAGEMENT DEPARTMENTS SHALL BE RESPONSIBLE FOR PROVIDING EMERGENCY SERVICES TO NOTIFY AND EVACUATE AFFECTED AREAS WITHIN THEIR JURISDICTION.
2. ① DENOTES PRIORITY OF CALL.
3. —⁓— DENOTES MICROWAVE (RADIO) TRANSMISSION.
4. EAS = EMERGENCY ALERT SYSTEM
5. ALL CONTACTS SHOWN SHOULD BE CONTACTED DURING A CONDITION A OR CONDITION B EVENT EXCEPT THAT CONTACTS SHOWN IN BLUE MAY NOT BE REQUIRED DURING A CONDITION B EVENT. THIS FLOWCHART DOES NOT APPLY TO A NON-EMERGENCY CONDITION OR A NON-FAILURE EMERGENCY CONDITION.

WOODS POND DAM EMERGENCY ACTION PLAN

GENERAL ELECTRIC COMPANY
LENOX/LEE

NOTIFICATION FLOWCHART

PROJ MGR: SDK
DESIGNED BY: SK
REVIEWED BY: SDK
OPERATOR: SC
DATE : OCTOBER 2024

GZA GeoEnvironmental, Inc.
249 VANDERBILT AVENUE DRIVE
NORWOOD, MA 02062
Ph.: (781) 278-3700
Fax: (781) 278-5701

PROJECT NO. 19896.80
FIGURE NO. 1

3.0 STATEMENT OF PURPOSE AND SCOPE

3.1 STATEMENT OF PURPOSE

The EAP defines responsibilities and provides procedures designed to identify unusual and unlikely conditions which may endanger the Woods Pond Dam in time to take mitigative action and to notify the appropriate emergency management officials of possible, impending, or actual failure of the Dam.

This EAP is a management document intended to be read, understood, annually tested, and updated before an emergency condition occurs. It is designed to outline the activities of GE, the Towns of Lenox and Lee, and other local and state emergency management officials within the framework of existing, in-place emergency management systems. It provides the planning basis for emergency detection, evaluation and classification; notification; evacuation; security, termination and follow-up; and preparedness.

3.2 SCOPE

The EAP sets forth basic procedures, duties, and responsibilities to be implemented by the Towns of Lenox and Lee and the GE (owner and operator of the Dam) and other key operational and public safety personnel in the event of an emergency condition at the Woods Pond Dam.

An "emergency," for the purposes of this EAP, is defined as an impending or actual sudden uncontrolled release of water caused by a failure of the Dam.

The major focus of the EAP is the description of the area of inundation resulting from a hypothetical Dam break flood, and the development of a detailed notification plan that describes responsibilities to warn key operational personnel, local public safety agencies, state law enforcement, and emergency management agencies in the path of an anticipated Dam break flood wave. The EAP also provides preparedness steps.

As indicated above, the overall contents of this EAP, including recommendations describing organization and duties, are not intended for GE personnel to take over the responsibilities of the state and other local governmental entities. Rather, the EAP has been developed to be integrated within the framework of existing emergency preparedness plans. During the development of this EAP, GE and its dam safety engineering consulting firm, GZA GeoEnvironmental, Inc. (GZA), have coordinated with the Towns of Lenox, Lee, and Stockbridge, and other emergency preparedness personnel. The following public agencies will be directly involved in the event of the activation of this EAP:

- Town of Lenox
- Town of Lee
- Town of Stockbridge
- Massachusetts State Police
- Massachusetts Emergency Management Agency (MEMA)
- MassDCR ODS
- United States Army Corps of Engineers

This updated EAP was prepared to conform with the MassDCR requirement that the EAP format be consistent with the "Federal Guidelines for Dam Safety: *Emergency Action Planning for Dam Owners* (FEMA 64)," dated July 2013. The scope and format of this EAP generally conform to the FEMA guidelines. The dam break scenario is consistent with Massachusetts simplified dam breach standards for significant hazard dams as specified in 302 CMR 10 Dam Safety 10.11(2). Results of dam break analyses performed by GZA in 2024 are included in **Attachment A**. Inundation maps based on the dam break analyses are discussed in **Section 8.0** and included in **Attachment E**. GE's plans for training of GE personnel and personnel from the Towns of Lenox, Lee, and Stockbridge for implementation of this EAP in the event of an emergency at Woods Pond Dam, along with the requirements for updating this EAP and posting the above-reference Notification Flowchart, are provided in **Attachment B**.

4.0 PROJECT DESCRIPTION

4.1 LOCATION

Woods Pond Dam (the "Dam") is located in on the border of Lenox and Lee in Berkshire County, Massachusetts. The Dam is located perpendicular to Valley Street and Crystal Street near the Housatonic Street crossing. The Dam impounds water from Housatonic River creating Woods Pond. Its general location is shown on **Figure 2**. The Dam is at the longitude and latitude coordinates:

Latitude: 42.347173°N Longitude: 73.244588°W

4.2 OWNER/OPERATOR

The Woods Pond Dam is owned, operated, and maintained by GE. The current caretaker is Kevin Mooney, and the alternate caretaker is Matthew Calacone, both located at the address below.

Dam Owner/Caretaker	
Name Mailing Address Town	General Electric Company GE Aerospace 1 Plastics Avenue Pittsfield, MA 01201
Daytime Phone Emergency Phone	(413) 448-6610 (Caretaker) (413) 553-6614 (Alternate Caretaker) (413) 441-4619 (Caretaker Cell Phone)

4.3 PURPOSE OF THE DAM

There have been two dams impounding Woods Pond at this location. The original Woods Pond Dam was a timber crib dam built between 1876 and 1882. It was located about 80 to 250 feet upstream of the current Dam. The purpose of the original dam was to divert water to an adjacent mill. The purpose of the current Dam (circa 1989) is to impound Woods Pond reservoir, including impounding existing sediments that are impacted by polychlorinated biphenyls.

4.4 DESCRIPTION OF THE DAM AND APPURTENANCES

The engineering data presented below are based on available information in previous reports prepared by or on behalf of GE.

Woods Pond Dam is a run-of-the-river structure consisting of the following (moving from right/west to left/east) a concrete section as the right abutment, a primary spillway, sheetpile cells filled with concrete as the left abutment section, and a raceway closure structure which controls flow into the raceway channel. Additionally, a raceway embankment extends both upstream and downstream of the left abutment cellular sheetpiles. Outflow at the downstream end of the raceway channel is controlled by the raceway stoplog sluice structure. The raceway channel is no longer used to feed the downstream mill, and the raceway embankment no longer impounds the reservoir or serves a functional role in the current Dam. An aerial photograph of the Dam and its appurtenances is shown below.

Source: GZA ArcGIS Mapper Tool

The right abutment section is a concrete gravity structure that extends approximately 60 feet between the railroad tracks and the spillway with a top elevation of 954.0 feet. The right abutment section is referred to as the non-overflow gravity section on the record drawings. Although this structure is termed "non-overflow," the right abutment section of the Dam is designed to overflow during the applicable Spillway Design Flood (SDF).

The spillway is an uncontrolled, ogee-shaped concrete weir with a top elevation between 948.2 and 948.4 feet. The spillway is approximately 140 feet long.

The left abutment section extends approximately 60 feet between the spillway and the raceway closure structure and consists of steel sheetpile cells filled and capped with concrete. The sheetpiles were driven to bedrock during construction. The top elevation of the left abutment section is 954.0 feet and it is about 21 feet wide. Similar to the right abutment section, the left abutment section is designed to overflow during the applicable SDF.

The raceway closure structure is located on the left side of the Dam between the left abutment and riverbank. It is a formed concrete control structure that can hold up to five two-foot-high steel and concrete stoplogs that are lifted into place using a gantry crane and hoist. The stoplogs are used to control flow into the raceway channel that extends parallel to the river downstream of the Dam for approximately 350 feet. A one-inch spacer is typically located between the second and third stoplogs at about elevation of 948.0 feet to provide flow into the raceway channel to mitigate downstream water stagnation.

The raceway embankment extends parallel to the river for approximately 450 feet, extending both upstream and downstream of the Dam's left abutment section. Although structurally connected to the current Dam, the raceway embankment serves no functional role in the current Dam and no longer impounds the reservoir. The upstream section is the left abutment of the previous upstream dam. The right (river) embankment slopes are protected by grouted riprap and the left side has vertical stone masonry walls that line the raceway channel upstream of the raceway closure structure. The downstream section forms the 350-foot boundary between the raceway channel and the river. Immediately downstream of the left abutment, the raceway embankment slopes are protected by grouted riprap on both sides of the embankment for approximately 25 feet. The remainder the raceway embankment slopes are surfaced with riprap. The raceway embankment ends at the downstream raceway channel outlet (raceway stoplog sluice structure).

The downstream outlet of the raceway channel is a controlled concrete and masonry structure referred to as the raceway stoplog sluice structure. The purpose of the raceway stoplog sluice structure is to control water levels in the raceway channel and in the downstream Valley Mill Pond. The controls consist of up to seven 14-inch-high steel stoplogs. A truck-mounted crane can be mobilized to install and remove the stoplog controls. Three of the stoplogs are typically left in place to maintain the raceway and Valley Mill Pond level between the Woods Pond impoundment and river tailwater levels.

Instrumentation at the Dam consists of a staff gage on the right upstream training wall. An additional staff gage is located at the downstream raceway stoplog sluice structure. Downstream raceway embankment instrumentation consists of three open standpipe observation wells (historically referred to as piezometers). These wells are labeled (from downstream to upstream) B-1, B-2, and B-3. GE is in the process of installing automated pond water sampling equipment at the right and left training walls. The sampling equipment serves no dam-related function.

At EPA's direction, GE installed warning signs at Woods Pond Dam in November and December of 2020, with the format, wording, and locations of those signs approved by EPA.

Certain site-specific concerns relating to the Dam are described in **Attachment C**.

4.5 OPERATIONS AND MAINTENANCE

The Dam is operated and maintained by GE and is subject to GE's revised Operation, Monitoring, and Maintenance (OM&M) Plan for Woods Pond Dam (dated December 2024). GE maintains files on the Woods Pond Dam, including plans, inspection reports and results of investigations, at its office at 1 Plastics Avenue, Pittsfield, Massachusetts 01201. In accordance with the revised OM&M Plan for this Dam, GE or its contractor conducts routine quarterly inspections of the Dam, and a qualified and registered Professional Engineer with experience in dam safety conducts Engineering Phase 1 Inspections/Evaluations of the Dam on a biennial (every two years) basis. GE or its contractor mows grass and removes debris from the spillway regularly and conducts maintenance activities and minor repairs as described in the OM&M Plan for this Dam. Warning buoys are deployed upstream of the spillway and warning signs are installed around the property at Woods Pond Dam.

4.6 DCR SIZE CLASSIFICATION

Woods Pond Dam has a height of approximately 17.6 feet and a maximum storage capacity of 5,300 acre-feet. In accordance with the classification procedures of the Mass DCR ODS, under the Massachusetts dam safety regulations in 302 CMR 10.00, Woods Pond Dam is a **Large** size structure based on maximum storage above 1,000 acre-feet.

4.7 DCR HAZARD CLASSIFICATION

In accordance with MassDCR ODS classification procedures, under Commonwealth of Massachusetts dam safety regulations stated in 302 CMR 10.00, Woods Pond Dam is classified as a dam with **Significant Hazard** potential. This hazard class assessment is consistent with the hazard class for the dam on record with the MassDCR ODS.

5.0 EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION

5.1 EMERGENCY DETECTION

This section describes the detection of an unusual or emergency event at the Dam and provides information to assist the Towns of Lenox and Lee in determining the appropriate emergency level for the event.

Unusual or emergency events may be detected by:

- Observations at or near the Dam by government personnel (local, state, or federal), landowners, visitors to the Dam, or the public;
- Earthquakes felt or reported in the vicinity of the Dam; or
- Forewarning of weather conditions that may cause an unusual event or emergency event at the Dam (for example, a severe weather or flash flood forecast).

5.2 EMERGENCY EVALUATION

The Incident Commanders (Lenox Fire Chief and Lee Police Chief) will coordinate with the Caretaker (GE), Lenox and Lee DPWs, and a registered professional dam safety engineer to evaluate the severity of the observed dam safety issue. Incident Commanders from Lenox and Lee will coordinate activities due to the Dam's location on the border between the two towns. The Towns of Lenox and Lee also have a mutual aid agreement.

5.3 EMERGENCY CLASSIFICATION

After an unusual or emergency event is detected or reported and evaluated, the Incident Commander is responsible for classifying the event into one of the following four conditions.

1. Condition A: Urgent; dam failure appears imminent or has occurred. This is an extremely urgent situation when a dam failure is occurring or obviously is about to occur and cannot be prevented. Flash flooding will occur downstream of the dam.

2. Condition B: Potential dam failure situation, rapidly developing. This situation may eventually lead to dam failure and flash flooding downstream, but there is not an immediate threat of dam failure. Time available to employ remedial actions may be hours or days.

3. Non-Emergency Condition: Unusual event, slowly developing. This situation is not normal (e.g. an increased amount of seepage) but has not yet threatened the operation or structural integrity of the dam. If this situation worsens it could threaten the integrity of the dam.

4. Non-Failure Emergency Condition: No danger of dam failure, only flooding concerns. Generally, this situation indicates that there is no sign of pending or imminent dam failure. This Condition is only used when there are flooding concerns caused by high reservoir/river/flow conditions are such that flooding is expected to occur downstream of the dam.

Examples of different situations that could occur at the Dam and the corresponding emergency condition are presented in **Table 8**. Expanded descriptions of the observed conditions, including guidance on response actions, are included in **Table 9** and **Attachment D**. Refer also to **Attachment F** for examples of general conditions that could lead to dam failure.[1]

[1] Texas Commission on Environmental Quality, "Guidelines for Operation and Maintenance of Dams in Texas," Publication No. GI-357, November 2006.

6.0 GENERAL RESPONSIBILITIES UNDER THE EMERGENCY ACTION PLAN

6.1 DAM OWNER RESPONSIBILITIES

As owner, GE has overall responsibility for care and maintenance of Woods Pond Dam. The following duties and responsibilities are assigned to on-site personnel for the five phases of emergency response. Within the context of the EAP, GE's duties and responsibilities include the following:

1. Condition A: Failure of the Woods Pond Dam is imminent or has occurred

   Once the Incident Commanders have determined that there is no longer any time available to safely attempt corrective measures to prevent failure, the "failure is imminent or has occurred" warning should be issued. Responsibilities of GE include:

   - Initiate the notification procedures for Condition A. Refer to **Section 5.3** and **Figure 1 – Notification Flowchart** (in **Section 2.0**).
   - Continuously update the Incident Commanders and emergency responders on the emergency situation.
   - Provide periodic updates to DCR Office of Dam Safety as to condition of affected area, pool level, and discharge through any breach.

2. Condition B: A failure situation at Woods Pond Dam may be developing

   Under this scenario, it is assumed that some time is available for further analyses/decisions to be made before dam failure is considered to be imminent. Dam failure may eventually occur but preplanned actions may avert or mitigate a full dam failure. Responsibilities of GE include:

   - Initiate notification procedures for Condition B. Refer to **Section 5.3** and **Figure 1 – Notification Flowchart** (in **Section 2.0**).
   - Continuously update the Incident Commanders on the emergency situation to mobilize staff to the affected area to institute emergency repair procedures (if time and safety considerations permit).
   - Contact GE's consulting dam safety engineer for repair guidance.
   - Provide periodic situation reports/emergency messages concerning ongoing repair efforts to DCR Office of Dam Safety as outlined in **Figure 1 - Notification Flowchart**. Also provide periodic updates to the Towns of Lenox, Lee, and Stockbridge through the Lenox and Lee Emergency Dispatch Centers.

3. Non-Emergency, Unusual Event, Slowly Developing Condition

   During an unusual, non-emergency condition, the situation is abnormal but has not yet threatened the integrity of the Dam. GE is responsible for monitoring the situation and for providing updates to the

Incident Commanders. GE will seek guidance from a qualified dam safety engineer and from the DCR Office of Dam Safety, as necessary.
Note that not all responsibilities of GE are listed above. Where duties fall into other specific categories (such as responsibilities for the Town of Lenox and Lee or responsibilities for termination and follow-up, etc.) these duties are discussed separately in **Sections 6.2, 6.3, 6.4,** and **6.5**.

4. Non-Failure Emergency Condition

   During a non-failure emergency condition, flooding is expected to occur downstream but there is little danger of dam failure. GE is responsible for performing a post-event assessment of Woods Pond Dam to determine if the dam has been damaged.

6.2 RESPONSIBILITY FOR NOTIFICATION

It is assumed that an emergency situation at Woods Pond Dam will be identified prior to complete structural failure. Although reaction time prior to complete failure may be limited, it is assumed that notification procedures can be initiated at the Lenox or Lee Emergency Dispatch Center, depending upon the source of initial notification and the condition of the emergency.

Condition A calls for **immediate evacuation** and therefore notification priorities are given to the downstream communities of Lenox, Lee, and Stockbridge.

Condition B allows for some evaluation of the condition by GE, with the Towns of Lenox and Lee, prior to notification of the downstream community of Stockbridge.

The likely mode of initial identification of the emergency condition will be from a passer-by (i.e. Observer – General Public).

If the initial observation of an emergency is made by a GE employee or contractor, then he or she will report the situation to the GE Dam Caretaker and the 911 dispatch center for the State Police. The State Police will then contact both Lenox and Lee Emergency Dispatch Centers.

The Lenox Dispatch Center's first contact will be to Lenox Emergency Management, which is in turn is responsible for providing notification to the emergency responders in Lenox: Police, Fire, and Highway Departments, Board of Selectmen, and Town Manager.

The Lee Dispatch Center's first contact will be to Lee Emergency Management, which is in turn is responsible for providing notification to the emergency responders in Lee: Police, Fire, and Highway Departments, Board of Selectmen, and Town Manager.

The Towns of Lenox and Lee will work as one operative unit during an emergency at Woods Pond Dam due to the Dam's location on their border and their mutual aid agreement. The Lenox or Lee Dispatch Center will contact the Berkshire Sheriff's Office in Pittsfield and then Massachusetts Emergency Management Agency (MEMA) in Agawam. The Berkshire County Sheriff's Office then will provide notification to the emergency responders in Stockbridge: Emergency Management, Police, and Fire Departments.

If the initial observation is made by the general public, the observer is expected to call 911 from either a cell phone or landline in the Towns of Lenox or Lee. A cell phone call will be directed to State Police, which will route the call to the Lenox or Lee Dispatch Center, depending on the location of the caller. The contacted Dispatch Center is responsible for carrying out the same notification procedures described above for an emergency that is initially observed by a GE employee or contractor. Once the communication reaches the local level, direct communication via radio or cell phone may be the quickest way to communicate amongst the local responders. Major announcements; however, will be distributed through the dispatch centers.

If time allows, GE is responsible for contacting its consulting dam safety engineer and the DCR Office of Dam Safety for advice. GE will also contact the Housatonic Railroad as necessary for access to the right abutment.

The Incident Commander from Lenox or Lee will contact MEMA or the Massachusetts State Police (MSP) if he/she deems that assistance is or may be needed. Assistance can be requested from and updates can be provided to MEMA through the Web Emergency Operations Center (WebEOC). MEMA has the ability to issue flood watches and warnings to the public through the National Weather Service if appropriate. MEMA also has the ability to transmit warning messages to the public over the Emergency Alert System (EAS).

The Notification Flowchart provided in **Section 2.0** summarizes the notification responsibilities listed above; however, individuals listed on the Flowchart may not be available, in which case alternates or designees may be involved in the notification procedures. Alternate contacts and additional phone numbers are listed in the Contact Lists provided in **Tables 1 through 7**. Initial means of notification will likely be made by telephone landlines or cellular telephones. Additional communication systems are listed in **Section 7.6**.

Upon notification of an emergency condition, the Towns of Lenox, Lee, and Stockbridge are responsible for providing direct warning to their residents via a pre-arranged warning system. A discussion of evacuation responsibilities is included in **Section 6.3**. The Towns of Towns of Lenox, Lee, and Stockbridge will coordinate their responses from their respective Emergency Operations Centers (EOCs).

Preparation of warning messages should begin as soon as their potential need is apparent, which is likely to be immediately after initial notification. When time is available for preparation, the initial message should contain pertinent information as to the severity of the problem, expected extent and timing of inundation at key population centers, and general instructions concerning evacuation. However, in some cases, an emergency condition may be declared when failure is imminent with little advance notice or time to compose a specific message intended for broadcast. The example messages below provide a model for the initial announcements in those cases. Subsequent announcements should be scripted so to provide additional data as the situation dictates.

<u>Sample Message for Emergency Condition A – Announcement for Major Failure of Woods Pond Dam</u>

In the event of a Condition A emergency, the Incident Commanders or their designees have the authority to issue the following message to the emergency responders from the Towns of Lenox and Lee via telephone or local two-way radio.

Urgent: **THE WOODS POND DAM IN LEE AND LENOX, MASSACHUSETTS HAS FAILED.**

Woods Pond Dam, located on Crystal Street in Lenox and Valley Street in Lee, Massachusetts, is failing. Water from the dam is expected to cause widespread flooding along Route 20 and Route 102 in the towns of Lenox, Lee, and Stockbridge. The downstream area must be evacuated immediately. Repeat, Woods Pond Dam is failing; evacuate the area along low-lying portions of the Housatonic River.

We have activated the emergency action plan for this dam and are currently under emergency Condition A.

Reference the inundation map in your copy of the Emergency Action Plan.

Stay alert for further announcements. Updated information as to river levels, flood arrival times and evacuation efforts will be provided as soon as they are available.

This is an emergency. This is *identify your name and position*.

Sample Message for Emergency Condition B – Announcement for Rapidly Developing Condition at Woods Pond Dam

In the event of a Condition B emergency, the Incident Commanders or their designees have the authority to issue the following message to the emergency responders from the Towns Lenox, Lee, and Stockbridge via telephone or local two-way radio.

Urgent: **The Towns of Lenox and Lee have announced that a potential failure situation is developing at Woods Pond Dam in Lenox and Lee, Massachusetts.**

We have an emergency condition at Woods Pond Dam, located on between Crystal Street in Lenox and Valley Street in Lee, Massachusetts. We have activated the emergency action plan for this dam and are currently under emergency Condition B.

We are implementing pre-determined actions to respond to a rapidly developing situation that could result in dam failure.

Reference the inundation map in your copy of the Emergency Action Plan.

Standby for periodic updates on the repair efforts at the dam and additional guidance on evacuate. We will advise you when the situation is resolved or if the situation gets worse.

This is *identify your name and position.*

Sample Message for Emergency Services Personnel to Communicate the Status of the Emergency with the Public

In the event of a Condition A emergency, the emergency managers for the Towns of Lenox, Lee, and Stockbridge have the authority to issue the following message to the general public through Reverse 911. This message may be modified for a Condition B emergency.

Urgent: **This is an emergency message from the *name of community*. Listen carefully. Your life may depend on immediate action.**

Woods Pond Dam, located on Crystal Street in Lenox and Valley Street in Lee, Massachusetts, is failing. Repeat Woods Pond Dam, located on Crystal Street in Lenox and Valley Street in Lee, Massachusetts, is failing.

If you are in or near this area, proceed immediately to high ground away from the valley. Do not travel on Routes 20 or 102 or return to your home to recover your possessions. You cannot outrun or drive away from the floodwave. Proceed immediately to high ground away from the valley.

This message will be repeated once.

The accurate and timely dissemination of emergency public information is very important to the overall success of an EAP.

6.3 RESPONSIBILITY FOR EVACUATION

Warning and evacuation planning are the responsibilities of local authorities who have the statutory obligation within their respective communities (i.e., the Towns of Lenox, Lee, and Stockbridge). The Lenox, Lee, and Stockbridge Police Departments will provide traffic control for secondary and local roadways and direct evacuees along the major evacuation routes toward upland areas and away from the inundation areas shown on the inundation maps in **Attachment E**. In addition to traffic control, local police/fire departments will provide a warning of the emergency by loudspeakers, door to door and Reverse 911. Emergency evacuation routes should also be broadcast simultaneously over local radio, television, cable stations. Additionally, the Towns of Lenox, Lee, and Stockbridge may request activation of the EAS through MEMA. The Towns of Lenox, Lee, and Stockbridge have limited resources and may request evacuation and/ or traffic control and resident warning assistance from the County Sheriff and the MSP. MSP will provide traffic control along major interstate highways, state highways, and bridges in accordance with the procedures prescribed in the Incident Command System (ICS). In addition, the Berkshire County Sheriff's Office will respond to emergency sites with emergency supply equipment, including shelter trailers and a portable command center.

According to dam break analysis, the inundation areas occur along the Housatonic River. Based on the generally northerly to southerly flow direction north of I-90 (the Mass Pike) within the downstream floodplain zone, the general evacuation direction adjacent to the east and west sides of the flooding should be toward the east and west, respectively, away from the floodplain zone north of I-90. South of I-90, where the flow direction is westerly (along the Housatonic River) and southerly (along Hop Brook), evacuation should be to the north and south along the Housatonic, and to the west along Hop Brook.

6.4 RESPONSIBILITY FOR DURATION, SECURITY, TERMINATION, AND FOLLOW-UP

The Towns of Lenox and Lee each will have their own Incident Commander (Emergency Manager) who will perform on-site monitoring of the situation at the Dam and keep local authorities informed of developing conditions at the Dam until the emergency has been terminated. The Towns of Lenox and Lee have a mutual aid relationship and will work closely.

The Towns of Lenox and Lee will provide security measures to prevent unauthorized entry into the emergency area and establish access control points. Security measures may include warning signage, security tape, staffed outposts, etc. Additional materials may be provided by the Berkshire County Sheriff's Office.

Throughout the duration of an emergency, emergency responders will update the Unusual Emergency Event Log, which is available in **Table 10**.

Whenever the EAP has been activated, an emergency level has been declared, all EAP actions have been completed, and the emergency is over, the EAP operations must eventually be terminated and follow-up procedures completed. The Lenox and Lee Incident Commanders are responsible for terminating EAP operations and relaying this decision to Lenox and Lee Dispatch Centers, and then the Stockbridge Dispatch Center. It is then the responsibility of each dispatch center to notify the same group of contacts that were notified during the original event notification process to inform those people that the event has been terminated.

Prior to the termination of an emergency Condition A event that has not caused actual dam failure, the Lenox and Lee Incident Commanders, with the assistance of GE and its consulting dam safety engineer, will inspect the dam to determine whether any damage has occurred that could potentially result in loss of life, injury, or property damage. The DCR Office of Dam Safety may also participate in the inspection. If it is determined that conditions do not pose a threat to people or property, the Incident Commanders may terminate EAP operations as described above. If the severity of a Condition A emergency changes such that there is no longer a threat of imminent failure, the emergency condition will be reduced to Condition B. If the severity of a Condition B emergency changes such that there is no longer a threat of dam failure, the Incident Commanders may terminate EAP operations as described above.

GE will document the emergency event and all actions that were taken. GE will also perform an initial damage assessment and shall also modify/update this EAP, if warranted, based upon lessons learned during the emergency situation.

The Towns of Lenox, Lee, and Stockbridge should also document their responses and perform initial damage assessments. The results of their evaluations should be documented in written reports for their own files.

6.5 EAP COORDINATION RESPONSIBILITY

GE is responsible for identifying the EAP Coordinator. The EAP Coordinator is responsible for EAP-related activities, including the following:

- Review and update, as necessary, EAP including notification procedures, contact lists, and responsibilities on at least a yearly basis (per 302 CMR 10.11). Updates will be recorded in **Table 11**, entitled "EAP Update Log".

- Arrange for Orientation Meetings to discuss proper procedures for surveillance and emergency repair, if requested.
- Conduct a biennial test of the validity of notification procedures and communication systems.
- Review and update available resources information.
- Be prepared to mobilize available on-site resources and obtain contractors on short notice.

6.6 TYPICAL MEMA FUNCTIONS

If the Incident Commander from either Lenox or Lee deems that assistance is or may be needed, he or she may contact MEMA. Typical MEMA functions include the following:

- Dispatch MEMA personnel to coordinate support activities with the local incident commander, when appropriate.
- Activate the State Emergency Operations Center when appropriate.
- Monitor and document potential or actual emergency situations resulting from failure of the Woods Pond Dam.
- Coordinate the delivery of assistance to local governments and state agencies as requested and available.
- Brief the Governor and advise him or her as to necessary actions.
- Assist Governor's Office with emergency and non-emergency public information releases.
- Transmit warning messages over EAS when the State EOC is activated.
- Receive and evaluate Situation Reports from local governments, state agencies, and utility companies.
- Prepare thorough documentation of emergency response activities and development of post-disaster reports on overall emergency operations by State government.
- Contact National Weather Service.

6.7 TYPICAL MASSACHUSETTS STATE POLICE FUNCTIONS

If the Incident Commander from either town deems that assistance is or may be needed, he or she may also contact MSP. Typical MSP functions include the following:

- Provide the key communication lines for rapid and simultaneous notification to local public safety within the affected inundated areas.
- Mobilize, deploy, and organize personnel for crowd and traffic control operations in support of evacuation.
- Provide personnel specifically trained in a wide range of expertise, and specialized equipment, as necessary, to support the public safety response to affected areas.
- Issue initial emergency messages and situation updates and relay them via the Law Enforcement Automated Personnel System (LEAPS) to local public safety personnel.

- Act as community liaison for MEMA.
- Report damage and other vital information including road closures, bridge failures, collapsed buildings, and casualty estimates.
- Conduct search and rescue operations.
- Control access to dangerous or impassable sections of State-maintained and/or State-patrolled roads.
- Provide assistance as requested to local public safety forces primarily for the purposes of search and rescue, route alerting, anti-looting, traffic control, curfew enforcement, and access control.
- Provide emergency transportation for town, state/federal officials, and engineering consultants.
- Provide emergency communications links through mobile units and the State Police communications.
- Provide departmental Situation Reports to MEMA throughout the increased readiness and emergency response phases of a disaster or emergency.
- Advise the Governor, as to necessary actions, particularly regarding the issuance of curfews and the need for National Guard support.
- Prepare thorough documentation and debriefing of State Police emergency response activities.

6.8 TYPICAL BERKSHIRE COUNTY SHERIFF FUNCTIONS

If the Incident Commander from either town deems that assistance is or may be needed, he or she may also contact the Berkshire County Sheriff (BCS). Typical BCS functions include the following:

- Provide specialized equipment to assist in emergency management, including light towers with generators, and traffic safety equipment including programmable highway signs and barricades.
- Conduct search and rescue operations and provide equipment for off-road rescue operations.
- Conduct boat-based or underwater search and rescue operations.
- Provide assistance as requested to local public safety forces primarily for the purposes of search and rescue, route alerting, anti-looting, traffic control, curfew enforcement, and access control.
- Provide a mobile communications center/command post, and communications equipment including VHF and multiband radios and handheld GPS units with integrated radios
- Provide departmental Situation Reports to MEMA throughout the increased readiness and emergency response phases of a disaster or emergency.
- Prepare thorough documentation and debriefing of BCS's emergency response activities.

7.0 PREPAREDNESS

7.1 SURVEILLANCE PROCEDURES

The keys to the successful implementation of the EAP are the means, timeliness and accuracy of identifying potential emergencies. An emergency condition is one in which the occurrence of a significant hazard to life and/or property is possible or certain to occur (COE, 1983).[2] Conditions justifying declaration of an emergency condition may be imminent (Condition A) or may develop over a longer term (Condition B). However, in either case, such a declaration will likely come from GE personnel who are familiar with the operations/maintenance history and existing conditions of the Woods Pond Dam.

This section summarizes the routine observations and inspections of the Dam and appurtenant structures. Additional details are provided in the revised OM&M Plan for Woods Pond Dam. Early identification of the existence or potential for occurrence of such emergency conditions is essential as a basis for initiating emergency repairs and for issuing appropriate notifications. Refer to **Table 9** for key items for which the dam inspector(s) will observe during Dam inspections. Refer to **Attachment F** for images of these key items.

1. Quarterly visual inspections will be conducted by GE or its contractor. These inspections will include a walk along the structure and across the bridge downstream of the Dam to check for cracks, movement, seepage, boils and/or other signs of increased leakage or other unusual occurrences at the dam. Ice-out observations will be made during the second quarterly inspection. During these inspections, particular attention will be paid to the concrete structures.

2. A complete visual inspection of the Woods Pond Dam will be made on a biennial basis by a dam safety engineer registered in the Commonwealth of Massachusetts who has extensive experience in dam inspections. The inspection reports will document existing conditions, and present recommendations for maintenance and repairs, as necessary.

3. These routine inspections will be augmented with inspections after every high-flow event, defined as a flow event with a peak river flow of 1,500 cfs or greater at the U.S. Geological Survey (USGS) gage at Coltsville or 3,650 cfs or greater at the USGS gage on the Housatonic River at Division Street in Great Barrington, or after an earthquake with reported damage in Berkshire County.

4. Topographic and bathymetric surveys of the Dam will be performed every five years as discussed in the revised OM&M Plan.

All inspection reports and checklists will be completed by or on behalf of GE, kept permanently on file by GE, and submitted to EPA when required by the OM&M Plan.

[2] U.S. Army Corps of Engineers (COE), The Hydrologic Engineering Center, "Example Emergency Plan for Blue Marsh Dam and Lake," Research Document No. 19, August 1983.

7.2 RESPONSE DURING PERIODS OF DARKNESS

During normal business hours, response time of GE personnel to the site of an identified potential emergency condition would be rapid. Actual response time, especially during non-business hours, will be a function of how and by whom the initial emergency condition is discovered and by weather conditions. The Lenox and Lee Emergency Dispatch Centers are available 24 hours a day.

Please refer to **Figure 1**, the **Notification Flowchart**, and **Section 6.0** for special notification procedures.

Emergency power and remote lighting contingencies are available from the Towns of Lenox and Lee. Additional power and remote lighting can be provided by the Berkshire County Sheriff's Office and by local contractors.

7.3 ACCESS TO SITE

The Woods Pond Dam can be reached from I-90 following these directions:

1. Take Exit 2 (US-20W/Housatonic Street) towards Lee/Pittsfield;
2. In 0.8 miles, take a right onto Fuller Street;
3. Take the first left onto Greylock Street;
4. In 1.5 miles, continue onto Bradley Street;
5. In 0.3 miles, continue onto Mill Street;
6. In 0.6 miles, turn right onto Crystal Street;
7. Follow Crystal Street for 0.5 miles, then turn right onto Valley Mill Road;
8. Turn left at the end of Valley Mill Road, onto Valley Street, which is an access road through the mill parking lot.

The left (east) abutment of the Dam is on the left side of Valley Street about 0.6 miles north from Valley Mill Road. The right (west) abutment of the Dam is accessed over the train tracks paralleling Crystal Street about 0.6 miles north of the intersection of Crystal Road and Valley Mill Road.

7.4 RESPONSE DURING WEEKENDS AND HOLIDAYS

During normal business days and hours, response time of GE and Towns of Lenox and Lee personnel to the site of an identified potential emergency condition would be rapid. Actual response time will be a function of how and by whom the initial emergency condition is discovered and communicated. It will also be affected by weather conditions.

Response time could be impacted if the emergency event occurs on a weekends or holiday. The Towns of Lenox and Lee will attempt to minimize the impact of weekends and holidays through their preparedness measures. Emergency phone numbers listed are for dispatch centers, which are operational 24 hours per day, 7 days per week. Dispatch centers have the ability to contact individuals during weekends and holidays.

7.5 RESPONSE DURING PERIODS OF ADVERSE WEATHER

GE personnel will be placed on a heightened state of readiness in the event of predicted or actual adverse weather conditions. Should weather events make some local roads impassable, the Dam can be accessed from either abutment.

7.6 ALTERNATIVE SYSTEMS OF COMMUNICATION

In the event of an emergency condition, the primary means of notification will be made by telephone landlines or cellular telephones; however, additional/alternative communication systems are listed below. The Contact Lists provided in **Tables 1 through 7** contain responder contact information available at the time that this EAP was prepared. This contact information includes emergency dispatch phone numbers, office phone numbers, cell phone numbers, home phone numbers and radio frequencies, when available.

Should the method of primary communication being used fail, responders should be prepared to utilize alternative communication systems. During an ongoing emergency, many of the communication systems listed below will be vital communication links for use in directing and coordinating emergency operations, issuing alerts and warnings, and instructing the general public.

7.6.1 Local Two-Way Radio

The Police, Fire, and Highway Departments in the Towns of Lenox, Lee, and Stockbridge communicate through portable radios. Each department communicates via its Emergency Dispatch Center. The following are the Towns' departments' radio frequencies:

Town	Police Department		Fire Department		DPW/Highway DEP.	
	Frequency (MHz)	PL Code	Frequency (MHz)	PL Code	Frequency (MHz)	PL Code
Lenox	153.965	107.2	152.9825	131.8	158.835	107.2
Lee	153.965	107.2	152.9825	131.8	154.040	107.2
Stockbridge	153.965	107.2	154.310	107.2	151.100	107.2

Other radio contact capabilities include contact with MEMA, which operates on an 800 MHz trunked system, and the mobile communications system available from the Berkshire County Sheriff.

7.6.2 Emergency Alert System (EAS)

EAS allows government officials to access local radio and TV stations to communicate with the public in times of impending or actual emergency. To activate the EAS at the state level, a request may be directed to an Originating Primary Relay Station (usually an FM station located near the State capital) by the Governor, State Police, State Emergency Management, or the National Weather Service.

7.6.3 Internet Access Capabilities

The Towns of Lenox, Lee, and Stockbridge have internet access capabilities and may utilize the MEMA WebEOC portal (System Logins for Emergency Management | Mass.gov) to report an emergency condition, provide updates to MEMA and request assistance (manpower, materials, equipment, etc.), as needed.

7.6.4 Reverse 911

The Towns of Lenox, Lee, and Stockbridge utilize Reverse 911 (or equivalent) systems. Reverse 911 (or equivalent) systems would allow Town officials to send out pre-recorded messages to residents by telephone, during an emergency (flood) or a situation that requires public outreach to residents and businesses. Pre-recorded messages would be sent out to entire communities or to specific locations depending on the nature of the emergency. In the case of a dam break flood wave, the notification system would be used to notify residents in the potential impact areas.

7.7 EMERGENCY SUPPLIES AND INFORMATION

7.7.1 Stockpiling Materials and Equipment

GE has selected an Emergency Response Contractor to respond to an emergency situation at the Dam: LB Corporation, whose contact information is provided in the **Table 7**. LB Corporation is a full-service contractor that maintains and will provide materials and equipment that could be used in case of an emergency. The Towns of Lenox, Lee, and Stockbridge DPWs should be prepared to respond with additional equipment, material, and labor as required.

7.7.2 Coordination of Information

There are no dams upstream that can be used to reduce flows into Woods Pond Dam.

7.7.3 Other Site-Specific Actions

Under the direction of the Incident Commanders, the Town of Lenox or Lee employees may provide manpower to perform emergency repair activities. If additional manpower is required, the Towns of Lenox or Lee may request the assistance of the National Guard through MEMA. GE maintains an on-call relationship with a local contractor who can respond in times of emergency.

7.7.4 Alternate Sources of Power

Towns of Lenox and Lee Fire and Police Departments own portable generators which would be available during times of emergency to power lighting and mobile EOCs.

Additional power sources are available from MEMA and the Berkshire County Sheriff. It is noted that during a local or regional emergency incident, these resources may be in use by others and not available for use in an emergency response at the Woods Pond Dam.

7.8 PUBLIC AWARENESS AND COMMUNICATION

As previously noted, GE maintains warning signs at Woods Pond Dam. During the quarterly inspections, the posted signs are observed to evaluate whether they remain in place and intact and whether they need repair or replacement. In the event that the visual inspections indicate that the posted signs are not in place or intact or that other sign repair or replacement activities are needed, the necessary sign repair or replacement activities will be conducted as part of the regularly scheduled maintenance program.

8.0 INUNDATION MAPS

The inundation maps provided in **Attachment E** are based on the latest Dam Break Analysis, performed by GZA in 2024 (see **Attachment A**).

Note that the inundation maps available in **Attachment E** include a limited number of key landmarks within the impact area and presents estimated flood zones. However, the maps do not include all possible structures and facilities that may be impacted due to a dam break of Woods Pond Dam. It is incumbent upon the Towns of Lenox, Lee, and Stockbridge to locate key local landmarks and modify the inundation maps, as they deem appropriate.

TABLES

TABLE 1

GENERAL ELECTRIC COMPANY CONTACT LIST

General Electric Company
1 Plastics Avenue
Pittsfield, Massachusetts 01201

Name	Title	Telephone No.
Kevin Mooney	Senior Project Manager Caretaker	(413) 448-6610 office (413) 441-4619 cell
Matthew Calacone	Senior Project Manager Alternate Caretaker	(413) 553-6614 office (413) 822-0082 cell
Pittsfield Plant Security	GE Emergency Line	(413) 553-6625 24-hr

TABLE 2

TOWN OF LEE COMMUNITY ALERT LIST

City/Town	Name/Dept.	Position/Title	Address	Telephone No.
Lee	**Police Department /Emergency Management** Craig Desantis	Chief	32 Main Street Lee, Massachusetts 01238	911 (413) 243-5530 Freq: 153.965 / PL 107.2
	Fire Department Ryan Brown	Chief	179 Main Street Lee, Massachusetts 01238	911 (413) 243-5550 Freq: 152.9825 / PL 131.8
	Board of Selectmen Bob Jones	Chair	32 Main Street Lee, Massachusetts 01238	(413) 409-5975
	Department of Public Works Lenny Tisdale	Superintendent	32 Main Street Lee, Massachusetts 01238	(413) 243-5520 Freq: 154.040 / PL 107.2

TABLE 3

TOWN OF LENOX COMMUNITY ALERT LIST

City/Town	Name/Dept.	Position/Title	Address	Telephone No.
Lenox	**Police Department** Stephen O'Brien	Chief	6 Walker Street Lenox, Massachusetts 01240	911 (413) 637-2346 Freq: 153.965 / PL 107.2
	Fire Department Chris O'Brien	Chief	14 Walker Street Lenox, Massachusetts 01240	911 (413) 637-2347 Freq: 152.9825 / PL 131.8
	Board of Selectmen Ed Lane	Chair	6 Walker Street Lenox, Massachusetts 01240	(413) 637-5500 x 7
	Department of Public Works William J. Gop	Superintendent	275 Main Street Lenox, Massachusetts 01240	(413) 637-5500 x 1211 Freq: 158.835 / PL 107.2

TABLE 4

TOWN OF STOCKBRIDGE COMMUNITY ALERT LIST

City/Town	Name/Dept.	Position/Title	Address	Telephone No.
Stockbridge	**Police Department** Darrell Fennelly	Chief	50 Main Street Stockbridge, Massachusetts 01262	911 (413) 298-4179 Freq: 153.965 / PL 107.2
	Fire Department / Emergency Management Vincent Garofoli	Chief	1 East Street Stockbridge, Massachusetts 01262	911 (413) 298-4866 (Office) (413) 717-2751 (Cell) Freq: 154.310 / PL 107.2
	Board of Selectmen Ernest Cardillo [Contact: Theresa Zanetti]	Chair [Admin Asistant]	50 Main Street Stockbridge, Massachusetts 01262	(413) 298-4170 x 250
	Department of Public Works Hugh Page	Highway Superintendent	1 West Stockbridge Road Stockbridge, Massachusetts 01262	(413) 298-5506 (Office) (413) 717-1938 (Cell) Freq: 151.100 / PL 107.2

TABLE 5

STATE AGENCY ALERT LIST

Location	Name/Contact	Address	Telephone No.
Lee, Massachusetts	State Police Troop B-1 SP	215 Laurel Street Route 20 Lee, Massachusetts 01238	(413) 243-0600
Northampton, Massachusetts	State Police Troop B Headquarters	555 North King Street Northampton, Massachusetts 01060	(413) 584-3000
Framingham, Massachusetts	State Police Communication Center	470 Worcester Road Framingham, Massachusetts 01702-5399	(508) 820-2121
Framingham, Massachusetts	Massachusetts Emergency Management Agency (MEMA) Executive Office	400 Worcester Road Framingham, Massachusetts 01702-5399	(508) 820-2000 (24 hrs) (508) 820-2022
Boston, Massachusetts	Department of Conservation and Recreation - Office of Dam Safety	10 Park Plaza Suite 6620 Boston, Massachusetts 02116	(617) 626-1250
Agawam, Massachusetts	Massachusetts Emergency Management Agency (MEMA) Region 3	1002 Suffield Street Agawam, Massachusetts 01001	(413) 750-1400
Springfield, Massachusetts	Massachusetts Department of Environmental Protection (MassDEP)	436 Dwight Street Springfield, Massachusetts 01103	Benjamin Guidi (857) 383-7476
Hartford, Connecticut	Connecticut Department of Energy and Environmental Protection (CTDEEP)	79 Elm Street Hartford, Connecticut 06106	Emergency Response & Spill Prevention (860) 424-3338 Additional Emergency Contact: (866) 337-7745
Boston, Massachusetts	U.S. Environmental Protection Agency (EPA)	EPA Region 1 5 Post Office Square- Suite 100 Boston, Massachusetts 02109	Josh Fontaine (617) 918-1720 Emergency Reponse Duty Desk: (617) 918-1236

TABLE 6

MAJOR UTILITIES LIST

Name	Telephone No.
Telephone Verizon	(800) 870-9999
Electric Lee – Eversource Lenox, Stockbridge – National Grid	Eversource: (877) 659-6326 National Grid Emergency: (800) 465-1212
Highway Massachusetts Department of Transportation	Highway District 1: (857) 368-1000
Railroad Housatonic Railroad	(860) 824-0850 Emergency (Matt Boardman): (860) 824-0850 x17
Gas Berkshire Gas Tennessee Gas Pipeline	Emergency: (800) 292-5012 (713) 420-4135

Note:

This list has been provided for general reference purposes and is not intended to be an all-inclusive list of major utilities within the potential downstream impact area. Primary responsibility for notifying key utilities, rail lines, etc. will rest with the public safety agencies of the individual community.

TABLE 7

GENERAL ELECTRIC EMERGENCY RESPONSE CONTRACTOR LIST

Steve Garrity	LB Corporation	(413) 243-1072 office (413) 441-1412 cell

TABLE 8
GUIDANCE FOR DETERMINING THE EMERGENCY CONDITION

Event	Situation	Emergency Condition*
Spillways	Principal spillway blocked with debris and pool is rapidly rising	B
	Principal spillway severely blocked with debris or structurally damaged	NE
	Principal spillway leaking	NE
Flooding	Action level (or above) river stage occurring or forecasted by Advanced Hydrologic Prediction Service for Housatonic River at Coltsville or Great Barrington (See NOAA AHPS website)	NE
	Flood flows are overtopping the dam	A
	The reservoir elevation reaches the predetermined evacuation trigger elevation 952.5 NGVD (i.e. 1.5 feet below top of embankment)	A
	The reservoir elevation reaches the predetermined notification trigger elevation 952.0 NGVD (i.e. 2.0 foot below top of embankment; Consider rate of rise)	B
	National Weather Service issues a flood warning for the area	NE/NF
Seepage	Boils observed downstream of dam with cloudy discharge	B
	New seepage areas with cloudy discharge or increasing flow rate	B
	New seepage areas in or near the dam	NE
	Boils observed downstream of dam	NE
Sinkholes	Rapidly enlarging sinkhole	A
	Observation of new sinkhole in reservoir area or on embankment	B
Embankment Cracking	Cracks in the embankment with seepage	B
	New cracks in the embankment greater than 1/4-inch wide without seepage	NE
Embankment Movement	Sudden or rapidly proceeding slides of the embankment slopes	A
	Visual movement/slippage of the embankment slope	NE
Instruments	Instrumentation readings beyond predetermined values	NE
Earthquake	Earthquake resulting in uncontrolled release of water from the dam	A
	Earthquake resulting in visible damage to the dam or appurtenances	B
	Measurable earthquake felt or reported on or within 50 miles of the dam	NE
Security Threat	Detonated bomb that has resulted in damage to the dam or appurtenances	A
	Verified bomb threat that, if carried out, could result in damage to the dam	B
Sabotage / Vandalism	Damage to dam or appurtenances that has resulted in uncontrolled water release	A
	Damage to dam or appurtenances that has resulted in seepage flow	B
	Modification to the dam or appurtenances that could adversely impact the functioning of the dam	NE
	Damage to dam or appurtenances with no impacts to the functioning of the dam	NE

* Emergency Conditions:

A: Urgent; dam failure appears imminent or is in progress
B: Potential dam failure situation, rapidly developing
NE: Non-emergency, unusual event, slowly developing
NF: Non-failure emergency condition, no danger of dam failure, only flooding concerns

Note: This table is based upon the 2007 ASDSO sample EAP format.

TABLE 9

EMERGENCY REPAIR GUIDELINES

Observed Conditions	Potential Effects of the Observed Conditions	Guide for Action	Data to be Reported Situation Report	Remarks
1. CRACKS/DISPLACEMENT in Dam	Not serious, if minor axial cracks in crest. If crack does not extend completely through the dam and no movement or displacement is evident, gradual surficial cracking and/or deterioration of concrete or masonry may not be serious.	Start repairs as soon as possible. Mobilize construction equipment and manpower to perform necessary repairs. Contact professional dam engineer to assess condition	Location, width, length, and pattern (horizontal, vertical, or in some intermediate direction). Record pond elevation.	Observe daily until repair work is complete. NOTE: Although cracks can develop anywhere, the most likely location is at transition zones.
	Could cause failure, if crack extends completely through the dam or if recent movement or displacement of concrete or masonry is evident	Backfilling or other means of filling the crack will be required after the extent of the crack is determined.	Same as above. **Activate EAP. (Situation B).**	Observe hourly until repair work is completed.
	Failure imminent, if cracks extend completely through the dam and water is entering the crack and emerging on the downstream side at an increasing rate or if large sections of concrete or masonry have displaced significantly or fallen off the dam.	Replace and reinforce behind the area of shifted concrete/masonry with large rip rap to form a buttress. Plug the crack on upstream side to the extent possible using stone and gravel (or with other suitable material larger than the crack width) before adding sand or impervious material. After slowing flow, place two layers of geotextile filtration fabric across small cracks and cover with fine grained or impervious soil. This procedure will help prevent the washing out of the finer materials through the crack. The work should be started nearest the water surface on the upstream side.	Location, width, lengths and pattern of crack; also flow rate of downstream exit. **Activate EAP. (Situation A).**	Observe constantly.

Observed Conditions	Potential Effects of the Observed Conditions	Guide for Action	Data to be Reported Situation Report	Remarks
2. LEAKAGE (THROUGH CONCRETE OR MASONRY) a. Moist or wet surfaces	This may be due to cracks, deteriorated or porous concrete, open joints or plugged drains. This may not be serious or it could be the start of a serious problem.	Review to see if conditions relating to 1 applies and pursue same remedial actions.	Note the time, size, and location of leakage area and approximate flow rate.	Observe at least once per day until sure that leakage does not change into one of the conditions noted below.
b. Concentrated	Not serious. No loss of concrete or unusual movement. Rate of flow not increasing. Flow is clear.	Map location of all leaks, determine path of water if feasible through the use of dye tests. Report to the Consultant Engineer.	Note the time, size and location of leakage area and approximate flow rate.	Monitor quantities and relate to reservoir elevation and other potential influencing conditions.
	Could lead to failure. Increase in flow or leakage leading to deterioration, movement, and weakening.	Same as above and: Specifically assess hazards associated with cracks/ displacement above and pursue same remedial actions. Control leakage with drainage system and channel uncontrolled flows. Protect eroded areas with concrete, gunite, rock, or gabions.	Note the time, size, and location of leakage area and approximate flow rate. **Activate EAP (Type B)**	Same as above. Monitor condition hourly, until otherwise notified by Consultant Engineer.
3. SEEPAGE a. Wet surface area, located on downstream abutment slope or otherwise normally dry areas downstream of the dam, with very little or no surface water, or very minor seeps.	This may be caused by infiltration of rain water which is not serious, or may be the start of a serious seepage problem, which could be indicated by a quick change to one of the conditions below.	Compare to previously reported conditions under similar weather conditions. Perform complete visual inspection of abutment and downstream area. If situation cannot be fully explained by weather conditions, contact Consultant Engineer.	Note the time, size and location of seepage area, and quantity of surface water; report to dam supervisor.	Observe at least once a day until sure that seepage does not change into one of the conditions noted below.
b. Same wet area as above, with moderate seeps of clear or relatively clear water.	Not serious. Clear seep water and rate of flow not increasing.	Measure flow rate, inspect all downstream areas, and report any new seepage locations and conditions.	Note the time, size and location of seepage area, and approximate flow rate.	During flood stages the seepage area must be monitored daily for deteriorating conditions (increase in flow or material discharge).
	Could lead to failure. Relatively clear seep water, but rate of flow increases by minutes or hours.	Same as above.	Note the time, size and location of seepage area, and approximate flow rate. **Activate EAP (Situation B)**	Same as above. Monitor condition hourly.

Observed Conditions	Potential Effects of the Observed Conditions	Guide for Action	Data to be Reported Situation Report	Remarks
c. Boils - Soil particles forming a cone deposited around water discharge point. (Boils can vary from a few inches in diameter spaced to 2 to 3 feet apart to isolated boils several feet in diameter.)	Not serious. Emerging water in developed cone is clear and rate of flow is not increasing.	Check all downstream areas for other boils or seeps.	Note that time, size and location of seepage area, and approximate flow rate or velocity.	Observe at least once a day.
d. Piping - (seepage with removal of material through abutments), moderate to active.	Could lead to failure. Emerging water is muddy and rate of flow is increasing.	Temporarily control the seepage by ringing the area with a sandbag dike (see Figures 3 and 4 for schematic on ringing a boil). The dike should be constructed to provide sufficient flow reduction to prevent loss of material at the surface. If boils become so large that it is not practical to dike around them, place a coarse, granular blanket over the area, but do not stop the flow of water.	Note that time, size and location of seepage area, and approximate flow rate. **Activate EAP. (Situation B)**	Monitor constantly.
	Failure imminent. Emerging water is turbid (muddy), rate of flow increasing, and if there is upstream swirl (whirlpool) caused by water entering at the abutments.	Control seepage on downstream side of embankment as discussed above. Plugging of the upstream entrance of the pipe should be attempted. (See Observed Condition 5 below.)	Note the time, size and location of seepage conditions and approximate size of whirlpool. **Active EAP. (Situation A).**	Observe constantly.
4. SINKHOLES a. Above piping or tunnel in abutment.	Could lead to failure if problem occurs in conjunction with piping (or boils) problem.	If in conjunction with boils problem, place inverted granular blanket material in sinkhole. Check area for other sinkholes or seeps.	Same as above plus description and size of cracks or damage and seepage into conduit. **Activate EAP. (Situation B).**	Observe constantly.
b. Above Outlet works conduit.	Could lead to failure if conduit cracks and structural damage results.	Check conduit for cracks or damage and repair as soon as possible.	Same as above plus description and size of cracks or damage and seepage into conduit. **Activate EAP. (Situation B).**	Observe constantly.

Observed Conditions	Potential Effects of the Observed Conditions	Guide for Action	Data to be Reported Situation Report	Remarks
5. RESERVOIR WHIRLPOOLS	Usually caused by water flowing through a piping tunnel through the dam or abutment.	Lower the pool. An attempt should be made to plug the entrance with cobbles/boulders or stockpiled materials or anything else that is available. If the large material placed in the hole appears to have reduced the flow, continue adding progressively smaller material. When the flow is sufficiently reduced (Whirlpool disappears) place a granular blanket over the downstream outlet of the piping as noted above for problem, i.e., piping. Inspect abutments, dam, and downstream of dam for seepage areas, sinkholes, boils, etc.	Note the time observed, condition noted, location, and approximate size of whirlpool and the exit area downstream. **Activate EAP**. **(Situation B).**	Observe constantly for changes in the pond or the exit area.
6. SLIDES Upstream slope of abutments	Not serious, if slide does not intersect the crest or extend into the embankment more than 5 feet (measure perpendicular to the slope).	Start repairs as soon as possible. Mobilize town construction equipment and manpower or private contractor to perform necessary repairs.	Note: Location, time first observed, subsidence or building, whether water is emerging from slope, whether any movement can be visually detected and pool elevation.	Observe at least once a day.
	Could lead to failure, if slide passes through the crest, and water surface within 10 feet of the slumped crest.	Have labor, materials and equipment standing by as soon as possible. Start repairs as soon as possible.	Report same data as above. **Activate EAP. (Situation B).**	Observe constantly until necessary repairs are completed.
	Failure imminent, if: (1) the slide passes through the crest; and, (2) the water surface is at or near (less than 10 feet below) the top of the slumped crest.	Start lowering the reservoir. Use every means possible to armor the crest and to restore to original crest level.	Note: the time first observed location, whether water is emerging from downstream slope, whether any movement can be visually detected. **Activate EAP (Situation A).**	Observe constantly.

Observed Conditions	Potential Effects of the Observed Conditions	Guide for Action	Data to be Reported Situation Report	Remarks
7. OVERTOPPING	Could cause failure, if water surface elevation is approaching the top of the dam and there is the potential for erosion of the downstream face or if the water surface elevation is at or above the top of the dam and erosion is occuring.	Increases releases through outlet structures if possible. Increase freeboard by building a sandbag berm, or an earthen berm or parapet wall that is covered with a membrane. Force water through the outlet structures. Fill eroded areas with sandbags acording to the pyramid placement method as soon as they begin to form. Cover large areas that have been sandbaged with a membrane to further prevent erosion.	Note the time, location and height of overtopping and the length of the crest that is being overtopped. Note the size of the area that is being eroded. **Activate EAP (Situation B)**	Observe constantly.
	Failure imminent, if significant erosion is observed on the downstream face of the dam or if a significent decrease in crest width occurs as a result of the erosion.	Construct an auxillary spillway on an abutment. Dig a channel (starting from the bottom at the abutment/ downstream channel contact). Line the channel with filter fabric and dump appropriately sized (large) riprap in the channel. Once the channel approaches five feet from the reservoir, break through the top 6 inches of the channel/ reservoir contact to allow flow to proceed through the construted channel, while placing additional riprap in the channel to minimize erosion. As the water level drops, slowly and incrementally proceed to break through the top of channel/ reservoir contact to allow additional water through the channel. Place additional riprap as needed.	Note the time, location and height of overtopping and the length of the crest that is being eroded. **Activate EAP (Situation A)**	Observe constantly.
	General note: If riprap is depleted, sandbags may be placed. Each bag should be filled with sand and tied to prevent loss of material. Placement should be by hand, sling, or other methods that would prevent tearing of the bags. Bags filled with clay and silts may be used only if sand is not readily available and other methods of repair cannot be implemented.			

TABLE 10
UNUSUAL OR EMERGENCY EVENT LOG
(to be completed during the emergency)

Woods Pond Dam
Lee/Lenox, Massachusetts

When and how was the event detected? ______________________________

____

____

Weather conditions: ______________________________

____

General description of the emergency situation: ______________________________

____

____

____

Actions and Event Progression

Date	Time	Action/Event Progression	Taken by

Report prepared by: ______________________________ Date: ____________

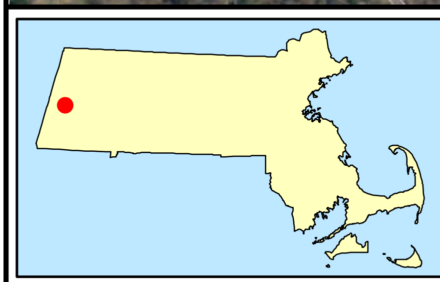
TABLE 11
EAP UPDATE LOG

Woods Pond Dam
Lee/Lenox, Massachusetts

EAP Updates

Date	EAP Update Description	Updated by
10/2015	Reformatted to comply with DCR Regulations and incorporate comments.	GZA
12/2017	Validated protocol and updated responsible parties' information.	GZA
10/2018	Revised to address U.S. Environmental Protection Agency comments on 12/2017 update and to provide other updated information.	GZA
6/2019	Revised to address U.S. Environmental Protection Agency comments on 10/2018 update.	GZA
4/2020	2020 annual updates to the EAP, including responsible parties' information.	GZA
3/2021	2021 annual updates to the EAP, including responsible parties' information.	GZA
11/2022	2022 annual updates to the EAP, including responsible parties' information.	GZA
12/2023	2023 annual updates to the EAP, including responsible parties' information. Updates to the base maps for the inundation maps.	GZA
12/2024	2024 annual updates to the EAP, including responsible parties' information. Updated Dam Break Analysis and inundation maps.	GZA

FIGURE



SOURCE: THE 2023 AERIAL IMAGERY MAP SERVICE WAS DISTRIBUTED BY MASSGIS ON MAY 3, 2024. THE FUNDING FOR THIS IMAGERY WAS PROVIDED BY MASSDOT, THE STATE 911 DEPARTMENT AND THE EXECUTIVE OFFICE OF TECHNOLOGY SERVICES AND SECURITY (EOTSS).

Data Supplied by : MASS GIS

0 500 1,000 2,000 3,000
SCALE IN FEET

N W E S

GZA	PROJ. MGR.: SDK DESIGNED BY: SDK REVIEWED BY: JDA OPERATOR: AJP DATE: 07-22-2024	AERIAL PHOTOGRAPH	JOB NO. 01.0019896.50
		WOODS POND DAM LEE / LENOX, MASSACHUSETTS	FIGURE NO. 2

ATTACHMENT A
INVESTIGATION OF POTENTIAL FLOOD LIMITS

ATTACHMENT A
DAM BREAK ANALYSIS – WOODS POND DAM

The objective of this analysis was to determine the resultant flooding depths caused by a breach of the Woods Pond Dam and to estimate the travel time of the flood wave as it progresses downstream. Woods Pond Dam is located on the Housatonic River in Lee and Lenox, Massachusetts. This analysis was performed using the U.S. Army Corps of Engineers HEC-RAS 2D version 6.5. The dam break scenario is consistent with Massachusetts dam breach standards for significant hazard dams as specified in 302 CMR 10 Dam Safety 10.11(2). The dam break consists of a full breach of the dam earthen embankment while the impoundment level is at the top of embankment elevation and the downstream area has fair-weather conditions. HEC-RAS calculates the peak outflow of the dam based on the breach geometry and the size of the reservoir. The model then estimates the flood wave as it travels downstream.

The results of the dam breach analysis are presented on an inundation map created using Esri ArcMap 10.8.2. The elevation reference datum used in the model was the North American Vertical Datum of 1988 (NAVD88). This map provides comprehensive information about the area affected by the modelled dam breach, including roadway names, stream names, and railroad locations. It also details the flooding impact, showing the incremental rise in water levels, the depth of the floodwaters, the time it takes for the flood wave to travel downstream, and the peak flow at various points.

PROGRAM INPUT

GZA developed a two-dimensional (2D) hydraulic unsteady model of the Woods Pond Dam using the USACE's Hydrological Engineering Center's River Analysis System (HEC-RAS) Version 6.5 to estimate dam break flows, elevations, and arrival times. HEC-RAS input parameters are summarized in **Table 1.** The HEC-RAS model was developed as follows:

- Imported digital terrain model and land cover data.
- Defined the model impoundment extent, called the Storage Area, with a polygon.
- Defined the model downstream extent, called the 2D Flow Area, with a polygon.
- Assigned a grid size resolution to generate a grid within the model extent.
- Modified the grid using break lines, which were used to align grid cells with significant topographic features, such as high points (i.e., ridges) and stream channel.
- Added boundary conditions along the perimeter of the model extent. Boundary conditions represent locations of flow entering or leaving the 2D Flow Area.
- Assigned Manning's n values to each land cover type.
- Added the dam, associated structures, and downstream hydraulic structures within the model extents.

Table 1: HEC-RAS Model Inputs Parameters

Model Element	Input Parameters
Model Extents and Layout	The model encompasses the Housatonic River up to 9.0 miles upstream of the Woods Pond Dam as a storage area and 28 miles downstream of the Dam as a 2D Flow Area. The 2D Flow Area model extent is represented with approximately 40,700 cells with an average grid resolution of 100 feet.
Terrain Data	The digital elevation model (DEM) of the Site was developed using terrain consisting of 1-meter by 1-meter LiDAR-generated DEM from the 2015 Western Massachusetts QL2 dataset, downloaded through USGS. Break lines were added to align grid cells with topographic high points which may act as pertinent hydraulic controls.
Storage Area (Woods Pond)	The storage area of Woods Pond Dam was represented by an elevation-storage curve. The storage curve was estimated using LiDAR data for the area above the normal pool and the bathymetry data provided by AnchorQEA. The Storage area of Woods Pond extends 9 miles upstream (north) of the Dam with a volume of 3,400 acre-feet at top of the dam.
Flow Structures	The Woods Pond Dam was modeled as an SA/2D connector. The dam embankment was 200 feet in length with a minimum elevation of 953.4 feet. The dam included the spillway and right stoplog sluice structure. The Woods Pond Dam stoplog sluice structure was modeled as 8 feet in length at elevation 947.6 feet. The spillway was modeled as a weir 140 feet in length at 947.7 feet in elevation. Downstream dams were also modeled with SA/2D connectors: Columbia Mill Dam (2.5 miles downstream of the Woods Ponds Dam), Hurlbut Dam (9.3 miles downstream of the Woods Ponds Dam), and Glendale Dam (16.2 miles downstream of the Woods Ponds Dam). Downstream dam geometries and elevations were based on Visual Inspections Reports, the Berkshire County FEMA FIS report published in July 2021, and LiDAR data.
Manning's n (i.e., roughness)	The 2016 Massachusetts Land Cover/Land Use dataset was used to establish roughness zones within the model with the following estimated Manning's n values: Barren Land = 0.025; Deciduous Forest = 0.160; Developed, Open Space = 0.040; Evergreen Forest = 0.160; Grassland = 0.035; Impervious = 0.150; Palustrine Aquatic Bed = 0.070; Palustrine Emergent Wetlands = 0.070; Palustrine Forested Wetlands = 0.120; Pasture-Hay = 0.030; Shrub-Scrub = 0.1; and Water = 0.040 Manning's n values were assigned based on "Manning's n Values for Various Land Covers to Use for Dam Breach Analyses by NRCS in Kansas" and the HEC-RAS Mapper User's Manual.
Upstream Boundary Condition	The upstream boundary condition was represented by the storage area reservoir. No inflow was applied, and the impoundment water elevation was set to the top of the dam.

<table>
<tr><th>Model Element</th><th>Input Parameters</th></tr>
<tr><td>Downstream Boundary Condition</td><td>The Housatonic River outflow applied an elevation-discharge rating curve based on the Berkshire County FEMA FIS report published in July 2021 (flood conditions) and LiDAR-generated DEM from the 2015 Western Massachusetts QL2 dataset (no and baseflow conditions):
<table>
<tr><th>Flow Condition</th><th>Water Surface Elevation (ft)</th><th>Discharge at the Downstream Boundary Condition (cfs)</th></tr>
<tr><td>No Flow</td><td>736.1</td><td>0</td></tr>
<tr><td>Median Baseflow</td><td>742.0</td><td>3,860</td></tr>
<tr><td>10-yr</td><td>744.4</td><td>6,640</td></tr>
<tr><td>50-yr</td><td>746.9</td><td>10,000</td></tr>
<tr><td>100-yr</td><td>747.9</td><td>11,700</td></tr>
<tr><td>500-yr</td><td>750.4</td><td>16,300</td></tr>
</table></td></tr>
<tr><td>Dam Breach Parameters</td><td>The breach bottom width was 70 feet. The breach weir coefficient was 2.6 for the Woods Pond Dam. The Breach Formation time was 0.1 hour and the bottom elevation was 937.0 feet. The breach side slopes were vertical. Breach parameters were estimated in accordance with FERC guidance for spillway monolith failure.</td></tr>
<tr><td>Run Parameters</td><td>SWE-ELM Equation Set
Computation interval set to 2 seconds</td></tr>
</table>

RESULTS

The results of the simulation indicated the peak flow through the dam breach to be approximately 9,600 cfs. At Golden Hill Road, 2.0 miles downstream of Woods Pond Dam, the peak flow was 5,200 cfs. At Park Street, 3.9 miles downstream of the Woods Pond Dam, the peak flow was 5,000 cfs with an incremental rise of 12.4 feet. At the Railroad bridge, 8.5 miles downstream of Woods Pond Dam, the peak flow has attenuated to 2,300 cfs as a result of available floodplain storage. At the Glendale Hydroelectric Project Dam, 16.2 miles downstream of Woods Ponds Dam, the peak flow was 1,500 cfs with an incremental rise of 2.0 feet. None of the downstream dams are considered High Hazard structures.

The flood wave is contained within the river channel by 16 miles downstream of Woods Pond Dam. Therefore, the Risingdale Neighborhood in the Town of Great Barrington approximately 19 miles downstream of the Woods Pond Dam is not anticipated to be significantly inundated by the significant hazard dam breach scenario and is thus not mapped.

ATTACHMENT B

PLANS FOR TRAINING, EXERCISING, UPDATING, AND POSTING THE EAP

ATTACHMENT B – PLANS FOR TRAINING, EXERCISING, UPDATING, AND POSTING THE EAP

TRAINING

Orientation Meetings will be held with the pertinent representatives of GE and the Towns of Lenox, Lee, and Stockbridge to review the EAP, if requested.

The focus of the Orientation Meetings is to clarify the roles, procedures, and responsibilities associated with the implementation of the EAP for the Woods Pond Dam. The general purpose is for meeting participants to evaluate plans and procedures and to resolve questions of coordination and assignment of responsibilities.

The key issues for discussion include, but are not necessarily limited to, the following:

- Familiarization with the overall framework and specific details of Figure 1 – Notification Flowchart.
- Familiarization with alternate means of communication.
- Review differences among Emergency Condition A (failure imminent), Emergency Condition B (potential hazardous situation developing), Non-Emergency Condition (unusual event, slowly developing), and Non-Failure Emergency Condition (no danger of dam failure, only flooding concerns) and notification procedures for each situation.
- Identification and differentiation of problem conditions at the dam observed during routine surveillance and maintenance.
- The Incident Commanders (the Lenox Fire Chief and Lee Police Chief) will function as “Incident Commanders” as per the Incident Command System (ICS).
- Review of general Emergency Repair Procedures and Guidelines for Woods Pond Dam EAP.
- Review of emergency operation procedures at the Woods Pond Dam.
- Review duties of other key emergency agencies.

EXERCISING

The need to test the EAP through tabletop exercises or field drills will be determined by the Incident Commanders identified in the EAP (the Lenox Fire Chief and Lee Police Chief). GE will fully cooperate in any tabletop exercises of field drills determined to be necessary.

Should the Incident Commanders determine that exercising the EAP is required, the Federal Guidelines for Emergency Action Planning for Dams (FEMA 64) recommends a combination of discussion-based and operations-based exercises. Descriptions of each, from FEMA 64, are provided below.

Discussion-based exercises familiarize participants with current plans, policies, agreements, and procedures, or may be used to develop new plans, policies, agreements, and procedures. The following are types of discussion-based exercises:

- **Seminar**. A seminar is an informal discussion designed to orient participants to new or updated plans, policies, or procedures (e.g., a seminar to review a new Evacuation Standard Operating Procedure). Seminars should include internal discussions as well as coordination with emergency management authorities and other organizations with a role in EAP implementation.

- **Workshop**. A workshop resembles a seminar but is used to build specific products such as a draft plan or policy. For example, a Training and Exercise Plan Workshop is used to develop a Multi-Year Training and Exercise Plan.
- **Tabletop Exercise**. A tabletop exercise involves key personnel discussing simulated scenarios in an informal setting. Tabletop exercises can be used to assess plans, policies, and procedures.
- **Games**. A game is a simulation of operations that often involves two or more teams, usually in a competitive environment, using rules, data, and procedures designed to depict an actual or assumed real-life situation.

Operations-based exercises validate plans, policies, agreements and procedures; clarify roles and responsibilities; and identify resource gaps in an operational environment. Types of operations-based exercises are:

- **Drill**. A drill is a coordinated, supervised activity usually employed to test a single operation or function within a single entity, such as testing sirens and warning systems, calling suppliers, checking material on hand, and conducting a call-down drill of those listed on the Notification Flowchart.
- **Functional Exercise**. A functional exercise examines and/or validates the coordination, command, and control between various multi-agency coordination centers, such as Emergency Operation Centers (EOCs) and Joint Field Offices. A functional exercise does not involve any “boots on the ground” such as first responders or emergency officials responding to an incident in real time.
- **Full-Scale Exercises**. A full-scale exercise is a multi-agency, multi-jurisdictional, multidiscipline exercise involving functional (e.g., Joint Field Office, EOC, “boots on the ground” response to a simulated event, such as activation of the EOC and role-playing to simulate an actual dam failure). Functional and full-scale exercises are considered comprehensive exercises that provide the necessary verification, training, and practice to improve the EAP and the operational readiness and coordination efforts of all parties responsible for responding to emergencies at a dam. The basic difference between these two exercise types is that a full-scale exercise involves actual field movement and mobilization, whereas in a functional exercise, field activity is simulated.

UPDATING

The Woods Pond Dam EAP will be periodically updated to reflect changes in names or titles of project operations, attendants, and other personnel with specific, designated responsibilities for actions in an emergency. The EAP will be annually reviewed and updated, as necessary. This may include changes in **Figure 1 - Notification Flowchart**, contact lists on **Tables 1 through 7**, or other information critical to providing notification to affected persons, federal, state, and local agencies. In addition, any input from federal, state, or local agencies will also be incorporated into the updated EAP document. GE will be responsible for updating the EAP.

GE has continuing responsibility to review the adequacy of the Woods Pond Dam EAP in light of any significant changes in upstream or downstream circumstances which might affect water flows or the location or extent of the areas, persons, or property that might be harmed due to a sudden release of water from Woods Pond Dam. Promptly after becoming aware of necessary changes to keep the

EAP workable, GE will consult and cooperate with appropriate federal, state, and local agencies responsible for public safety/emergency management to determine any advisable revision to the EAP.

GE will provide all holders of the EAP with copies of all revisions. Revised pages, maps, etc. will be marked, "Revision month/day/year" and revised material will be highlighted.

POSTING OF THE NOTIFICATION FLOWCHART

Figure 1 - Notification Flowchart will be posted and a 3-ring bound copy of the completed EAP will be available to each of the entities listed in the flowchart and contact lists. The following have copies of the EAP:

- GE
- Town of Lenox Emergency Management
- Town of Lee Emergency Management
- Town of Stockbridge Emergency Management
- MEMA
- DCR Office of Dam Safety
- Consulting Dam Safety Engineer

ATTACHMENT C
SITE-SPECIFIC CONCERNS

ATTACHMENT C – SITE-SPECIFIC CONCERNS

Each dam and downstream area are unique. Woods Pond Dam is accessible at both abutments, but as a run-of-the-river dam, those abutments are not accessible from each other. The right (west) abutment is accessible by foot from Crystal Street in Lenox over a set of train tracks. The left (east) abutment and raceway embankment are accessible through a parking lot from Valley Street in Lee.

ATTACHMENT D
EMERGENCY REPAIR

ATTACHMENT D – EMERGENCY REPAIR

GENERAL

In this section, potential emergency conditions that may affect the function of the Woods Pond Dam are identified and appropriate remedial actions are discussed herein. The intent is to facilitate emergency repair in cases where response time is critical and/or communications are disrupted which may delay the on-site arrival of the General Electric Company's dam safety engineer.

Potential natural phenomena and manmade forces which could affect the stability or function of the Woods Pond Dam include floods, earthquakes, inherent instability, aging and deterioration, accidents and sabotage.

While the cause of the damage is important, the remedial action to be undertaken is mostly dependent on certain characteristic signs of distress which indicate particular types of problems in earthen embankment dams. The following is a general description of conditions and corresponding corrective actions to be undertaken in emergency conditions to mitigate or delay the collapse of the dam. An action guide is presented in **Table 9** of the Emergency Action Plan, entitled "Emergency Repair Guidelines." This table was originally developed by the Army Corps of Engineers and has been modified to incorporate site-specific conditions at the dam. The Towns of Lenox and Lee personnel should become familiar with these procedures to reduce response time in the event of an emergency.

The emergency repair procedures outlined in Table 9 are to be supervised by the Towns, as appropriate. The following document potential remedial systems:

- Figure D-1: Boil Ring
- Figure D-2: Boil Ring Maintenance Instructions
- Figure D-3: Granular Blanket
- Figure D-4: Temporary Erosion Protection
- Figure D-5: Sandbag Berm Construction

At all times, utmost care should be given to the safety of personnel engaged in the remedial activities. If failure is imminent or cannot be effectively delayed, then remedial activities should cease and all personnel ordered out of the unsafe area by the senior staff at the scene. For observed conditions that are out of the norm, a qualified dam safety engineer (Massachusetts Registered Professional Engineer) should be consulted immediately, to assess the severity of the problem and recommended corrective measures.

EXCESS SEEPAGE

One of the leading causes of failures of embankment dams is embankment or foundation seepage/piping. Excess seepage leading to embankment failure may be caused by malfunctioning toe drains, presence of vegetative growth and extensive root systems within the embankment, burrowing of small animals, or high reservoir pool levels creating high hydrostatic heads.

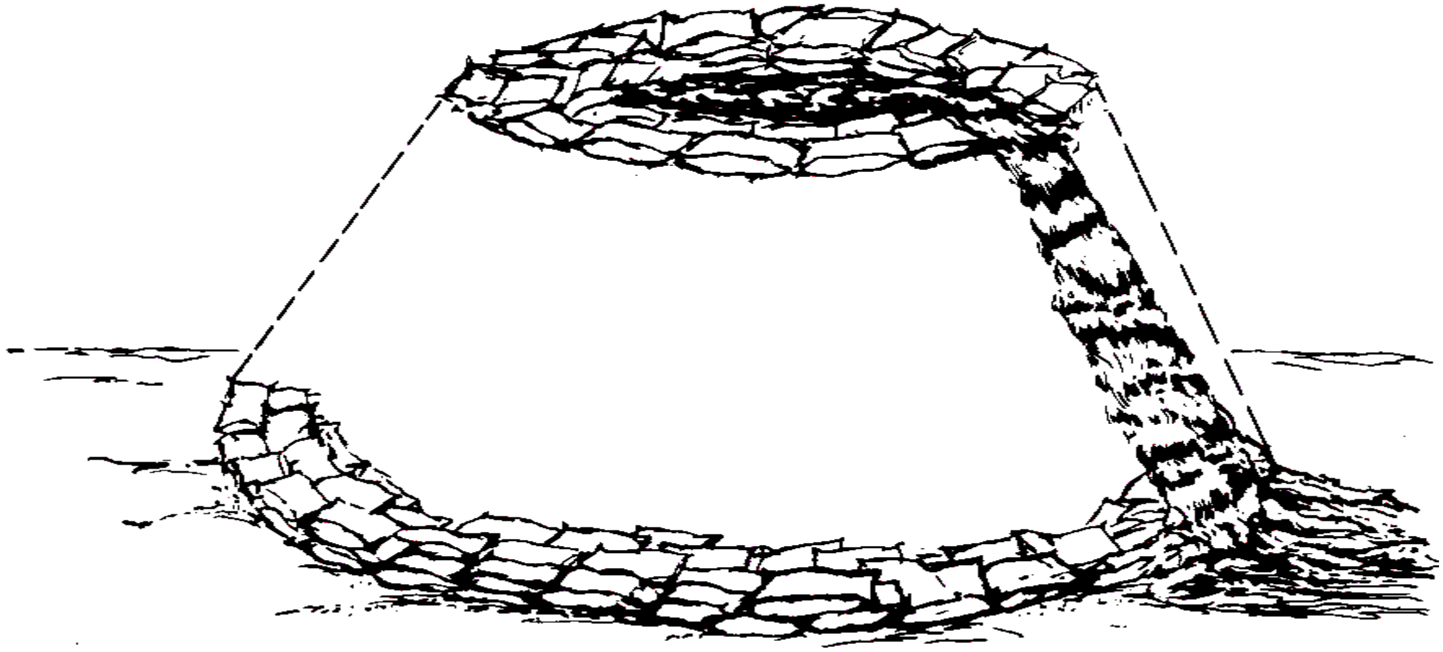
Controlled seepage through the toe of an earthen dam embankment is normal. However, rapid or significant increases in flow through the toe may begin to carry out fine soil materials, create sand boils, and produce new seep areas along the downstream face. Normal toe discharge is generally clear. Remedial actions should be taken if toe seepage quantities suddenly increase and become turbid (cloudy or muddy).

Piping is a process in which seepage dislodges and transports soil particles as it daylights on the downstream face of an embankment. An open channel forms at the point of seepage exit and works its way progressively into the embankment as erosion continues. Eventually, a completely open channel is formed through the embankment. Piping may also originate inside an embankment from any internal voids into which water can flow. Abandoned conduits could initiate piping if cracks develop in these structures. Cracks could form as a result of structural deterioration or settlement under static or earthquake loads. Slope failures extending through an embankment's core create another potential source of piping. The soils along the failure plane will be weakened and will likely be more permeable.

Internal erosion is defined as flow seeking and eroding a preferential flow path within or below the dam. This mode of failure is a soil removal process from within the embankment, and, if not corrected, will accelerate over time and ultimately lead to the collapse of the earth embankment structure. Individual “boils” downstream of the embankment dam can be an indicator that this type of failure mechanism is developing. Individual boils or small areas of seepage can be controlled on a temporary basis by ringing them with sandbags, stone, or other materials. Refer to Figures 3 and 4 for schematics of "ringing a boil" including estimated quantities of required personnel and material.

SAND BAGS / OVERTOPPING

Sand bag berms are one of the most common methods for temporarily increasing freeboard to reduce overtopping of a dam during a flood event. Figure 7 provides information on proper methods for constructing sandbag berms. Sandbag berm construction can be highly effective but requires appropriate material and is labor intensive. The maximum effective height should be limited to approximately three feet. (Source: Flood Fighting: How To Use Sandbags, US Army Corps of Engineers). It is expected that the Towns of Lee and Lenox will either stockpile sandbags at Town facilities or make arrangements with a local supplier to be able to obtain sandbags in the event of an overtopping emergency. Sand to fill the sand bags will be obtained from a local sand and gravel pit.



APPROXIMATE CONSTRUCTION REQUIREMENTS

BOIL DIA. (ft)	2			4			6			8			10		
RING HEIGHT (ft)	2	4	6	2	4	6	2	4	6	2	4	6	2	4	6
VOL. SAND REQ. (yd.^{3})	1	7	18	2	9	21	3	11	25	3	13	29	4	14	33
SANDBAGS REQUIRED	124	475	1150	160	600	1400	197	707	1600	233	824	1850	270	921	2100
PERSONNEL REQUIRED	5	5	5	10	10	10	20	20	20	25	25	25	30	30	30
TIME TO COMPLETE (hrs.)	1	3	7	1	3	5	2	3	4	2	3	4	2	3	4

SOURCE: NEW ENGLAND DIVISION ARMY CORPS OF ENGINEERS

FIGURE NO. **D-1**

JOB NO. 19896.30

WOODS POND DAM
EMERGENCY ACTION PLAN
GENERAL ELECTRIC COMPANY
LEE/LENOX, MASSACHUSETTS

BOIL RING

PROJ MGR: JDA
DESIGNED BY: DML
REVIEWED BY: ABB
OPERATOR: LGM
DATE: DEC 2013

NOT TO SCALE

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NORWOOD, MA 02062
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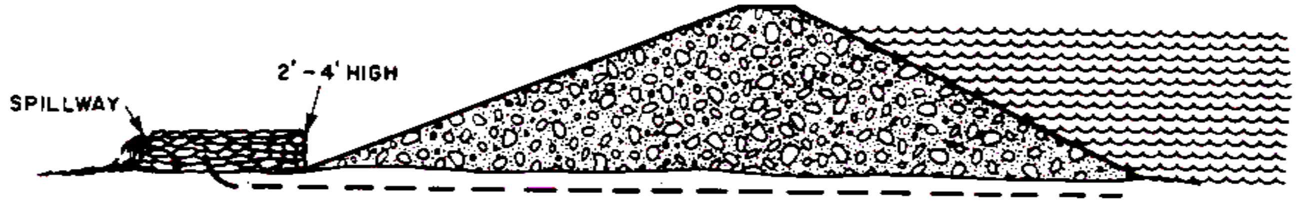
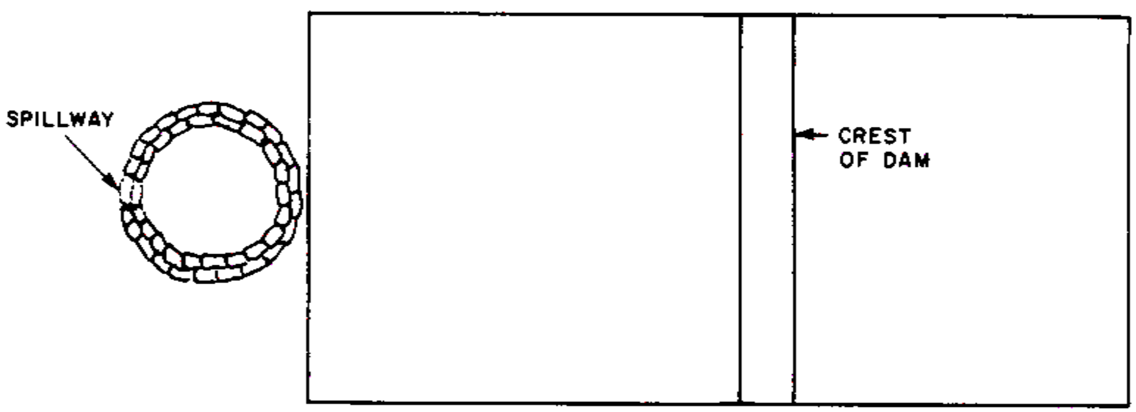
Fax: (781) 278–5701



ELEVATION

WALL SHOULD BE BUILT ON FIRM FOUNDATION, WITH WIDTH OF BASE AT LEAST 1 1/2 TIMES THE HEIGHT. BE SURE TO PLACE SACKS ON GROUND CLEAR OF SAND DISCHARGE. TIE INTO DAM IF BOIL IS NEAR TOE.



PLAN

DO NOT SACK BOIL WHICH DOES NOT PUT OUT MATERIAL. HEIGHT OF SACK LOOP OR RING SHOULD BE ONLY SUFFCIENT TO CREATE ENOUGH HEAD TO SLOW DOWN FLOW THROUGH BOIL SO THAT NO MORE MATERIAL IS DISPLACED AND BOIL RUNS CLEAR. DO NOT TRY TO STOP FULLY, FLOW THROUGH BOIL.

FIGURE NO. D-2

JOB NO. 19896.30

WOODS POND DAM
EMERGENCY ACTION PLAN
GENERAL ELECTRIC COMPANY
LENOX/LEE, MASSACHUSETTS

BOIL RING MAINTENANCE INSTRUCTIONS

PROJ MGR: JDA
DESIGNED BY: DML
REVIEWED BY: ABB
OPERATOR: LGM

DATE: DEC 2013

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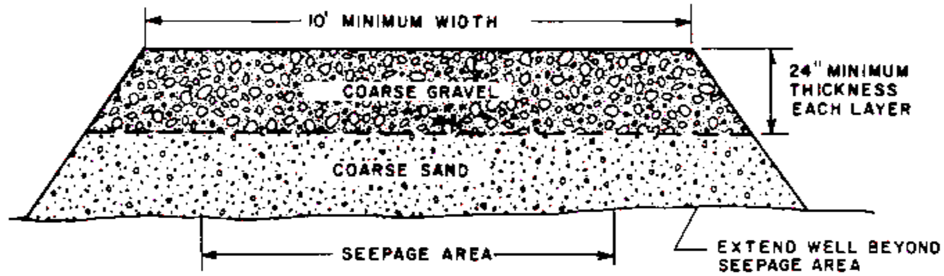
GZA–J:\19,000–20,999\19896\19896–30.JDA\EAP Update – Rising Woods\Figures\FIG–5.DWG [Layout1] December 24, 2013 – 11:50am laurie.miller



GRANULAR BLANKET

APPROXIMATE CONSTUCTION REQUIREMENTS

BLANKET AREA (ft.^{2})	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
MATERIAL REQUIRED PER LAYER (yd.^{3})	40	80	120	150	190	225	270	300	330	370
NO. TRUCKS & DRIVERS	3	3	6	6	6	8	10	10	12	12
NO. GRADERS & OPERATORS	5	5	10	10	15	15	15	20	20	20
TOTAL TIME REQUIRED (hrs)	4	8	6	8	8	8	8	8	9	10

SOURCE: NEW ENGLAND DIVISION ARMY CORPS OF ENGINEERS

FIGURE NO. D-3

JOB NO. 19896.30

WOODS POND DAM
EMERGENCY ACTION PLAN
GENERAL ELECTRIC COMPANY
LENOX/LEE, MASSACHUSETTS

GRANULAR BLANKET

PROJ MGR: JDA
DESIGNED BY: DML
REVIEWED BY: ABB
OPERATOR: LGM
DATE: DEC 2013

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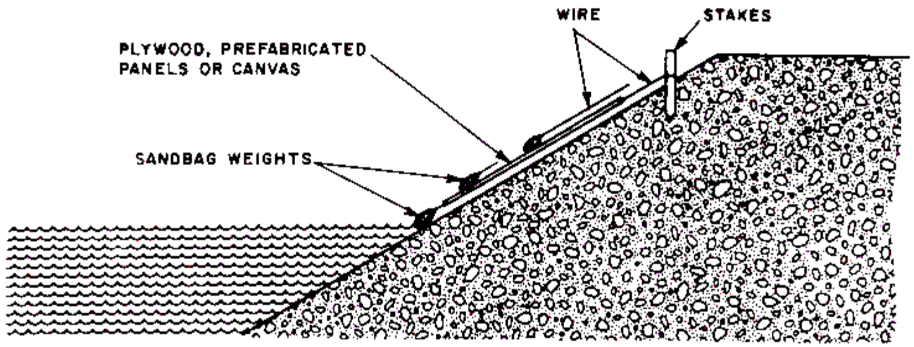
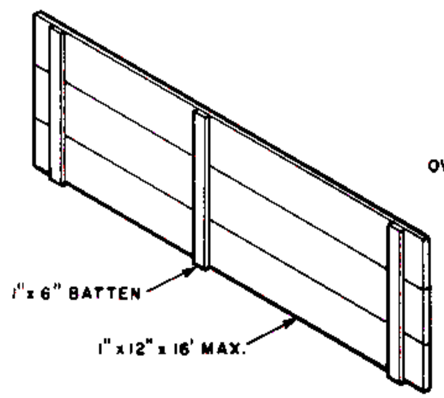
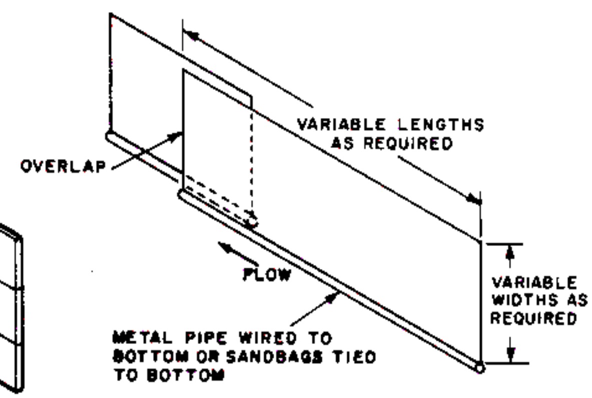
GZA–J:\19,000–20,999\19896\19896–30.JDA\EAP Update – Rising Woods\Figures\FIG–6.DWG [Layout1] December 24, 2013 – 11:49am laurie.miller





PREFABRICATED PANELS



COTTON BAGGING, CANVAS OR PLASTIC SHEETS

SOURCE: NEW ENGLAND DIVISION ARMY CORPS OF ENGINEERS

FIGURE NO. D-4

JOB NO. 19896.30

WOODS POND DAM
EMERGENCY ACTION PLAN
GENERAL ELECTRIC COMPANY
LENOX/LEE, MASSACHUSETTS

TEMPORARY EROSION PROTECTION

PROJ MGR: JDA
DESIGNED BY: DML
REVIEWED BY: ABB
OPERATOR: LGM

DATE: DEC 2013

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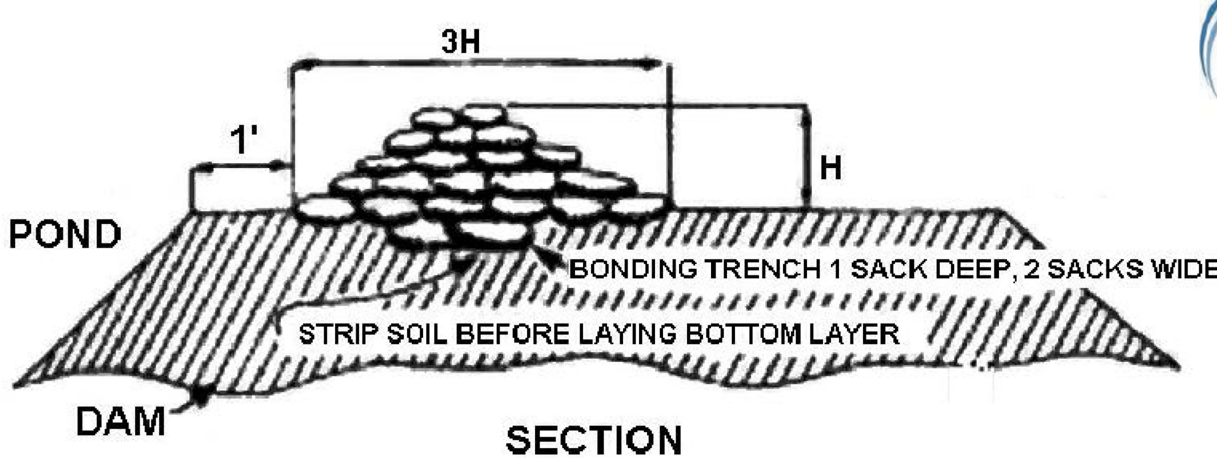

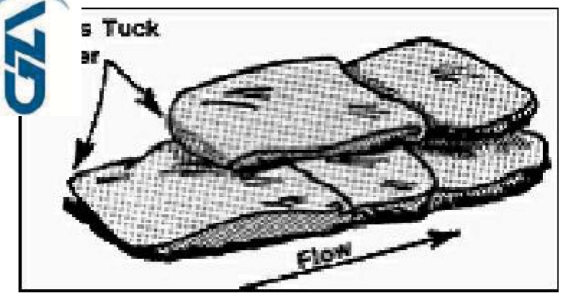

HEIGHT OF BERM	BAGS/100FEET
1 FOOT	800
2 FEET	2000
3 FEET	3400

Notes:

1) **Sandbag Preparation**

a. Utilize polypropylene or burlap bags about 14" - 18" wide and 30" -36" deep.
b. A heavy bodied or sandy soil is most desirable for filling sandbags. On-site soil sources may be utilized, as appropriate.
c. Bags should be filled between one-third (1/3) to one-half (1/2) of their capacity. This keeps the bag from getting too heavy, and permits the bags to be stacked with a good seal.
d. Untied sandbags are recommended for most situations. Tied sandbags should be used only for special situations when pre-filling and stockpiling may be required, or for specific purposes such as filling holes, holding objects in position, or to form barriers backed by supportive planks. Tied sandbags are generally easier to handle and stockpile.

2) **Sandbag Placement**

a. Remove any debris from the area where the bags are to be placed.
b. Fold the open end of the unfilled portion of the bag to form a triangle. If tied bags are used, flatten or flare the tied end.
c. Place the partially filled bags lengthwise and parallel to the direction of flow, with the open end facing against the water flow.
d. Tuck the flaps under, keeping the unfilled portion under the weight of the sack.
e. Place succeeding bags on top, offsetting by one-half (1/2) filled length of the previous bag, and stamp into place to eliminate voids, and form a tight seal.
f. Stagger the joint connections when multiple layers are necessary. For unsupported layers over three (3) courses high, use the pyramid placement method.

3) **Pyramid Placement Method**

The pyramid placement is used to increase the height of sandbag protection.

a. Place the sandbags to form a pyramid by alternating header courses (bags placed crosswise) and stretcher courses (bags placed lengthwise).
b. Stamp each bag in place, overlap sacks, maintain staggered joint placement, and tuck in any loose ends.
c. Use the table on this Figure to estimate the number of bags required

SOURCE: NEW ENGLAND DIVISION ARMY CORPS OF ENGINEERS

FIGURE NO. 7

JOB NO. 19896.30

WOODS POND DAM
EMERGENCY ACTION PLAN
GENERAL ELECTRIC COMPANY
LENOX/LEE, MASSACHUSETTS

SANDBAG BERM CONSTRUCTION

PROJ MGR: JDA
DESIGNED BY: DML
REVIEWED BY: ABB
OPERATOR: LGM

DATE: DEC 2013

D-5 [redacted]

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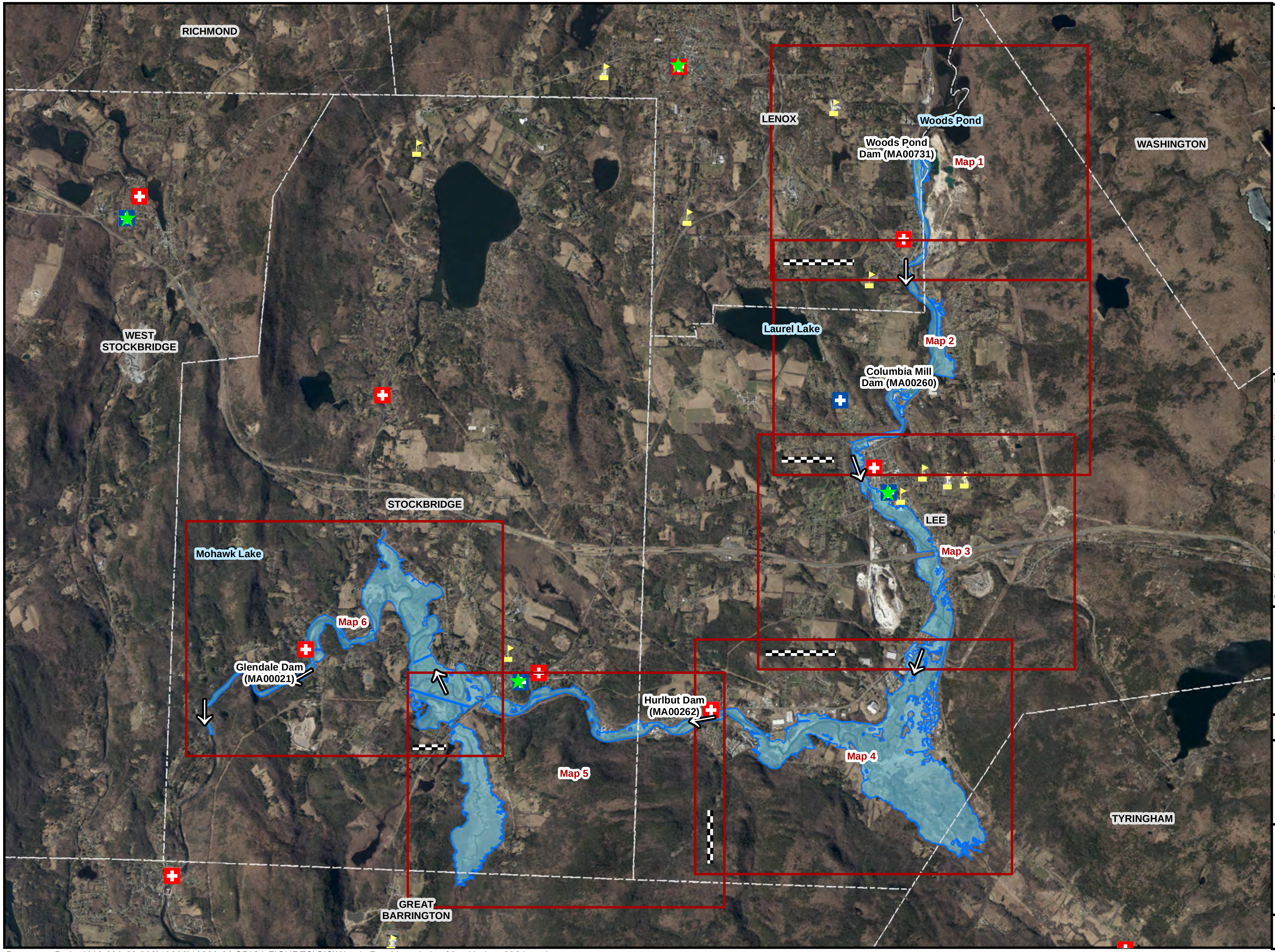
ATTACHMENT E

INUNDATION MAPS

(based on the updated Dam Break Analysis, GZA 2024)



NORTH

Page Size: 11 by 17 inches
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LEGEND

- Flow Direction
- Matchlines
- Town Halls
- Fire Stations
- Hospitals
- Police Stations
- Schools
- Municipal Boundaries
- Inundation Area for Dam Failure (Significant Hazard Breach)

NOTES:

1. THE INUNDATION AREA SHOWN IS APPROXIMATE AND SHOULD BE USED AS A GUIDELINE FOR ESTABLISHING EVACUATION ZONES.
2. ACTUAL INUNDATION AREA WILL DEPEND ON ACTUAL FAILURE CONDITIONS AND MAY DIFFER FROM THIS MAP.
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4. INUNDATION AREA REFLECTS FAILURE OF THE DAM'S EMBANKMENT, OCCURRING WHEN THE RESERVOIR IS AT THE TOP OF EMBANKMENT (953.4 FT, NAVD88) AND THE DOWNSTREAM RIVERS HAVE NORMAL BASEFLOWS REPRESENTED IN THE LIDAR.
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8. SCHOOLS LOCATIONS FROM MA DEP (JULY 2020). SCHOOLS INCLUDE PRE-K THROUGH HIGH SCHOOL
9. HOSPITALS LOCATIONS FROM THE DPH, OEMS (DEC. 2018)

INUNDATION LIMITS FOR WOODS POND DAM (MA00731)

LEE / LENOX, MASSACHUSETTS

INDEX MAP

Prepared For:

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Operator:	RSG		

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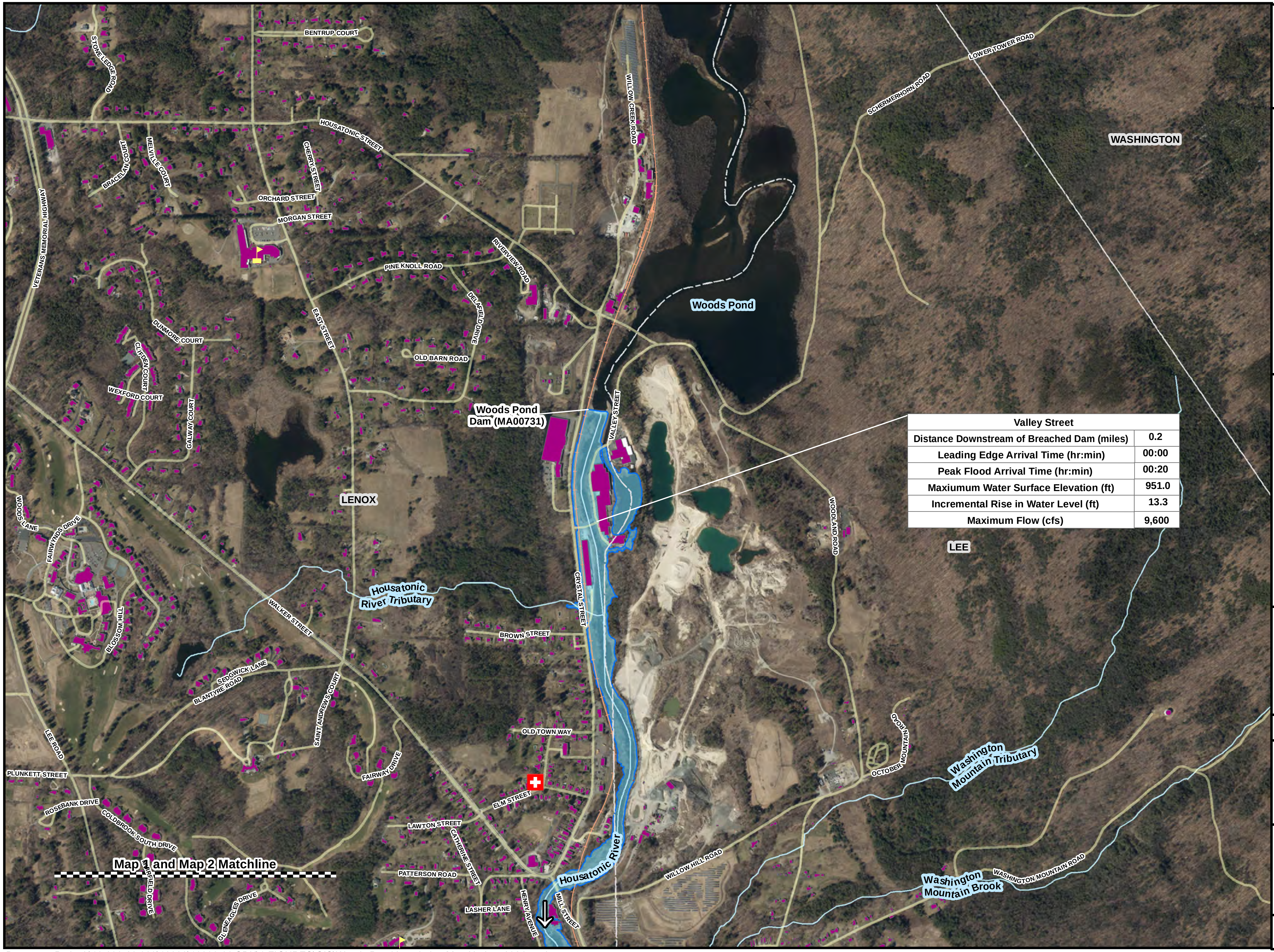

Valley Street	
Distance Downstream of Breached Dam (miles)	0.2
Leading Edge Arrival Time (hr:min)	00:00
Peak Flood Arrival Time (hr:min)	00:20
Maxiumum Water Surface Elevation (ft)	951.0
Incremental Rise in Water Level (ft)	13.3
Maximum Flow (cfs)	9,600

NORTH

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LEGEND

- Flow Direction
- Matchlines
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- Hospitals
- Police Stations
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INUNDATION LIMITS FOR WOODS POND DAM (MA00731)

LEE / LENOX, MASSACHUSETTS

INUNDATION MAP 1 OF 6

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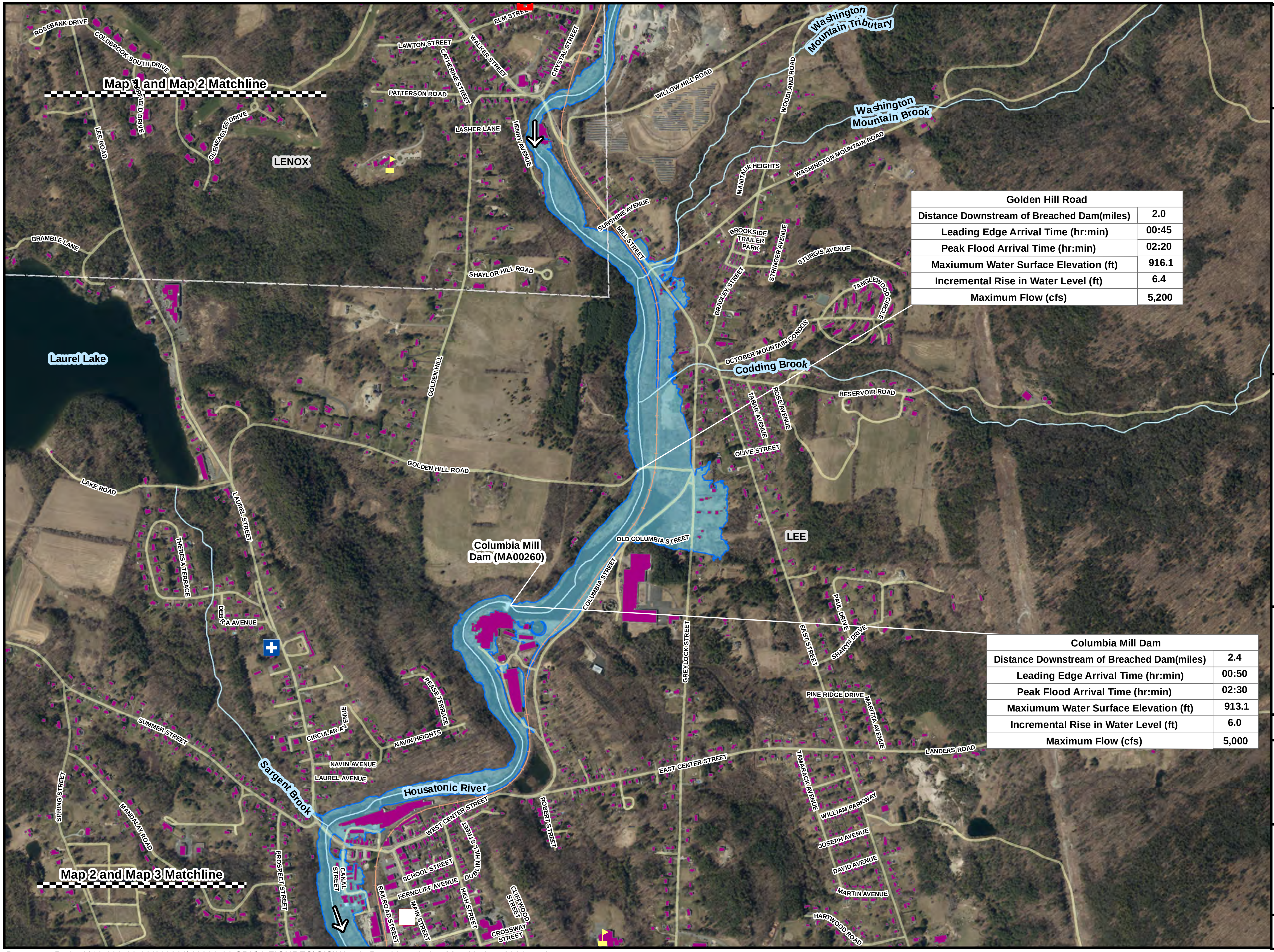

Golden Hill Road	
Distance Downstream of Breached Dam(miles)	2.0
Leading Edge Arrival Time (hr:min)	00:45
Peak Flood Arrival Time (hr:min)	02:20
Maxiumum Water Surface Elevation (ft)	916.1
Incremental Rise in Water Level (ft)	6.4
Maximum Flow (cfs)	5,200

Columbia Mill Dam	
Distance Downstream of Breached Dam(miles)	2.4
Leading Edge Arrival Time (hr:min)	00:50
Peak Flood Arrival Time (hr:min)	02:30
Maxiumum Water Surface Elevation (ft)	913.1
Incremental Rise in Water Level (ft)	6.0
Maximum Flow (cfs)	5,000

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LEGEND

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9. HOSPITALS LOCATIONS FROM THE DPH, OEMS (DEC. 2018)

INUNDATION LIMITS FOR WOODS POND DAM (MA00731)

LEE / LENOX, MASSACHUSETTS

INUNDATION MAP 2 OF 6

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Reviewed By: SK
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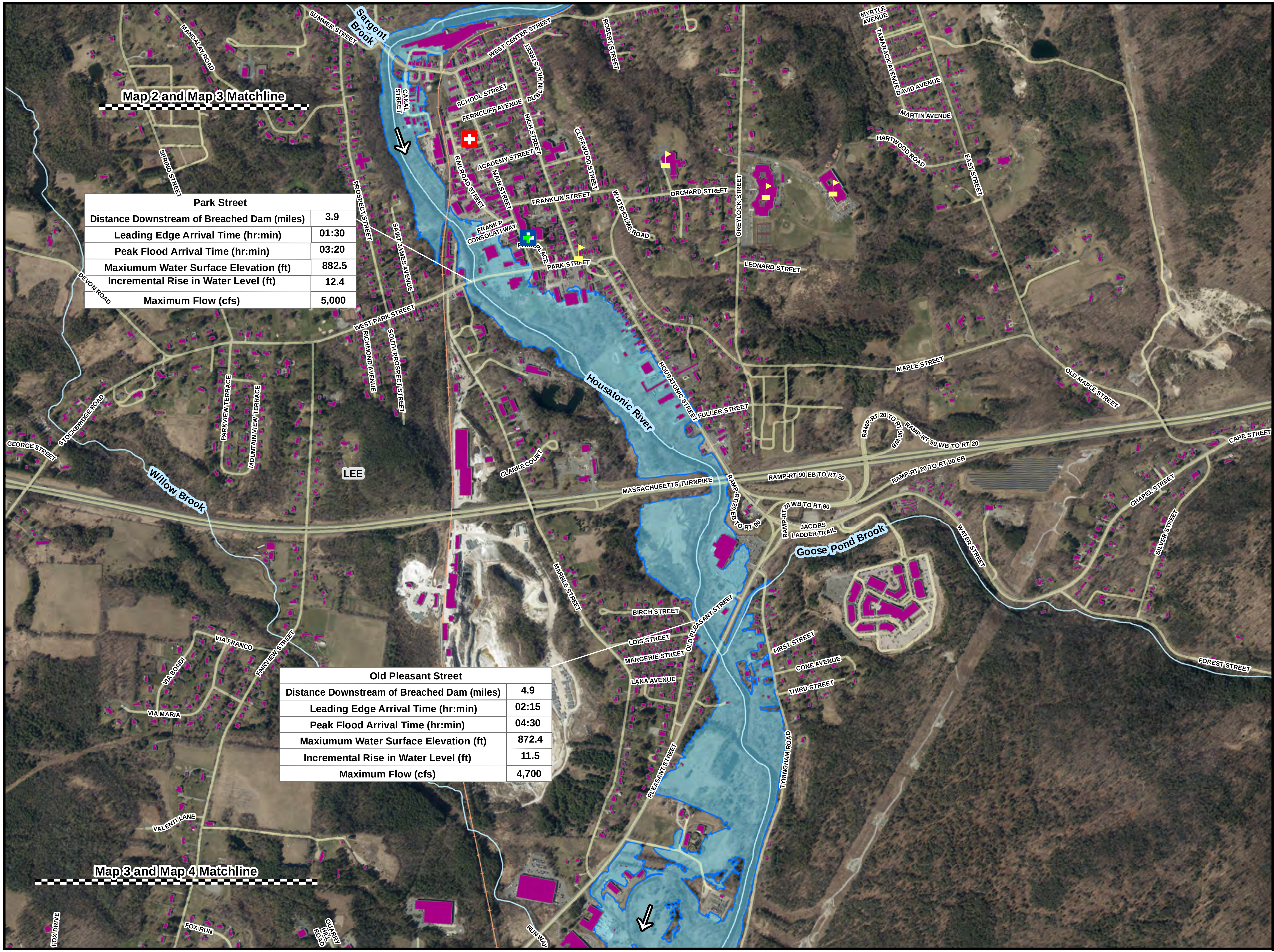

Park Street	
Distance Downstream of Breached Dam (miles)	3.9
Leading Edge Arrival Time (hr:min)	01:30
Peak Flood Arrival Time (hr:min)	03:20
Maxiumum Water Surface Elevation (ft)	882.5
Incremental Rise in Water Level (ft)	12.4
Maximum Flow (cfs)	5,000

Old Pleasant Street	
Distance Downstream of Breached Dam (miles)	4.9
Leading Edge Arrival Time (hr:min)	02:15
Peak Flood Arrival Time (hr:min)	04:30
Maxiumum Water Surface Elevation (ft)	872.4
Incremental Rise in Water Level (ft)	11.5
Maximum Flow (cfs)	4,700

NORTH

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LEGEND

- Flow Direction
- Matchlines
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INUNDATION LIMITS FOR WOODS POND DAM (MA00731)

LEE / LENOX, MASSACHUSETTS

INUNDATION MAP 3 OF 6

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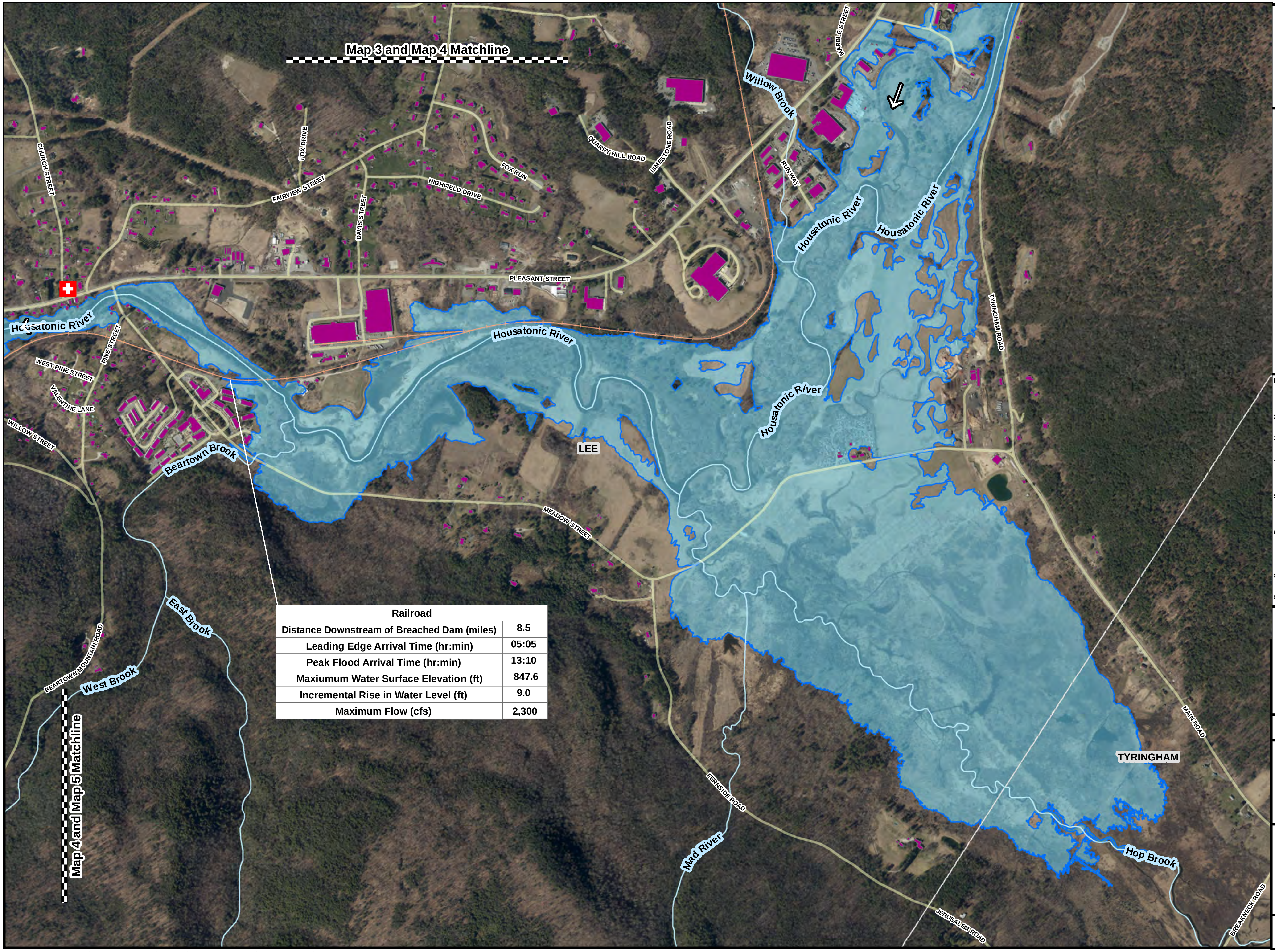

Railroad	
Distance Downstream of Breached Dam (miles)	8.5
Leading Edge Arrival Time (hr:min)	05:05
Peak Flood Arrival Time (hr:min)	13:10
Maxiumum Water Surface Elevation (ft)	847.6
Incremental Rise in Water Level (ft)	9.0
Maximum Flow (cfs)	2,300

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LEGEND

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4. INUNDATION AREA REFLECTS FAILURE OF THE DAM'S EMBANKMENT, OCCURRING WHEN THE RESERVOIR IS AT THE TOP OF EMBANKMENT (953.4 FT, NAVD88) AND THE DOWNSTREAM RIVERS HAVE NORMAL BASEFLOWS REPRESENTED IN THE LIDAR.
5. THE INUNDATION AREAS SHOWN ON THIS MAP REFLECT EVENTS OF AN EXTREMELY REMOTE NATURE. THESE RESULTS ARE NOT IN ANY WAY INTENDED TO REFLECT UPON THE INTEGRITY OF RISING POND DAM.
6. ELEVATION REFERENCE DATUM USED IN THE MODEL WAS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
7. AERIAL PHOTO OBTAINED FROM MASSGIS (DATE OF IMAGERY IS SPRING 2019).
8. SCHOOLS LOCATIONS FROM MA DEP (JULY 2020). SCHOOLS INCLUDE PRE-K THROUGH HIGH SCHOOL
9. HOSPITALS LOCATIONS FROM THE DPH, OEMS (DEC. 2018)

INUNDATION LIMITS FOR WOODS POND DAM (MA00731)

LEE / LENOX, MASSACHUSETTS

INUNDATION MAP 4 OF 6

Prepared For:

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Reviewed By: SK
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Dwg. Date: 11/26/2024
Job No.: 01.0019896.80

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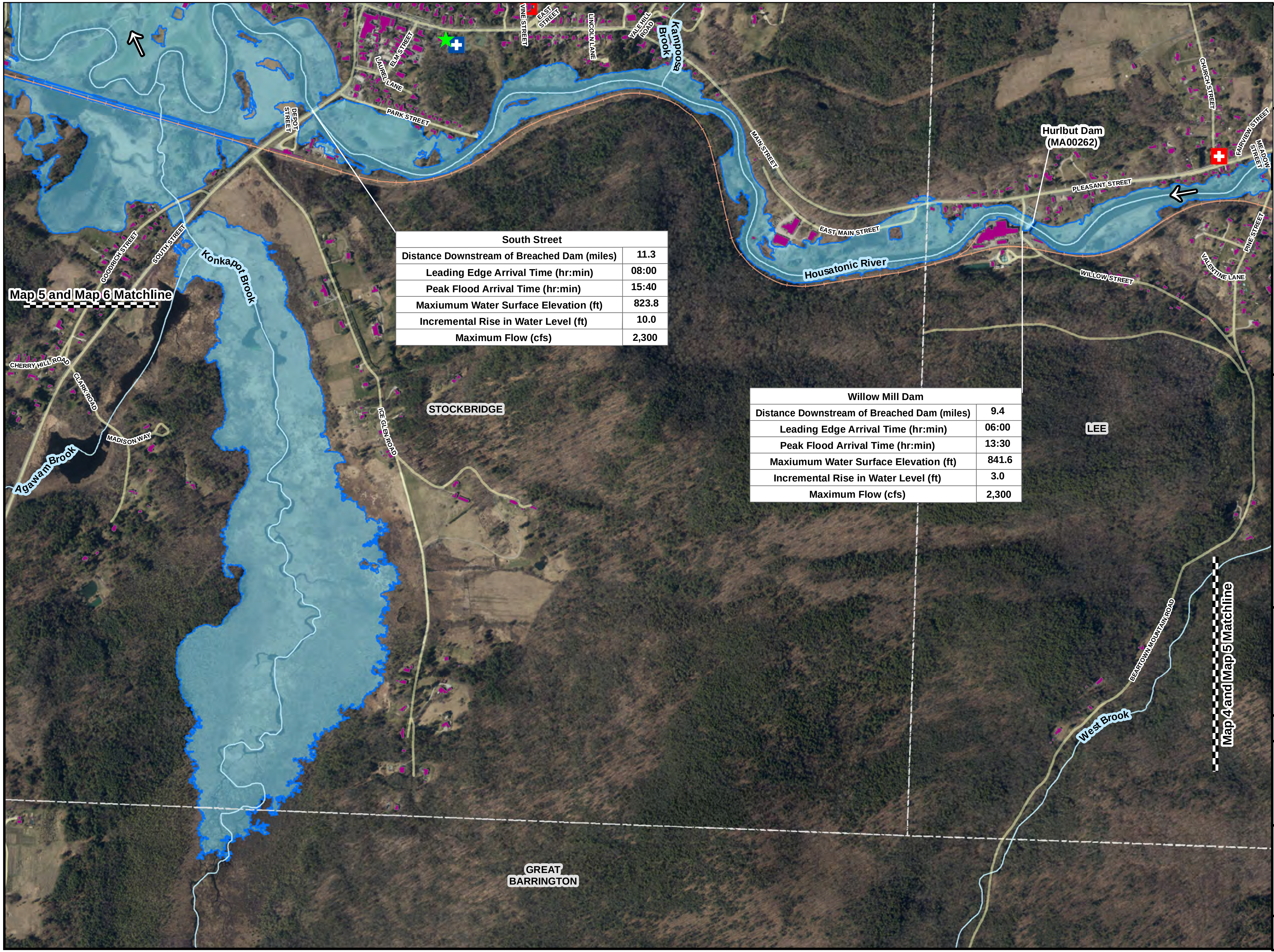

South Street	
Distance Downstream of Breached Dam (miles)	11.3
Leading Edge Arrival Time (hr:min)	08:00
Peak Flood Arrival Time (hr:min)	15:40
Maxiumum Water Surface Elevation (ft)	823.8
Incremental Rise in Water Level (ft)	10.0
Maximum Flow (cfs)	2,300

Willow Mill Dam	
Distance Downstream of Breached Dam (miles)	9.4
Leading Edge Arrival Time (hr:min)	06:00
Peak Flood Arrival Time (hr:min)	13:30
Maxiumum Water Surface Elevation (ft)	841.6
Incremental Rise in Water Level (ft)	3.0
Maximum Flow (cfs)	2,300

NORTH

Page Size: 11 by 17 inches
1 inch = 1,000 feet

0 500 1,000 2,000 Feet

LEGEND
- Flow Direction
- Matchlines
- Town Halls
- Fire Stations
- Hospitals
- Police Stations
- Schools
- Roadways
- Rivers & Streams
- Municipal Boundaries
- Railroads
- Inundation Area for Dam Failure (Significant Hazard Breach)

NOTES:

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2. ACTUAL INUNDATION AREA WILL DEPEND ON ACTUAL FAILURE CONDITIONS AND MAY DIFFER FROM THIS MAP.
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INUNDATION LIMITS FOR WOODS POND DAM (MA00731)

LEE / LENOX, MASSACHUSETTS

INUNDATION MAP 5 OF 6

Prepared For:

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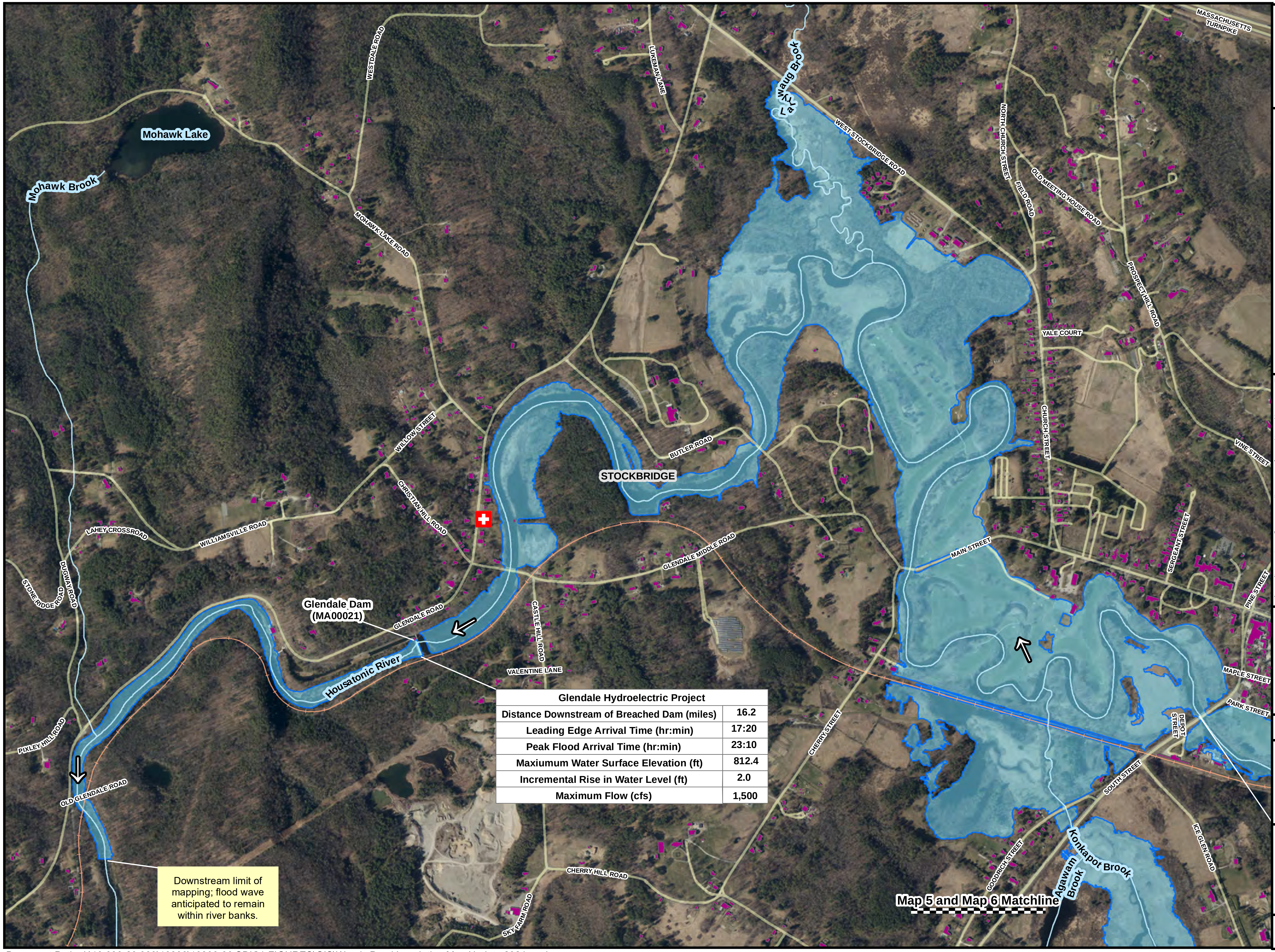
Proj. Mgr.:	JDA	Dwg. Date:	11/26/2024
Designed By:	RSG		
Reviewed By:	SK	Job No.:	01.0019896.80
Operator:	RSG		

Document Path: J:\19,000-20,999\19896\19896-80.SDK\4-FIGURES\GIS\Woods Pond Inundation Map Update 2024.mxd



Glendale Hydroelectric Project	
Distance Downstream of Breached Dam (miles)	16.2
Leading Edge Arrival Time (hr:min)	17:20
Peak Flood Arrival Time (hr:min)	23:10
Maxiumum Water Surface Elevation (ft)	812.4
Incremental Rise in Water Level (ft)	2.0
Maximum Flow (cfs)	1,500

NORTH

Page Size: 11 by 17 inches
1 inch = 1,000 feet

0 500 1,000 2,000 Feet

LEGEND

- Flow Direction
- Matchlines
- Town Halls
- Fire Stations
- Hospitals
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- Schools
- Roadways
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- Municipal Boundaries
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INUNDATION LIMITS FOR WOODS POND DAM (MA00731)

LEE / LENOX, MASSACHUSETTS

INUNDATION MAP 6 OF 6

Prepared For:

GENERAL ELECTRIC COMPANY

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ATTACHMENT F

INSPECTION GUIDELINES

(from Texas Commission on Environmental Quality)

Figure 5.1
Inspection Guidelines - Upstream Slope

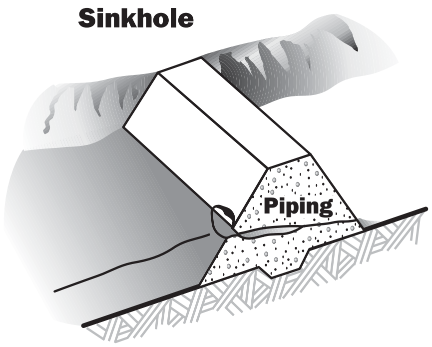


Figure 5.1a

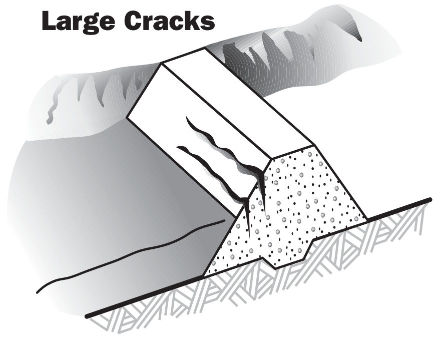


Figure 5.1b

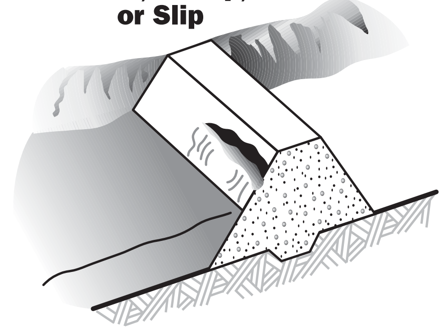


Figure 5.1c

Problem	Probable Cause and Possible Consequences	Recommended Actions
Sinkhole *(Figure 5.1a)*	Piping or internal erosion of embankment materials or foundation causes a sinkhole. The cave-in of an eroded cavern can result in a sinkhole. A small hole in the wall of an outlet pipe can develop into a sinkhole. Dirty water at the exit indicates erosion of the dam. Piping can empty a reservoir through a small hole in the wall or can lead to failure of a dam as soil pipes erode through the foundation or a pervious part of the dam. Dispersive soils are particularly susceptible to sinkholes.	Inspect other parts of the dam for seepage or more sinkholes. Check seepage and leakage outflows for dirty water. A qualified engineer should inspect the conditions, identify the exact cause of sinkholes, and recommend further actions. Depending on the location in the embankment, the reservoir may need to be drawn down. ENGINEER REQUIRED
Large Cracks *(Figure 5.1b)*	A portion of the embankment has moved because of loss of strength, or the foundation may have moved, causing embankment movement. Indicates onset of massive slide or settlement caused by foundation failure.	Depending on embankment involved, draw reservoir level down. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED
Slide, Slump, or Slip *(Figure 5.1c)*	Earth or rocks move down the slope along a slippage surface because of too steep a slope, or the foundation moves. Also, look for slide movements in reservoir basin. A series of slides can lead to obstruction of the inlet or failure of the dam.	Evaluate extent of the slide. Monitor slide. (See Chapter 6.) Draw the reservoir level down if safety of dam is threatened. A qualified engineer should inspect the conditions and recommend further actions. ENGINEER REQUIRED

Figure 5.1 *(cont.)*
Inspection Guidelines - Upstream Slope

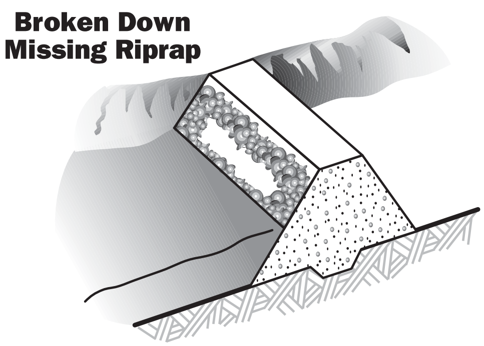


Figure 5.1d

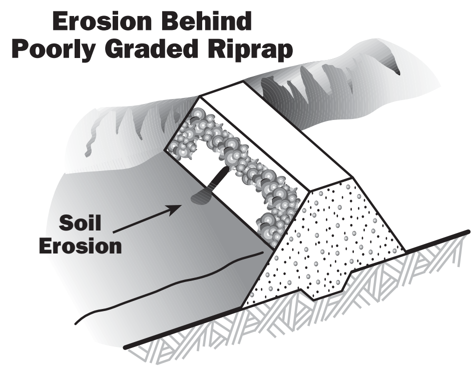


Figure 5.1e

Problem	Probable Cause and Possible Consequences	Recommended Actions
Scarps, Benches, Oversteep Areas	Wave action, local settlement, or ice action cause soil and rock to erode and slide to the lower part of the slope, forming a bench. Erosion lessens the width and possible height of the embankment and could lead to seepage or overtopping of the dam.	Determine exact cause of scarps. Do necessary earthwork, restore embankment to original slope, and supply adequate protection (bedding and riprap). (See Chapter 7.)
Broken Down, Missing Riprap ***(Figure 5.1d)***	Poor-quality riprap has deteriorated. Wave action or ice action has displaced riprap. Round and similar-sized rocks have rolled downhill. Wave action against these unprotected areas decreases embankment width.	Reestablish normal slope. Place bedding and competent riprap. (See Chapter 7.)
Erosion Behind Poorly Graded Riprap ***(Figure 5.1e)***	Similar-sized rocks allow waves to pass between them and erode small gravel particles and soil. Soil is eroded away from behind the riprap. This allows riprap to settle, offering less protection and decreased embankment width.	Reestablish effective slope protection. Place bedding material. ENGINEER REQUIRED for design—for graduation and size for rock for bedding and riprap. A qualified engineer should inspect the conditions and recommend further actions.

Figure 5.2
Inspection Guidelines - Downstream Slope

Slide/Slough

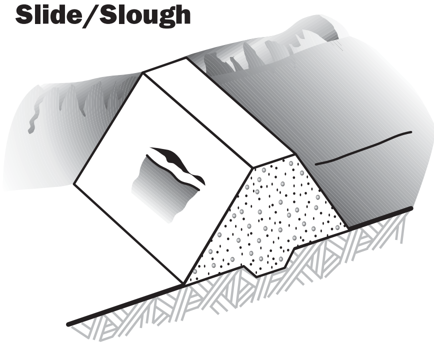


Figure 5.2a

Transverse Cracking

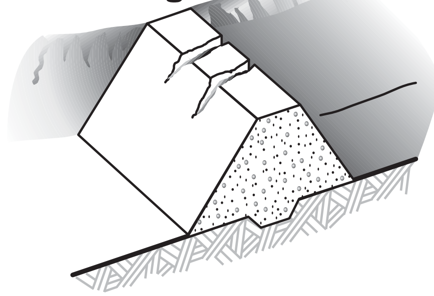


Figure 5.2b

Cave In/ Collapse

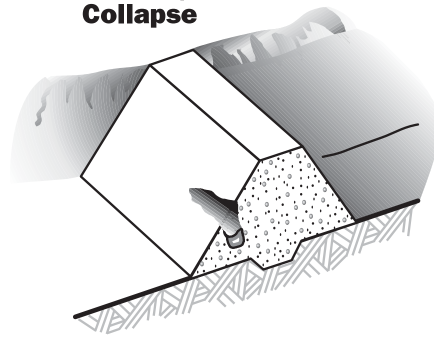


Figure 5.2c

Problem	Probable Cause and Possible Consequences	Recommended Actions
Slide or Slough *(Figure 5.2a)*	Lack loss of strength of embankment material. Loss of strength can be attributed to infiltration of water into the embankment or loss of support by the foundation. Massive slide cuts through crest or upstream slope reducing freeboard and cross-section. Structural collapse or overtopping can result	1. Measure extent and displacement of slide. If continued movement is seen, begin lowering water level until movement stops. 2. Have a qualified engineer inspect the condition and recommend further action. ENGINEER REQUIRED
Transverse Cracking *(Figure 5.2b)*	1. Uneven movement between adjacent segments of the embankment. 2. Deformation caused by structural stress or instability. 1. Can provide a path for seepage through the embankment cross-section. 2. Provides local area of low strength within embankment. Future structural movement, deformation or failure could begin. 3. Provides entrance point for surface run-off to enter embankment	1. Inspect crack and carefully record crack location, length, depth, width and other pertinent physical features. Stake out limits of cracking. Engineer should determine cause of cracking and supervise all steps necessary to reduce danger to dam and correct condition. 2. Excavate slope along crack to a point below the bottom of the crack. Then, backfill excavation using competent material and correct construction techniques. This will seal the crack against seepage and surface runoff. This should be supervised by engineer. Continue to monitor crest routinely for evidence of future cracking. ENGINEER REQUIRED
Cave-in or Collapse *(Figure 5.2c)*	1. Lack of adequate compaction. 2. Rodent hole below. 3. Piping through embankment or foundation. 4. Presence of dispersive soils. Indicates possible washout of embankment.	1. Inspect for and immediately repair rodent holes. Control rodents to prevent future damage. 2. Have a qualified engineer inspect the condition and recommend further action. ENGINEER REQUIRED

Figure 5.2 *(cont.)*
Inspection Guidelines - Downstream Slope

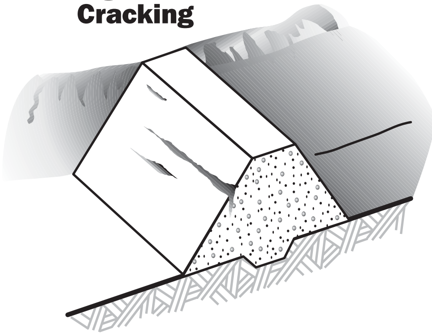


Figure 5.2d

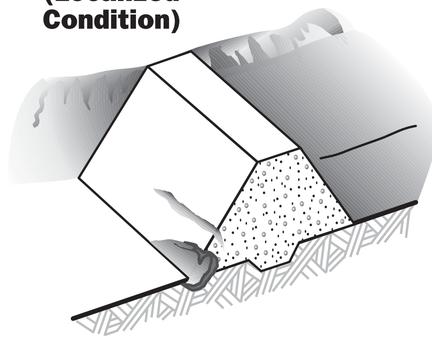


Figure 5.2e

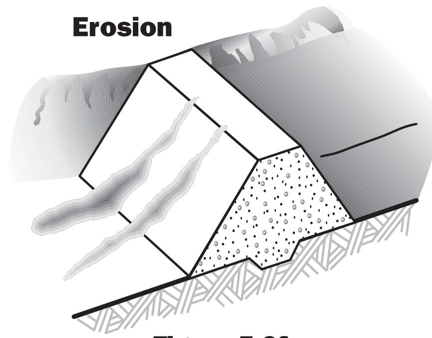


Figure 5.2f

Problem	Probable Cause and Possible Consequences	Recommended Actions
Longitudinal Cracking *(Figure 5.2d)*	1. Drying and shrinkage of surface material. 2. Downstream movement or settlement of embankment. 1. Can be an early warning of a potential slide. 2. Shrinkage cracks allow water to enter the embankment and freezing will further crack the embankment. 3. Settlement or slide, showing loss of strength in embankment that can lead to failure.	1. If cracks are from drying, dress area with well-compacted material to keep surface water out and natural moisture in. 2. If cracks are extensive, a qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED
Slump ***(localized condition)*** *(Figure 5.2e)*	Preceded by erosion undercutting a portion of the slope. Can also be found on steep slopes. Can expose impervious zone to erosion and lead to additional slumps.	1. Inspect area for seepage. 2. Monitor for progressive failure. 3. Have a qualified engineer inspect the condition and recommend further action. ENGINEER REQUIRED
Erosion *(Figure 5.2f)*	Water from intense rainstorms or snowmelt carries surface material down the slope, resulting in continuous troughs. Can be hazardous if allowed to continue. Erosion can lead to eventual deterioration of the downstream slope and failure of the structure.	1. The preferred method to protect eroded areas is rock or riprap. 2. Reestablishing protective grasses can be adequate if the problem is detected early.

Figure 5.2 ***(cont.)***
Inspection Guidelines - Downstream Slope

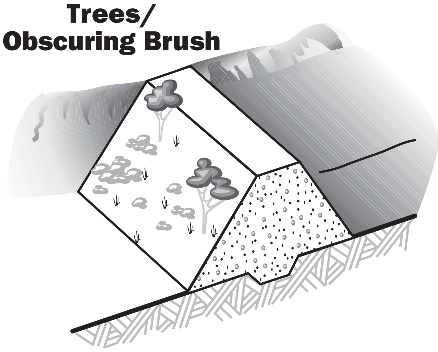


Figure 5.2g

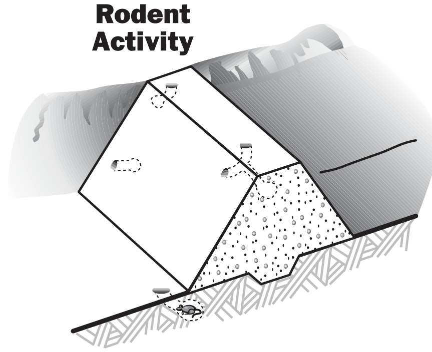


Figure 5.2h

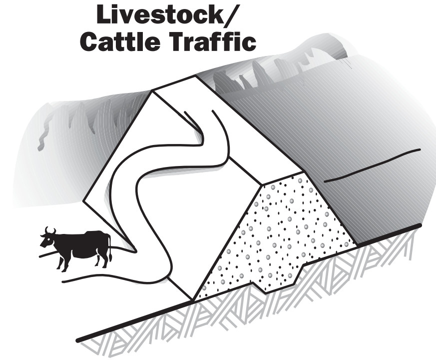


Figure 5.2i

Problem	Probable Cause and Possible Consequences	Recommended Actions
Trees, Obscuring Brush *(Figure 5.2g)*	Natural vegetation in area. Large tree roots can create seepage paths. Large trees can blow over during storms and damage dam or cause breach. Bushes can obscure visual inspection and harbor rodents.	1. Remove all brush and trees less than 4" in diameter. Larger trees may be allowed to stay until they die. At that time, the tree, with its root system, should be removed and the void properly filled with compacted soil. (See Chapter 7.) 2. Control vegetation on the embankment that obscures visual inspection. (See Chapter 7.)
Rodent Activity *(Figure 5.2h)*	Overabundance of rodents. Animal burrowing creates holes, tunnels, and caverns. Certain habitats, such as cattail-filled areas and trees close to the reservoir encourage these animals. Can reduce length of seepage path and lead to piping failure. If tunnel runs through most of the dam, it can lead to collapse.	1. Control rodents to prevent more damage. 2. Backfill existing rodent holes. 3. Remove rodents. Determine exact location and extent of tunneling. Remove habitat and repair damages. (See Chapter 7.)
Livestock ***(such as cattle)*** **Traffic** *(Figure 5.2i)*	Excessive travel by livestock especially harmful to slope when wet. Creates areas bare of erosion protection and causes erosion channels. Allows water to stand. Area susceptible to drying cracks.	1. Fence livestock outside embankment area. 2. Repair erosion protection, i.e. riprap, grass.

Figure 5.3
Inspection Guidelines - Embankment Crest

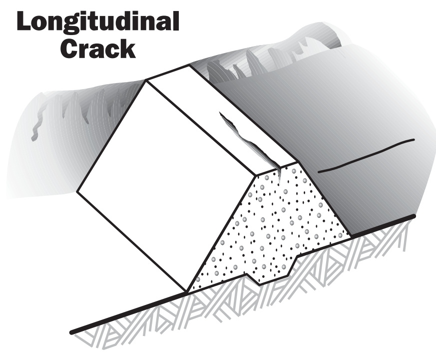


Figure 5.3a

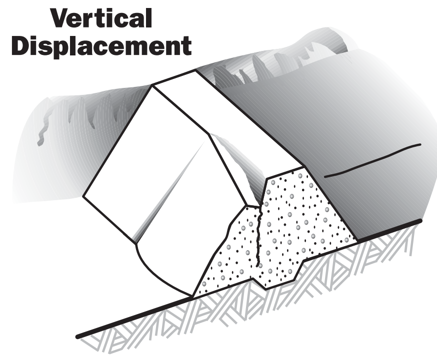


Figure 5.3b

Problem	Probable Cause and Possible Consequences	Recommended Actions
Longitudinal Crack *(Figure 5.3a)*	1. Uneven settlement between adjacent sections or zones within the embankment. 2. Foundation failure causing loss of support to embankment. 3. Initial stages of embankment slide. 1. Creates local area of low strength within an embankment. Could be the point of initiation of future structural movement, deformation or failure. 2. Provides entrance point for surface runoff into embankment, allowing saturation of adjacent embankment area and possible lubrication which could lead to localized failure.	1. Inspect crack and carefully record location, length, depth, width, alignment, and other pertinent physical features. Immediately stake out limits of cracking. Monitor frequently. 2. Engineer should determine cause of cracking and supervise steps necessary to reduce danger to dam and correct condition. 3. Effectively seal the cracks at the crest surface to prevent infiltration by surface water. 4. Continue to routinely monitor crest for evidence of further cracking. ENGINEER REQUIRED
Vertical Displacement *(Figure 5.3b)*	1. Vertical movement between adjacent sections of the embankment. 2. Structural deformation or failure caused by structure stress or instability, or by failure of the foundation. 1. Creates local area of low strength within embankment which could cause future movement. 2. Leads to structural instability or failure. 3. Creates entrance point for surface water that could further lubricate failure plane. 4. Reduces available embankment cross-section.	1. Carefully inspect displacement and record its location, vertical and horizontal displacement, length and other physical features. Immediately stake out limits of cracking. 2. Engineer should determine cause of displacement and supervise all steps necessary to reduce danger to dam and correct condition. 3. Excavate area to the bottom of the displacement. Backfill excavation using competent material and correct construction techniques, under supervision of engineer. 4. Continue to monitor areas routinely for evidence of cracking or movement. (See Chapter 6.) ENGINEER REQUIRED

Figure 5.3 *(cont.)*
Inspection Guidelines - Embankment Crest

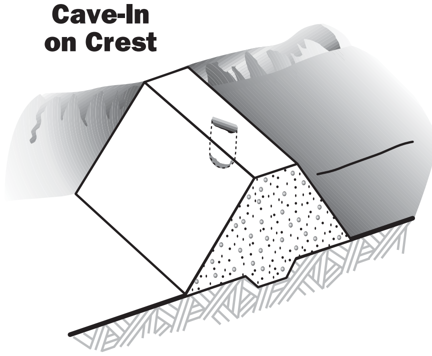


Figure 5.3c

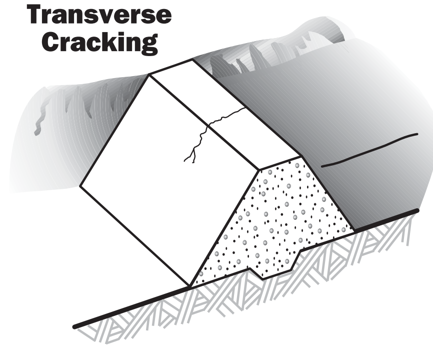


Figure 5.3d

Problem	Probable Cause and Possible Consequences	Recommended Actions
Cave-in On Crest *(Figure 5.3c)*	1. Rodent activity. 2. Hole in outlet conduit is causing erosion of embankment material. 3. Internal erosion or piping of embankment material by seepage. 4. Breakdown of dispersive clays within embankment by seepage waters. 1. Void within dam could cause localized caving, sloughing, instability or reduced embankment cross-section. 2. Entrance point for surface water.	1. Carefully inspect and record location and physical characteristics (depth, width, length) of cave-in. 2. Engineer should determine cause of cave-in and supervise all steps necessary to reduce threat to dam and correct condition. 3. Excavate cave-in, slope sides of excavation and backfill hole with competent material using proper construction techniques. (See Chapter 7.) This should be supervised by engineer. ENGINEER REQUIRED
Transverse Cracking *(Figure 5.3d)*	1. Uneven movement between adjacent segments of the embankment. 2. Deformation caused by structural stress or instability. 1. Can provide a path for seepage through the embankment cross-section. 2. Provides local area of low strength within embankment. Future structural movement, deformation or failure could begin. 3. Provides entrance point for surface runoff to enter embankment.	1. Inspect crack and carefully record crack location, length, depth, width and other pertinent physical features. Stake out limits of cracking. 2. Engineer should determine cause of cracking and supervise all steps necessary to reduce danger to dam and correct condition. 3. Excavate crest along crack to a point below the bottom of the crack. Then backfilling excavation using competent material and correct construction techniques. This will seal the crack against seepage and surface runoff. (See Chapter 7.) This should be supervised by engineer. 4. Continue to monitor crest routinely for evidence of future cracking. (See Chapter 4.) ENGINEER REQUIRED

Figure 5.3 *(cont.)*
Inspection Guidelines - Embankment Crest

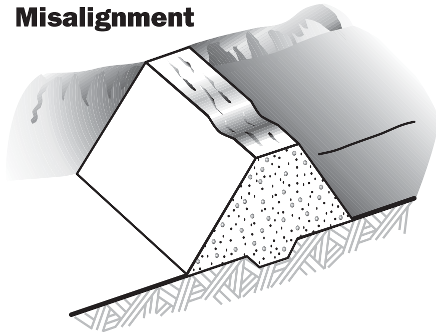


Figure 5.3e

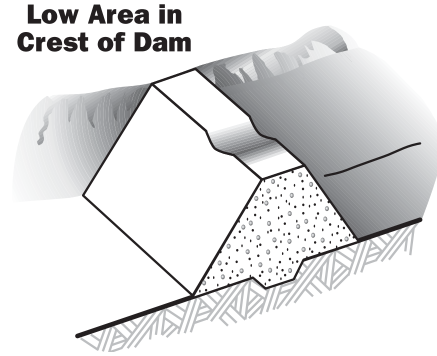


Figure 5.3f

Problem	Probable Cause and Possible Consequences	Recommended Actions
Crest Misalignment *(Figure 5.3e)*	1. Movement between adjacent parts of the structure. 2. Uneven deflection of dam under loading by reservoir. 3. Structural deformation or failure near area of misalignment. 1. Area of misalignment is usually accompanied by low area in crest which reduces freeboard. 2. Can produce local areas of low embankment strength which may lead to failure.	1. Establish monuments across crest to determine exact amount, location, and extent of misalignment. 2. Engineer should determine cause of misalignment and supervise all steps necessary to reduce threat to dam and correct condition. 3. Following remedial action, monitor crest monuments according to a schedule to detect any movement. (See Chapter 6.) ENGINEER REQUIRED
Low Area in Crest *(Figure 5.3f)*	1. Excessive settlement in the embankment or foundation directly beneath the low area in the crest. 2. Internal erosion of embankment material. 3. Foundation spreading to upstream and/or downstream direction. 4. Prolonged wind erosion of crest area. 5. Improper final grading following construction. Reduces freeboard available to pass flood flows safely through spillway.	1. Establish monuments along length of crest to determine exact amount, location, and extent of settlement in crest. 2. Engineer should determine cause of low area and supervise all steps necessary to reduce possible threat to the dam and correct condition. 3. Reestablish uniform crest elevation over crest length by filling in low area using proper construction techniques. This should be supervised by engineer. 4. Reestablish monuments across crest of dam and routinely monitor monuments to detect any settlement. ENGINEER REQUIRED

Figure 5.3 *(cont.)*
Inspection Guidelines - Embankment Crest

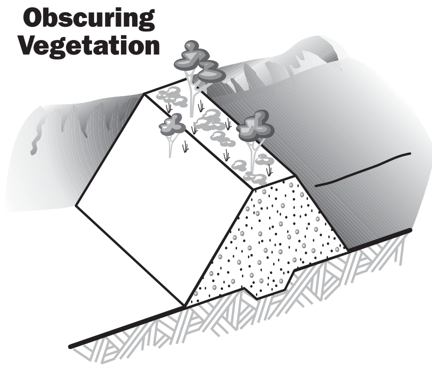


Figure 5.3g

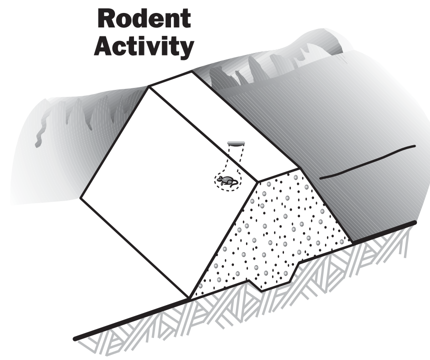


Figure 5.3h

Problem	Probable Cause and Possible Consequences	Recommended Actions
Obscuring Vegetation ***(Figure 5.3g)***	Neglect of dam and lack of proper maintenance procedures. 1. Obscures large parts of the dam, preventing adequate, accurate visual inspection of all parts of the dam. Problems which threaten the integrity of the dam can develop and remain undetected until they progress to a point that threatens the dam's safety. 2. Associated root systems develop and penetrate into the dam's cross-section. When the vegetation dies, the decaying root systems can provide paths for seepage. This reduces the effective seepage path through the embankment and could lead to possible piping situations. 3. Prevents easy access to all parts of the dam for operation, maintenance and inspection. 4. Provides habitat for rodents. 5. Large trees can blow over during storms, resulting in damage and possible breach of the dam.	1. Remove all damaging growth from the dam. This would include removal of trees (4-inches or less in diameter), bushes, brush, conifers and growth other than grass. Grass should be encouraged on all segments of the dam to prevent erosion by surface runoff. Root systems should also be removed to the maximum practical extent. The void which results from removing the root system should backfilled with well-competent, well-compacted material. 2. Future undesirable growth should be removed by cutting or spraying, as part of an annual maintenance program. (See Chapter 7.) 3. All cutting or debris resulting from the vegetative removal should be immediately taken from the dam and properly disposed of outside the reservoir basin. An engineer should be involved if the tree removal process poses a threat to the dam.
Rodent Activity ***(Figure 5.3h)***	Burrowing animals. 1. Entrance point for surface runoff to enter dam. Could saturate adjacent portions of the dam. 2. Especially dangerous if hole penetrates dam below phreatic line. During periods of high storage, seepage path through the dam would be greatly reduced and a piping situation could develop. Tunnels can lead to collapse of crest and possible failure.	1. Completely backfill the hole with competent well-compacted material. 2. Initiate a rodent control program to reduce the burrowing animal population and to prevent future damage to the dam. (See Chapter 7.)

Figure 5.3 *(cont.)*
Inspection Guidelines - Embankment Crest

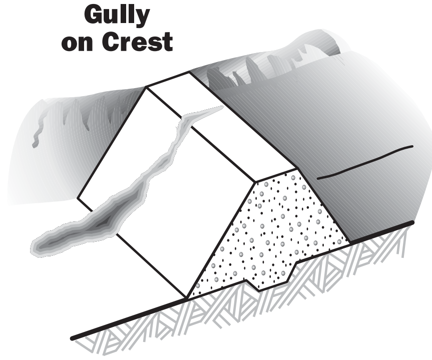


Figure 5.3i

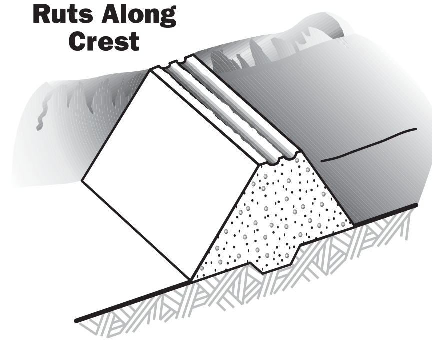


Figure 5.3j

Problem	Probable Cause and Possible Consequences	Recommended Actions
Gully on Crest *(Figure 5.3i)*	1. Poor grading and improper drainage of crest. Improper drainage causes surface runoff to collect and drain off crest at low point in upstream or downstream shoulder. 2. Inadequate spillway capacity which has caused dam to overtop. 1. Can reduce available freeboard. 2. Reduces cross-sectional area of dam. 3. Inhibits access to all parts of the crest and dam. 4. Can result in a hazardous condition if due to overtopping.	1. Restore freeboard to dam by adding fill material to low area, using proper construction techniques. (See Chapter 7.) 2. Regrading crest to provide proper drainage of surface runoff. 3. If gully was caused by overtopping, create adequate spillway that meets current design standards. This should be done by engineer. 4. Reestablish protective cover.
Ruts Along Crest *(Figure 5.3j)*	Heavy vehicle traffic without adequate or proper maintenance or proper crest surfacing 1. Inhibits easy access to all parts of crest. 2. Allows continued development of rutting. 3. Allows standing water to collect and saturate crest of dam. 4. Operating and maintenance vehicles can get stuck.	1. Drain standing water from ruts. 2. Regrade and re-compact crest to restore integrity and provide proper drainage to upstream slope. (See Chapter 7.) 3. Provide gravel or roadbase material to accommodate traffic. 4. Periodically maintain and regrade to prevent ruts reforming.

Figure 5.3 ***(cont.)***
Inspection Guidelines - Embankment Crest

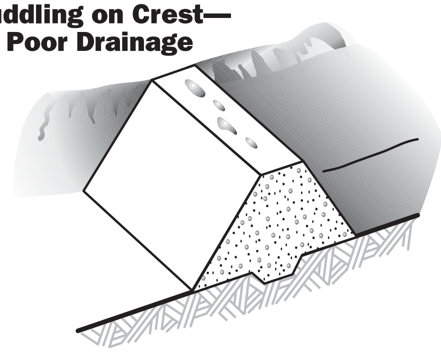


Figure 5.3k

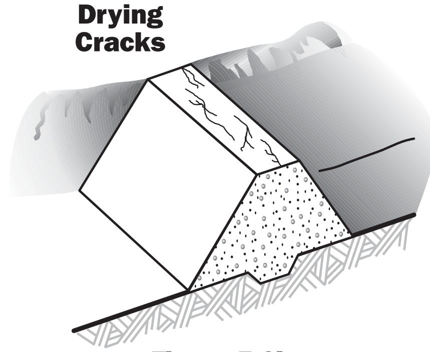


Figure 5.3l

Problem	Probable Cause and Possible Consequences	Recommended Actions
Puddling on Crest— Poor Drainage *(Figure 5.3k)*	1. Poor grading and improper drainage of crest. 2. Localized consolidation or settlement on crest allows puddles to develop. 1. Causes localized saturation of the crest. 2. Inhibits access to all parts of the dam and crest. 3. Becomes progressively worse if not corrected.	1. Drain standing water from puddles. 2. Regrade and re-compact crest to restore integrity and provide proper drainage to upstream slope. (See Chapter 7.) 3. Provide gravel or roadbase material to accommodate traffic. 4. Periodically maintain and regrade to prevent low areas reforming.
Drying Cracks *(Figure 5.3l)*	Material on the crest of dam expands and contracts with alternate wetting and drying of weather cycles. Drying cracks are usually short, shallow, narrow, and numerous. Point of entry for surface runoff and surface moisture, causing saturation of adjacent embankment areas. This saturation, and later drying of the dam, could cause further cracking.	1. Seal surface cracks with a tight, impervious material. (See Chapter 7.) 2. Routinely grade crest to proper drainage and fill cracks. 3. Cover crest with non-plastic material (not clay) to prevent large variations in moisture content.

Figure 5.4
Inspection Guidelines - Embankment Seepage Areas

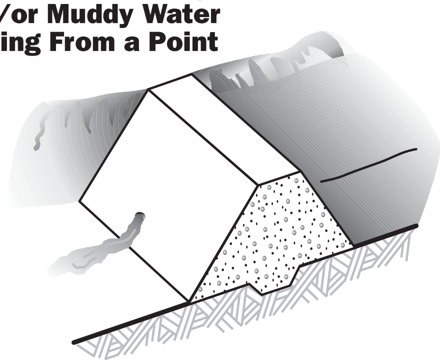


Figure 5.4a

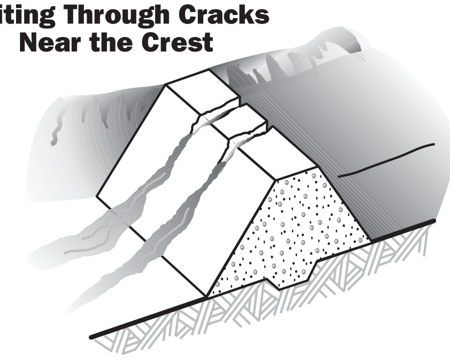


Figure 5.4b

Problem	Probable Cause and Possible Consequences	Recommended Actions
Excessive Quantity and/or Muddy Water Exiting From a Point *(Figure 5.4a)*	1. Water has created an open pathway, channel or pipe through the dam. The water is eroding and carrying embankment material. 2. Large amounts of water have accumulated in the downstream slope. Water and embankment materials are exiting at one point. Surface agitation may be causing the muddy water. 3. Rodents, frost action or poor construction have allowed water to create an open pathway or pipe through the embankment. 1. Continued flows can saturate parts of the embankment and lead to slides in the area. 2. Continued flows can further erode embankment materials and lead to failure of the dam.	1. Begin measuring outflow quantity and establishing whether water is getting muddier, staying the same or clearing up. 2. If quantity of flow is increasing, water level in reservoir should be lowered until flow stabilizes or stops. 3. Search for opening on upstream side and plug if possible. 4. A qualified engineer should inspect the condition and recommend further actions to be taken. ENGINEER REQUIRED
Stream of Water Exiting Through Cracks Near the Crest *(Figure 5.4b)*	1. Severe drying has caused shrinkage of embankment material. 2. Settlement in the embankment or foundation is causing the transverse cracks. Flow through the crack can cause failure of the dam.	1. Plug upstream side of crack to stop flow. 2. Lower water level in the reservoir should be lowered until below level of cracks. 3. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED

Figure 5.4 *(cont.)*
Inspection Guidelines - Embankment Seepage Areas

Seepage Water Exiting as a Boil in the Foundation

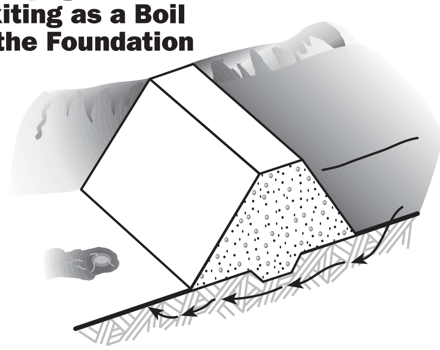


Figure 5.4c

Seepage Exiting at Abutment Contact

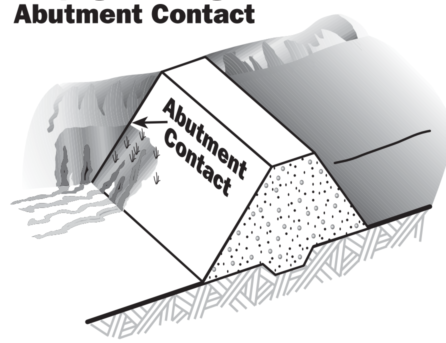


Figure 5.4d

Problem	Probable Cause and Possible Consequences	Recommended Actions
Seepage Water Exiting as a Boil in the Foundation *(Figure 5.4c)*	Some part of the foundation material is supplying a flow path. This could be caused by a sand or gravel layer in the foundation. Increased flows can lead to erosion of the foundation and failure of the dam.	1. Examine the boil for transportation of foundation materials. 2. If soil particles are moving downstream, sandbags or earth should be used to create a dike around the boil. The pressures created by the water level with the dike may control flow velocities and temporarily prevent further erosion. 3. If erosion is becoming greater, the reservoir level should be lowered. 4. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED
Seepage Exiting at Abutment Contact *(Figure 5.4d)*	1. Water flowing through pathways in the abutment. 2. Water flowing through the embankment. Can lead to erosion of embankment materials and failure of the dam.	1. Study leakage area to determine quantity of flow and extent of saturation. 2. Inspect daily for developing slides. 3. Water level in reservoir may need to be lowered to assure the safety of the embankment. 4. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED

Figure 5.4 ***(cont.)***
Inspection Guidelines - Embankment Seepage Areas

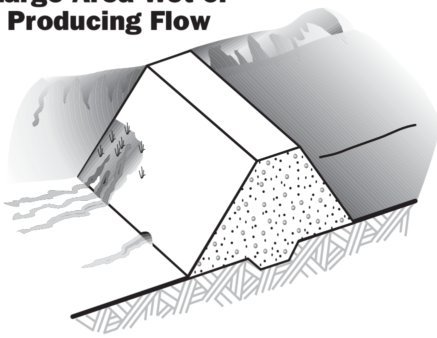


Figure 5.4e

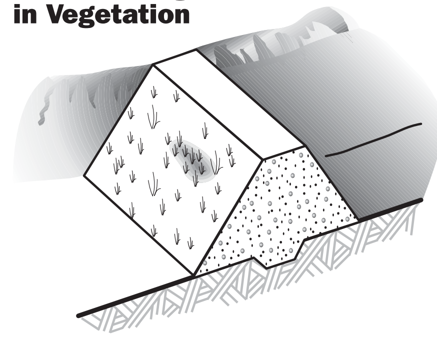


Figure 5.4f

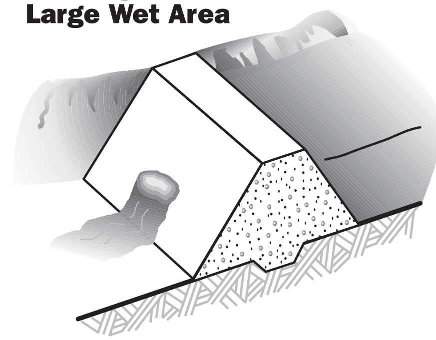


Figure 5.4g

Problem	Probable Cause and Possible Consequences	Recommended Actions
Large Area Wet or Producing Flow *(Figure 5.4e)*	A seepage path has developed through the abutment or embankment materials and failure of the dam can occur. 1. Increased flows could lead to erosion of embankment material and failure of the dam. 2. Saturation of the embankment can lead to local slides which could cause failure of the dam.	1. Stake out the saturated area and monitor for growth or shrinking. 2. Measure any outflows as accurately as possible. 3. Reservoir level may need to be lowered if saturated areas grow at a fixed storage level or if flow increases. 4. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED
Marked Change in Vegetation *(Figure 5.4f)*	1. Embankment materials are supplying flow paths. 2. Natural seeding by wind. 3. Change in seed type during early post-construction seeding. Can show a saturated area.	1. Use probe and shovel to establish if the materials in this area are wetter than surrounding areas. 2. If area shows wetness, when surrounding areas are dry or drier, a qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED
Bulge in Large Wet Area *(Figure 5.4g)*	Downstream embankment materials have begun to move. Failure of the embankment resulting from massive sliding can follow these early movements.	1. Compare embankment cross-section to the end of construction condition to see if observed condition may reflect end of construction. 2. Stake out affected area and accurately measure outflow. 3. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED

Figure 5.4 *(cont.)*
Inspection Guidelines - Embankment Seepage Areas

Trampoline Effect in Large Soggy Area

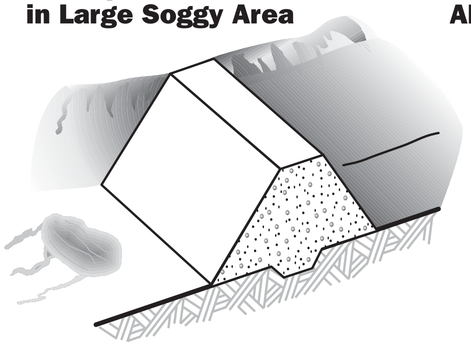


Figure 5.4h

Leakage From Abutments Beyond the Dam

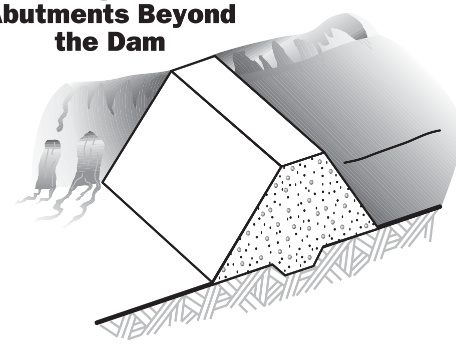


Figure 5.4i

Wet Area in Horizontal Band

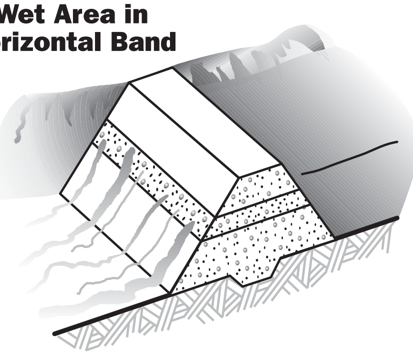


Figure 5.4j

Problem	Probable Cause and Possible Consequences	Recommended Actions
Trampoline Effect ***(bouncy when jumped on)*** **in Large Soggy Area** *(Figure 5.4h)*	Water moving rapidly through the embankment or foundation is being controlled or contained by a well- established turf root system. Condition shows excessive seepage in the area. If control layer of turf is destroyed, rapid erosion of foundation materials could result in failure of the dam.	1. Carefully inspect the area for outflow quantity and any transported material. 2. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED
Leakage From Abutments Beyond the Dam *(Figure 5.4i)*	Water moving through cracks and fissures in the abutment materials. Can lead to rapid erosion of abutment and evacuation of the reservoir. Can lead to massive slides near or downstream from the dam.	1. Carefully inspect the area to determine quantity of flow and amount of transported material. 2. A qualified engineer or geologist should inspect the condition and recommend further actions. ENGINEER REQUIRED
Wet Area in Horizontal Band *(Figure 5.4j)*	Frost layer or layer of sandy material in original construction. 1. Wetting of areas below the area of excessive seepage can lead to localized instability of the embankment, resulting in slides. 2. Excessive flows can lead to accelerated erosion of embankment materials and failure of the dam.	1. Determine as closely as possible the flow being produced. 2. If flow increases, reservoir level should be reduced until flow stabilizes or stops. 3. Stake out the exact area involved. 4. Using hand tools, try to identify the material allowing the flow. 5. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED

Figure 5.5
Inspection Guidelines - Concrete Upstream Slope

Large Increase in Flow or Sediment in Drain Outfall

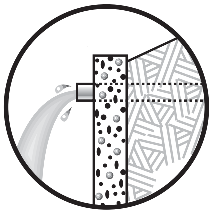


Figure 5.5a

Cracked Deteriorated Concrete Face

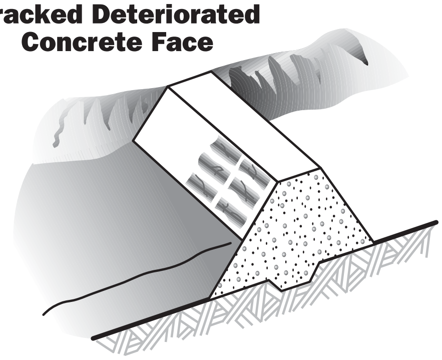


Figure 5.5b

Cracks Due to Drying

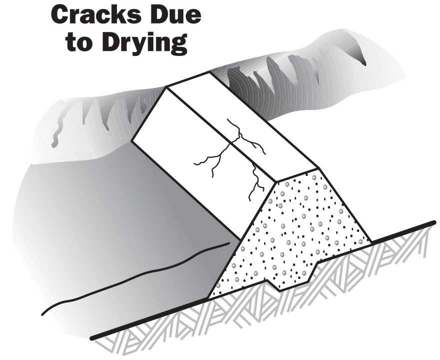


Figure 5.5c

Problem	Probable Cause and Possible Consequences	Recommended Actions
Large Increase in Flow or Sediment in Drain Outfall *(Figure 5.5a)*	Shortened seepage path or increased storage levels. 1. Higher-velocity flows can cause erosion of drain, then embankment materials. 2. Can lead to piping failure.	1. Accurately measure outflow quantity and determine amount of increase over previous flow. 2. Collect jar samples to compare turbidity. 3. If either quantity or turbidity has increased by 25%, a qualified engineer should evaluate the condition and recommend further actions. ENGINEER REQUIRED
Cracked Deteriorated Concrete Face *(Figure 5.5b)*	Concrete deteriorated from weathering. Joint filler deteriorated or displaced. Soil is eroded behind the face and caverns can be formed. Unsupported sections of concrete crack. Ice action may displace concrete.	1. Determine cause. Either patch with grout or contact engineer for permanent repair method. 2. If damage is extensive, a qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED
Cracks Due to Drying *(Figure 5.5c)*	Soil loses its moisture and shrinks, causing cracks. *Note:* Usually limited to crest and downstream slope. Heavy rains can fill cracks and cause small parts of embankment to move along internal slip surface.	1. Monitor cracks for increases in width, depth , or length. 2. A qualified engineer should inspect condition and recommend further actions. ENGINEER REQUIRED

Figure 5.6
Inspection Guidelines - Spillways

Excessive Vegetation or Debris in Channel

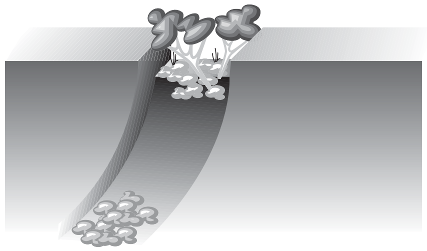


Figure 5.6a

Erosion Channels

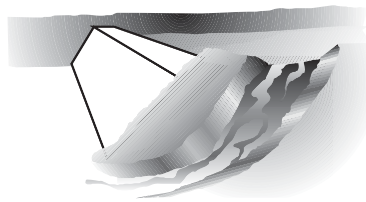


Figure 5.6b

Excessive Erosion in Earth-Slide Causes Concentrated Flows

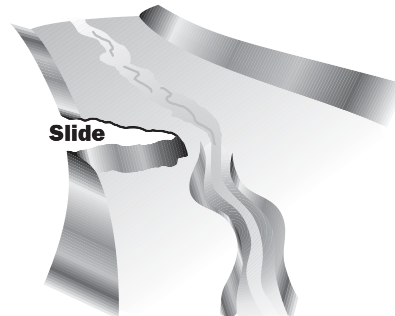


Figure 5.6c

Problem	Probable Cause and Possible Consequences	Recommended Actions
Excessive Vegetation or Debris in Channel *(Figure 5.6a)*	Accumulation of slide materials, dead trees, excessive vegetative growth, etc., in spillway channel. Reduced discharge capacity; overflow of spillway, overcropping of dam. Prolonged overtopping can cause failure of the dam.	Clean out debris periodically; control vegetative growth in spillway channel. Install log boom in front of spillway entrance to intercept debris.
Erosion Channels *(Figure 5.6b)*	Surface runoff from intense rainstorms or flow from spillway carries surface material down the slope, resulting in continuous troughs. Livestock traffic creates gullies where flow concentrates varies. Unabated erosion can lead to slides, slumps or slips which can result in reduced spillway capacity. Inadequate spillway capacity can lead to embankment overtopping and result in dam failure.	Photograph condition. Repair damaged areas by replacing eroded material with compacted fill. Protect areas against future erosion by installing suitable rock riprap. Re-vegetate area if appropriate. Bring condition to the attention of the engineer during next inspection.
Excessive Erosion in Earth-Slide Causes Concentrated Flows *(Figure 5.6c)*	Discharge velocity too high; bottom and slope material loose or deteriorated; channel and bank slopes too steep; bare soil unprotected; poor construction protective surface failed. Disturbed flow pattern; loss of material, increased sediment load downstream, collapse of banks; failure of spillway; can lead to rapid evacuation of the reservoir through the severely eroded spillway.	Minimize flow velocity by proper design. Use sound material. Keep channel and bank slopes mild. Encourage growth of grass on soil surface. Construct smooth and well- compacted surfaces. Protect surface with riprap, asphalt or concrete. Repair eroded portion using sound construction practices.

Figure 5.6 ***(cont.)***
Inspection Guidelines - Spillways

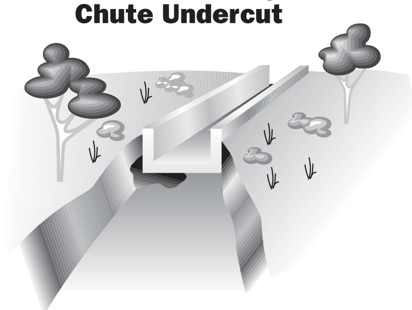


Figure 5.6d

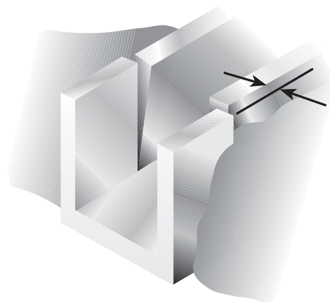


Figure 5.6e

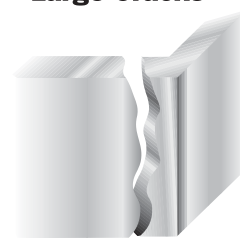


Figure 5.6f

Problem	Probable Cause and Possible Consequences	Recommended Actions
End of Spillway Chute Undercut *(Figure 5.6d)*	Poor configuration of stilling basin area. Highly erodible materials. Absence of cut-off wall at end of chute. Structural damage to spillway structure; collapse of slab and wall lead to costly repair.	Dewater affected area; clean out eroded area and properly backfill. Improve stream channel below chute; provide properly sized riprap in stilling basin area. Install cutoff wall.
Wall Displacement *(Figure 5.6e)*	Poor workmanship; uneven settlement of foundation; excessive earth and water pressure; insufficient steel bar reinforcement of concrete. Minor displacement will create eddies and turbulence in the flow, causing erosion of the soil behind the wall. Major displacement will cause severe cracks and eventual failure of the structure.	Reconstruction should be done according to sound engineering practices. Foundation should be carefully prepared. Adequate weep holes should be installed to relieve water pressure behind wall. Use enough reinforcement in the concrete. Anchor walls to present further displacement. Install struts between spillway walls. Clean out and backflush drains to assure proper operations. Consult an engineer before actions are taken. ENGINEER REQUIRED
Large Cracks *(Figure 5.6f)*	Construction defect; local concentrated stress; local material deterioration; foundation failure, excessive backfill pressure. Disturbance in flow patterns; erosion of foundation and backfill; eventual collapse of structure.	Large cracks without large displacement should be repaired by patching. Surrounding areas should be cleaned or cut out before patching material is applied. (See Chapter 7.) Installation of weep holes or other actions may be needed.

Figure 5.6 *(cont.)*
Inspection Guidelines - Spillways

Open or Displaced Joints

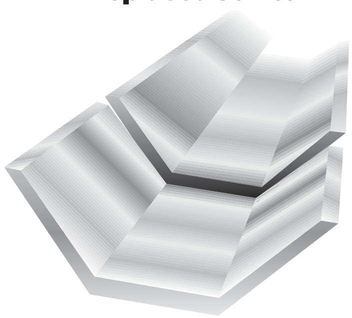


Figure 5.6g

Breakdown and Loss of Riprap

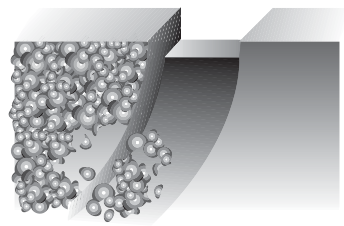


Figure 5.6h

Material Deterioration—Spalling and Disintegration of Riprap, Concrete, Etc.

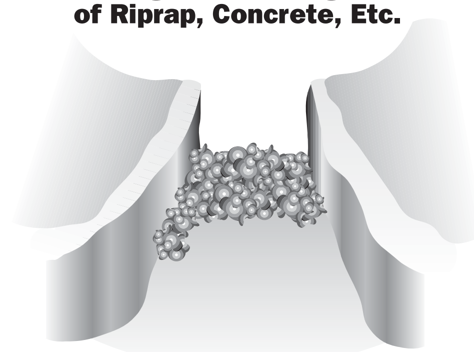


Figure 5.6i

Problem	Probable Cause and Possible Consequences	Recommended Actions
Open or Displaced Joints *(Figure 5.6g)*	Excessive and uneven settlement of foundation; sliding of concrete slab; construction joint too wide and left unsealed. Sealant deteriorated and washed away. Erosion of foundation material may weaken support and cause further cracks; pressure induced by water flowing over displaced joints may wash away wall or slab, or cause extensive undermining.	Construction joint should be no wider than 1/2". All joints should be sealed with asphalt or other flexible materials. Water stops should be used where feasible. Clean the joint, replace eroded materials, and seal the joint. Foundations should be properly drained and prepared. Underside of chute slabs should have ribs of enough depth to prevent sliding. Avoid steep chute slope. ENGINEER REQUIRED
Breakdown and Loss of Riprap *(Figure 5.6h)*	Slope too steep; material poorly graded; failure of subgrade; flow velocity too high; improper placement of material; bedding material or foundation washed away. Erosion of channel bottom and banks; failure of spillway.	Design a stable slope for channel bottom and banks. Riprap material should be well-graded (the material should contain small, medium and large particles). Subgrade should be properly prepared before placement of riprap. Install filter fabric if necessary. Control flow velocity in the spillway by proper design. Riprap should be placed according to specification. ENGINEER REQUIRED
Material Deterioration—Spalling and Disintiegration of Riprap, Concrete, Etc. *(Figure 5.6i)*	Use of unsound or defective materials; structures subject to freeze-thaw cycles; improper maintenance practices; harmful chemicals. Structure life will be shortened; premature failure.	Avoid using shale or sandstone for riprap. Add air-entraining agent when mixing concrete. Use only clean, good-quality aggregates in the concrete. Steel bars should have at least 1" of concrete cover. Concrete should be kept damp and protected from freezing during curing.

Figure 5.6 ***(cont.)***
Inspection Guidelines - Spillways

Poor Surface Drainage

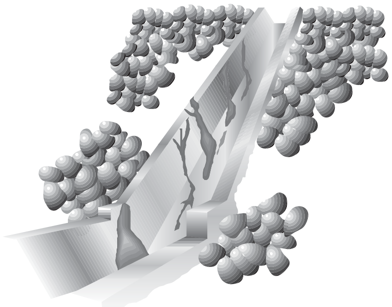


Figure 5.6j

Concrete Erosion, Abrasion, and Fracturing

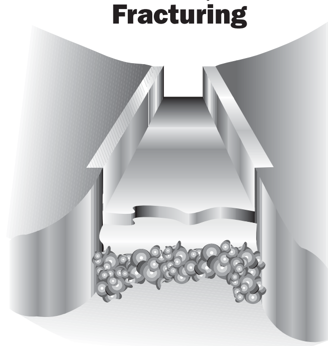


Figure 5.6k

Leakage in or Around Spillway

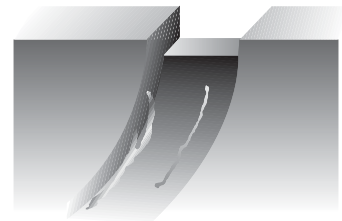


Figure 5.6l

Problem	Probable Cause and Possible Consequences	Recommended Actions
Poor Surface Drainage *(Figure 5.6j)*	No weep holes; no drainage facility; plugged drains. Wet foundation has lower supporting capacity; uplift pressure resulting from seepage water may damage spillway chute; accumulation of water may also increase total pressure on spillway walls and cause damage.	Install weep holes on spillway walls. Inner end of hole should be surrounded and packed with graded filtering material. Install drain system under spillway near downstream end. Clean out existing weep holes. Backflush and rehabilitate drain system under the supervision of an engineer. ENGINEER REQUIRED
Concrete Erosion, Abrasion, and Fracturing *(Figure 5.6k)*	Flow velocity too high (usually occurs at lower end of chute in high dams); rolling of gravel and rocks down the chutes; cavity behind or below concrete slab. Pockmarks and spalling of concrete surface may progressively worsen; small hole may cause undermining of foundation, leading to failure of structure.	Remove rocks and gravels from spillway chute before flood season. Raise water level in stilling basin. Use good-quality concrete. Assure concrete surface is smooth. ENGINEER REQUIRED
Leakage in or Around Spillway *(Figure 5.6l)*	1. Cracks and joints in geologic formation at spillway are permitting seepage. 2. Gravel or sand layers at spillway are permitting seepage. 1. Could lead to excessive loss of stored water. 2. Could lead to a progressive failure if velocities are high enough to cause erosion of natural materials.	1. Examine exit area to see if type of material can explain leakage. 2. Measure flow quantity and check for erosion of natural materials. 3. If flow rate or amount of eroded materials increases rapidly, reservoir level should be lowered until flow stabilizes or stops. 4. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED

Figure 5.6 *(cont.)*
Inspection Guidelines - Spillways

Too Much Leakage From Spillway Under Drains

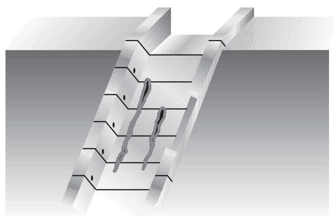


Figure 5.6m

Seepage From a Construction Joint or Crack in Concrete Structure

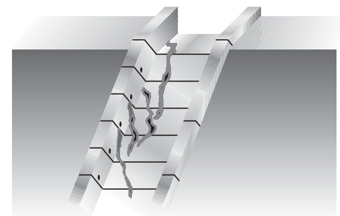


Figure 5.6n

Problem	Probable Cause and Possible Consequences	Recommended Actions
Too Much Leakage From Spillway Under Drains *(Figure 5.6m)*	Drain or cutoff may have failed. 1. Excessive flows under the spillway could lead to erosion of foundation material and collapse of parts of the spillway. 2. Uncontrolled flows could lead to loss of stored water.	1. Examine exit area to see if type of material can explain leakage. 2. Measure flow and check for erosion of natural materials. 3. If flow rate or amount of eroded materials increases rapidly, reservoir level should be lowered until flow stabilizes or stops. 4. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED
Seepage From a Construction Joint or Crack in Concrete Structure *(Figure 5.6n)*	Water is collecting behind structure because of insufficient drainage or clogged weep holes. 1. Can cause walls to tip in and over. Flows through concrete can lead to rapid deterioration from weathering. 2. If spillway is located within embankment, rapid erosion can lead to failure of the dam.	1. Check area behind wall for puddling of surface water. 2. Check and clean as needed; drain outfalls, flush lines and weep holes. 3. If condition persists, a qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED

Figure 5.7
Inspection Guidelines - Inlets, Outlets, and Drains

Outlet Pipe Damage

Crack

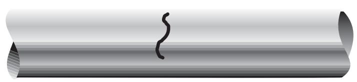


Figure 5.7a-1

Hole

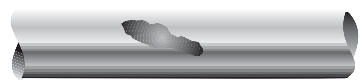


Figure 5.7a-2

Joint Offset

Figure 5.7a-3

Problem	Probable Cause and Possible Consequences	Recommended Actions
Outlet Pipe Damage: Crack *(Figure 5.7a-1)*	Settlement; impact. Excessive seepage, possible internal erosion.	Check for evidence of water either entering or exiting pipe at crack, hole, etc.
Outlet Pipe Damage: Hole *(Figure 5.7a-2)*	Rust (steel pipe); erosion (concrete pipe); cavitation. Excessive seepage, possible internal erosion.	Tap pipe in vicinity of damaged area, listening for hollow sound which indicates a void has formed along the outside of the conduit.
Outlet Pipe Damage: Joint Offset *(Figure 5.7a-3)*	Settlement or poor construction practice. Provides passageway for water to exit or enter pipe, resulting in erosion of internal materials of the dam.	If a progressive failure is suspected, request engineering advice.

Figure 5.7 *(cont.)*
Inspection Guidelines - Inlets, Outlets, and Drains

Control Works

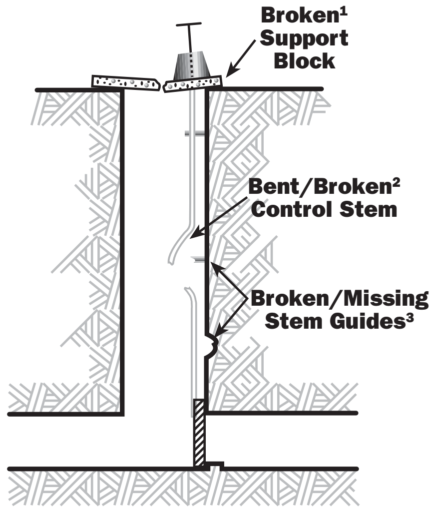


Figure 5.7b

Problem	Probable Cause and Possible Consequences	Recommended Actions
Damage to Control Works *(Figure 5.7b)*	1. BROKEN SUPPORT BLOCK Concrete deterioration. Excessive force exerted on control stem by trying to open gate when it was jammed. Causes control support block to tile; control stem may bind. Control head works may settle. Gate may not open all the way. Support block may fail completely, leaving outlet inoperable. 2. BENT/BROKEN CONTROL STEM Rust. Excess force used to open or close gate. Inadequate or broken stem guides. Outlet is inoperable. 3. BROKEN/MISSING STEM GUIDES Rust. Inadequate lubrication. Excess force used to open or close gate when jammed. Loss of support for control stem. Stem may buckle and break under normal use (as in this example).	Any of these conditions can mean the control is either inoperable or, at best, partly operable. Use of the system should be minimized or discontinued. If the outlet system has a second control valve, consider using it to regulate releases until repairs can be made. Engineering help is recommended.

Figure 5.7 *(cont.)*
Inspection Guidelines - Inlets, Outlets, and Drains

Failure of Concrete Outfall Structure

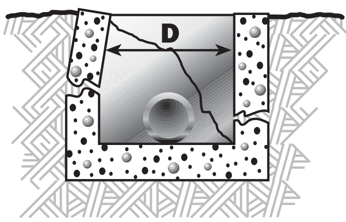


Figure 5.7c

Outlet Releases Eroding Toe of Dam

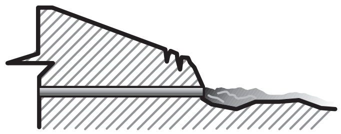


Figure 5.7d

Valve Leakage

Debris Stuck Under Gate

Figure 5.e-1

Cracked Gate Leaf

Figure 5.e-2

Damage Gate Seat or Guides

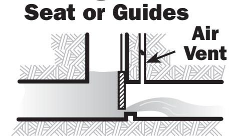


Figure 5.e-3

Problem	Probable Cause and Possible Consequences	Recommended Actions
Failure of Concrete Outfall Streucture *(Figure 5.7c)*	Excessive side pressures on nonreinforced concrete structure. Poor concrete quality. Loss of outfall structure exposes embankment to erosion by outlet releases.	1. Check for progressive failure by monitoring typical dimension, such as "D" shown in figure. 2. Repair by patching cracks and supplying drainage around concrete structure. Outfall structure may need total replacement.
Outlet Releases Eroding Toe of Dam *(Figure 5.7d)*	Outlet pipe too short. Lack of energy-dissipating pool or structure at downstream end of conduit. Erosion of toe oversteepens downstream slope, causing progressive sloughing.	1. Extend pipe beyond toe (use pipe of same size and material, and form watertight connection to existing conduit). 2. Protect embankment with riprap over suitable bedding.
Valve Leakage: Debris Stuck Under Gate *(Figure 5.7e-1)*	Trashrack missing or damaged. Gate will not close. Gate or stem may be damaged in effort to close gate.	Raise and lower gate slowly until debris is loosened and floats past valve. When reservoir is lowered, repair or replace trashrack.
Valve Leakage: Cracked Gate Leaf *(Figure 5.7e-2)*	Ice action, rust, affect vibration, or stress resulting from forcing gate closed when it is jammed. Gate-leaf main fail completely, evacuating reservoir.	Use valve only in fully open or closed position. Minimize use of valve until leaf can be repaired or replaced.
Valve Leakage: Damaged Gate Seat or Guides *(Figure 5.7e-3)*	Rust, erosion, cavitation, vibration or wear. Leakage and loss of support for gate leaf. Gate may bind in guides and become inoperable.	Minimize use of valve until guides or seats can be repaired. If cavitation is the cause, check to see if air-vent pipe exists, and is unobstructed.

Figure 5.7 ***(cont.)***
Inspection Guidelines - Inlets, Outlets, and Drains

Seepage Water Exiting From a Point Adjacent to the Outlet

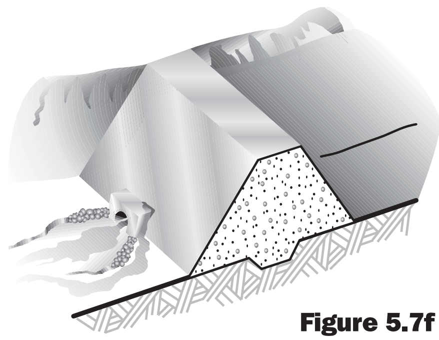


Figure 5.7f

Problem	Probable Cause and Possible Consequences	Recommended Actions
Seepage Water Exiting From a Point Adjacent to the Outlet ***(Figure 5.7f)***	1. A break in the outlet pipe. 2. A path for flow has developed along the outside of the outlet pipe. Continued flows can lead to erosion of the embankment materials and failure of the dam.	1. Thoroughly investigate the area by probing and/or shoveling to try to determine cause. 2. Determine if leakage water is carrying soil particles. 3. Determine quantity of flow. 4. If flow increases or is carrying embankment materials, reservoir level should be lowered until leakage stops. 5. A qualified engineer should inspect the condition and recommend further actions. ENGINEER REQUIRED

APPENDIX C - 2020 TOPOGRAPHIC AND BATHYMETRIC SURVEY

GENERAL NOTES

1. Topographic Survey was performed by Foresight Land Services on February 24 and 25, 2020, using Electronic Total Station with Data Collector. Bathymetric survey was performed by Foresight Land Services on August 20 and 21, 2020.

2. Plan was compiled on a PC-based computer using AutoCAD Civil 3D 2018.

3. Contours are computer-generated interpolations, edited to generally conform to field observations. Contour interval = 1 (one) foot. Contractor shall verify critical elevations and grades in the field prior to construction.

4. Horizontal Datum is based on NAD 83.

5. The vertical control is based upon NGVD 29. Temporary benchmarks were established on-site; TBM 1 Chiseled Square elev. = 954.06', TBM 2 Chiseled Square elev. = 954.22', TBM 3 Chiseled Square elev. = 951.83'

6. The locations and information about underground pipes, utilities or other structures are compiled from available record data and visible field evidence and are not represented as being exact or complete. Prior to beginning excavation, the excavator shall give adequate advance notice to the Dig Safe Center, the municipal and/or state Public Works Department, and private utility companies, to allow for field location of facilities in the vicinity.

7. If Contractor observes any field conditions which vary significantly from what is shown on these plans, the contractor shall immediately notify the Owner and Engineer for resolution of the conflicting information.

8. The Contractor shall record tie measurements, depths, dimensions, materials, field conditions and other pertinent data about all underground pipes, utilities and structures encountered during the work, both existing and constructed. Contractor shall submit Record drawings with this information to the Owner and Engineer prior to completion of the work.

9. Contractor shall immediately report any damage to existing pipes, utilities, or structures to the Owner and Engineer, and obtain directions as to repair, replacement or abandonment.

KEY ELEVATIONS TO BE MONITORED

(From Section 1.3.7 of the November 11, 2021 Woods Pond Dam Inspection/Evaluation Report)

Point	Location	Elevation, feet NGVD 29
A	Right side spillway abutment (Chiseled Square)	954.06
B	Left side spillway abutment (Center of concrete)	954.2
C	BH-1 (on raceway embankment)	952.8
D	BH-2 (on raceway embankment)	953.7
E	BH-3 (on raceway embankment)	953.8
F	Spillway Midpoint	948.4
G	Sill of Raceway Stoplog Sluice Structure	941.6
H	Sill of Raceway Closure Structure	944.4
I	Right Side Platform (Chiseled Square TBM 2)	954.22
J	Downstream End of Raceway (Chiseled Square)	951.83

LEGEND

- TEMPORARY BENCHMARK
- IRON PIPE FOUND
- BOUND FOUND
- MONITOR WELL
- SIGN
- GATE POST
- EDGE OF ASPHALT
- EDGE OF RIVER
- LIMIT OF VEGETATION CLEARING
- 724 — 1' CONTOUR
- 725 — 5' CONTOUR
- x — FENCE
- RIP RAP
- A — MONITORING LOCATION - SEE REPORT

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

NO.	DATE	REVISION	BY

TOPOGRAPHIC SURVEY PLAN
Prepared For

GZA GEOENVIRONMENTAL, INC.

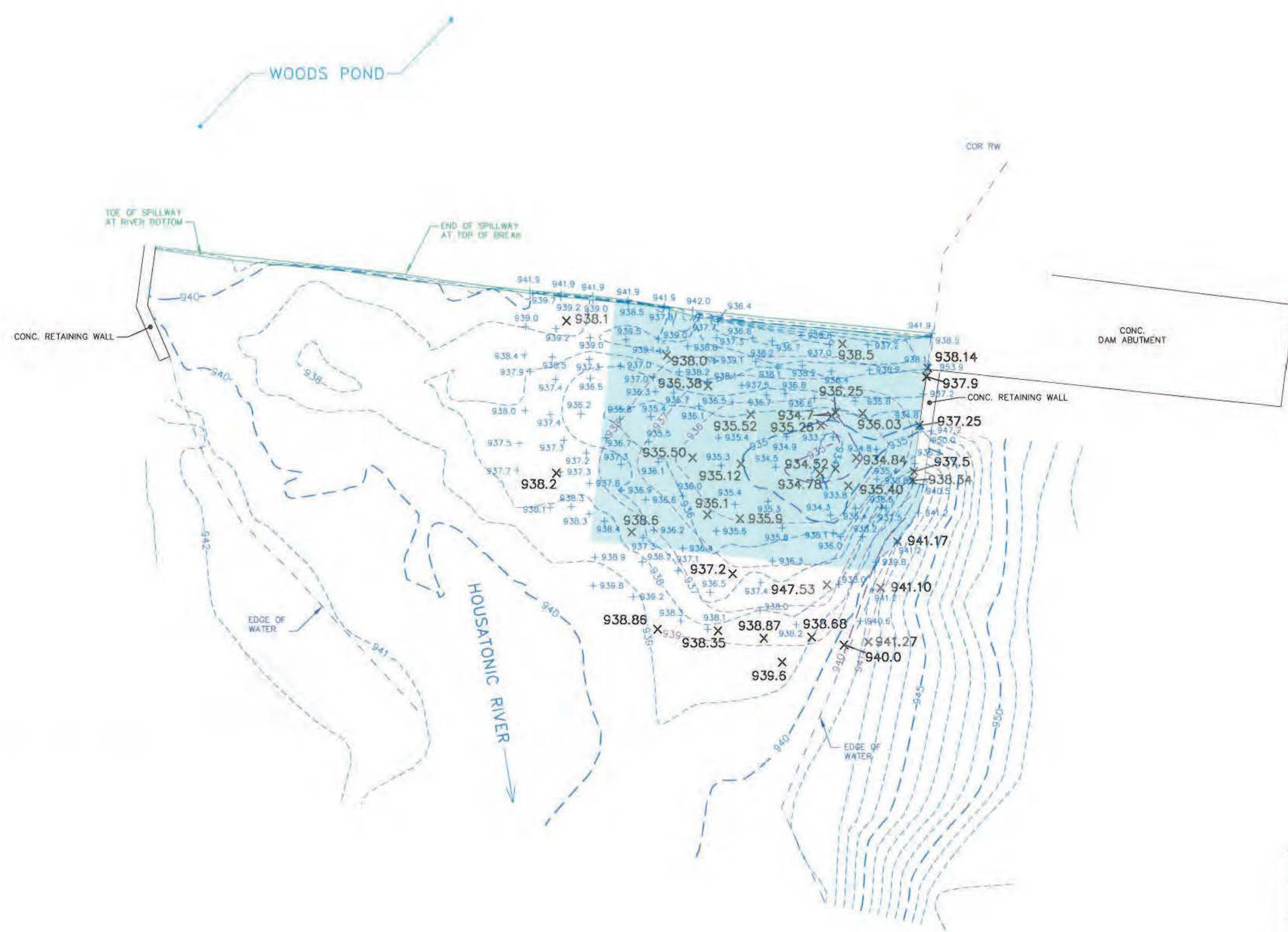
Woods Pond

LENOX MASSACHUSETTS

FORESIGHT LAND SERVICES — ENGINEERING SURVEYING PLANNING

Foresight Land Services, Inc.
1496 West Housatonic Street · Pittsfield, MA 01201
Tel:(413) 499-1560 Fax:(413) 499-3307 www.foresightland.com

SCALE: 1" = 20'	DWN. BY:DMW	CHK. BY: SAM
DATE: October 6, 2020	DWG. NO. S3013BW02 WOOD FIXED PER CAL	
JOB NO. S3013B	Layout Tab: W01	



LEGEND:

- APPROXIMATE AREA OF DEPRESSION
- —950— INDEX CONTOUR (2002)
- - -939- - - INTERMEDIATE CONTOUR (2002)
- —940— INDEX CONTOUR (2007)
- - -939- - - INTERMEDIATE CONTOUR (2007)
- + 934.9 SPOT ELEVATION (2002)
- × 951.1 SPOT ELEVATION (2007)

NOTE:

1. BASEMAP PROVIDED BY MONTGOMERY WATSON HARZA, DECEMBER 2002.
2. SURVEYING AND CONTOUR MAPPING COMPLETED BY D.L. MOWERS, OCTOBER 2002.
3. HORIZONTAL DATUM IS NAD27 MASSACHUSETTS MAINLAND ZONE.
4. VERTICAL DATUM IS NGVD 1929.
5. 2007 CONTOURS BASED ON 2007 SPOT ELEVATION INFORMATION FROM A FIELD SURVEY PERFORMED BY ARCADIS OF NEW YORK, INC. ON JULY 9 AND SEPTEMBER 14, 2007.

DRAFT

0 10' 20'
GRAPHIC SCALE

GENERAL ELECTRIC COMPANY
PITTSFIELD, MASSACHUSETTS
WOODS POND DAM

CONTOUR MAP OF RIVERBED DOWNSTREAM OF SPILLWAY

ARCADIS BBL

FIGURE **1**

SYR-85-LJP AGS LAF LAYER: ON=*, OFF=*REF* G:\CAD\GE-CAD\GE_ACTIVE\C\20199050\20199G03.DWG SAVED:10/4/2007 3:02 PM LAYOUT:1 PAGESETUP:DL2B-PDF PENTABLE:PLTFULL.CTB PRINTED:10/4/2007 3:02 PM BY:LFORAKER

APPENDIX D – QUARTERLY MAINTENANCE INSPECTION CHECKLIST

Woods Pond Dam
Quarterly Maintenance Inspection Checklist*

1.0 GENERAL COMMENTS

Date of Inspection: ______________________ Weather: ______________________

Inspection By:
1. ______________________
2. ______________________
3. ______________________
4. ______________________
5. ______________________
6. ______________________

Surface Water Readings (all elevations presented in NGVD29 datum):

Location	Elevation at Benchmark (ft) (a)	Depth to Water (ft) (b)	Water Elevation (ft) (a) – (b)	Depth Above Spillway Crest (ft)	River Flow (cfs)
Reservoir	954.1±				
Raceway Channel	954.2±			n/a	n/a
River (downstream)	948.2±			n/a	n/a

Note: Benchmark elevations are from the latest site survey, performed by Foresight Land Services, dated October 6, 2020.

Measuring Points for Surface Water Readings

Reservoir: Measure from the top of the left concrete training wall (top of dam), El. 954.1 feet NGVD29.

Raceway Channel: Measure from the top of the raceway structure on the downstream side, El. 954.2 feet NGVD29.

River: Measure from the top of the right concrete retaining wall at the painted staff gage downstream of the raceway stoplog sluice structure, El. 948.2 feet NGVD29.

Depth Above Spillway Crest: Record depth above Spillway Crest, ~El. 948.3 feet.

River Flow: USGS Gage at Coltsville (0119700) National Water Prediction Service (NWPS).

Comments:

* The specific items listed in this checklist may be modified or expanded to reflect findings druing a given inspection.

2.0 RACEWAY STOPLOG SLUICE STRUCTURE (Downstream End of Raceway Channel)

Item	Condition Description	Observed during this inspection?		Observed during previous inspection?		Condition similar to or changed from previous inspection?
		YES	NO	YES	NO	
A.	Missing or damaged stoplogs?					
B.	Substantial leakage through stoplogs?					
C.	Cracking or movement of concrete walls?					
D.	Leakage from crack(s) in concrete walls?					
E.	Seepage around/under the walls or under the apron? (If YES, comment on clarity of seepage water)					
F.	Accumulation of debris on stoplogs or apron?					
G.	Settlement of fill adjacent to structure?					
H.	Deterioration of concrete?					
I.	Unusual conditions/vandalism?					
J.	Deterioration or damage to upstream masonry walls?					

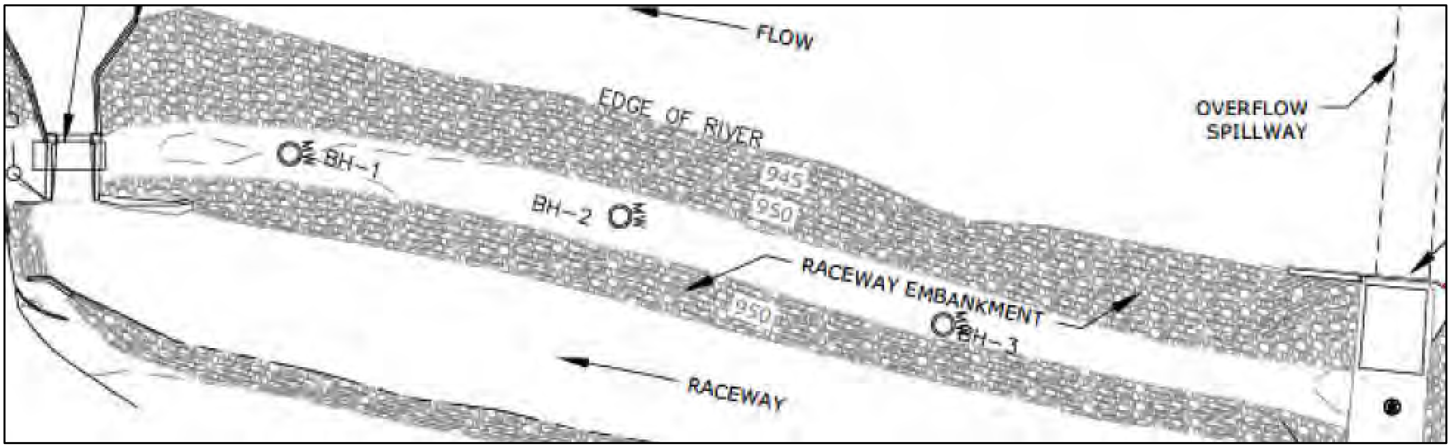
Comments:

3.0 RACEWAY EMBANKMENT

Item	Condition Description	Observed during this inspection?		Observed during previous inspection?		Condition similar to or changed from previous inspection?
		YES	NO	YES	NO	
A.	Local subsidence, sinkholes, animal burrows, or depressions?					
B.	Erosion at the water line (raceway or river side)?					
C.	Seepage from riverside slope of embankment? (If YES, comment on clarity of seepage water)					
D.	Change in vegetation, including vegetation on riverside portion of embankment that may indicate presence of seepage?					
E.	Large trees or heavy vegetation impeding inspection?					
F.	Accumulation of debris in raceway channel?					
G.	Settlement of crest?					
H.	Sloughing or slides?					
I.	Change in tilt of upstream left masonry wall?					
J.	Deterioration or loss of safety signage?					
K.	Unusual conditions/vandalism?					

Comments:

4.0 OBSERVATION WELLS



The three observation wells (BH-1, BH-2, and BH-3) are located along the top of the Raceway Embankment.

Observation Well Water Level Readings (depths from the top of the PVC riser)

Well	Elevation at Top of PVC (ft) (a)	Depth to Water (ft) (b)	Water Elevation (ft) (a) – (b)	Expected Water Elevation Range*	Within Range (Y/N)**
BH-1	952.8			943.4 to 947.2	
BH-2	953.7			941.1 to 945.5	
BH-3	953.8			945.4 to 948.3	

* Expected ranges based on measurements from 2010 to 2024.

** Circle readings outside the expected water elevation range.

Observation Well Sediment Level Readings (depths from the top of the PVC riser)

Well	Bottom of Well Depth (ft) (a)*	Sounded Bottom of Well Depth (b)	Bottom Feel during Sounding (Hard, Firm or Soft)	Approx. Silt Buildup (ft) (a) – (b)**
BH-1	24.1			
BH-2	20.2			
BH-3	22.0			

* Bottom of well depth based on soundings during April 1, 2020 well redevelopment measurements.

** Circle readings equal to or greater than 1-foot.

4.0 OBSERVATION WELLS (continued)

Item	Condition Description	BH-1 (Y/N)	BH-2 (Y/N)	BH-3 (Y/N)
A.	Damage to casing?			
B.	Broken, frost-heaved, or missing security cover?			
C.	Damaged or missing lock?			
D.	Broken or chipped PVC riser?			
E.	Debris or other obstruction inside the casing?			
F.	Ice inside the casing?			
G.	Settlement around the well? (If YES, note amount of settlement in Comments)			
H.	Unusual conditions/vandalism?			

Comments:

5.0 RACEWAY CLOSURE STRUCTURE (Upstream End of Raceway Channel)

Item	Condition Description	Observed during this inspection?		Observed during previous inspection?		Condition similar to or changed from previous inspection?
		YES	NO	YES	NO	
A.	Damage to chain lock or handrails?					
B.	Damage to hoisting mechanism?					
C.	Missing or damaged concrete stoplogs?					
D.	Debris in spacer gap?					
E.	Settlement or cracking of concrete deck?					
F.	Sheetpile bowing, interlock distress, or separation from concrete?					
G.	Loss of riprap or slush grout?					
H.	Settlement of fill adjacent to structure?					
I.	Adverse conditions at material interfaces (i.e., sheetpile/concrete interfaces), such as displacement or gaps, seepage, erosion, deterioration of concrete?					
J.	Seepage? (If YES, comment on clarity of seepage water)					
K.	Deterioration or loss of safety signage?					
L.	Deterioration of or unusual conditions in the four appurtenant structures listed above which would lead to limited access to or functionality of raceway closure structure?					
M.	Unusual conditions/vandalism?					

Comments:

6.0 LEFT (EAST) ABUTMENT SECTION

Item	Condition Description	Observed during this inspection?		Observed during previous inspection?		Condition similar to or changed from previous inspection?
		YES	NO	YES	NO	
A.	Erosion or settlement of material?					
B.	Settlement or cracking of concrete?					
C.	Dislocated or missing riprap?					
D.	Seepage around the end of the abutment? (If YES, comment on clarity of seepage water)					
E.	Change in vegetation, including vegetation on downstream portion of dam that may indicate presence of seepage?					
F.	Adverse conditions at material interfaces (i.e., earth fill/concrete, sheetpile/concrete, earth fill/sheetpile interfaces), such as displacement or gaps, seepage, erosion, deterioration of concrete?					
G.	Deterioration or loss of safety signage?					
H.	Unusual conditions/vandalism?					

Comments:

7.0 CONCRETE OVERFLOW SPILLWAY

Item	Condition Description	Observed during this inspection?		Observed during previous inspection?		Condition similar to or changed from previous inspection?
		YES	NO	YES	NO	
A.	Discontinuity of smooth spillway overflow?					
B.	Accumulation of large debris upstream?					
C.	Seepage from face of training walls? (If YES, comment on clarity of seepage water)					
D.	Adverse conditions at material interfaces (i.e., earth fill/concrete, sheetpile/concrete), such as displacement or gaps, seepage, erosion, deterioration of concrete?					
E.	Settlement or movement of spillway or walls?					
F.	Unusual conditions/vandalism?					

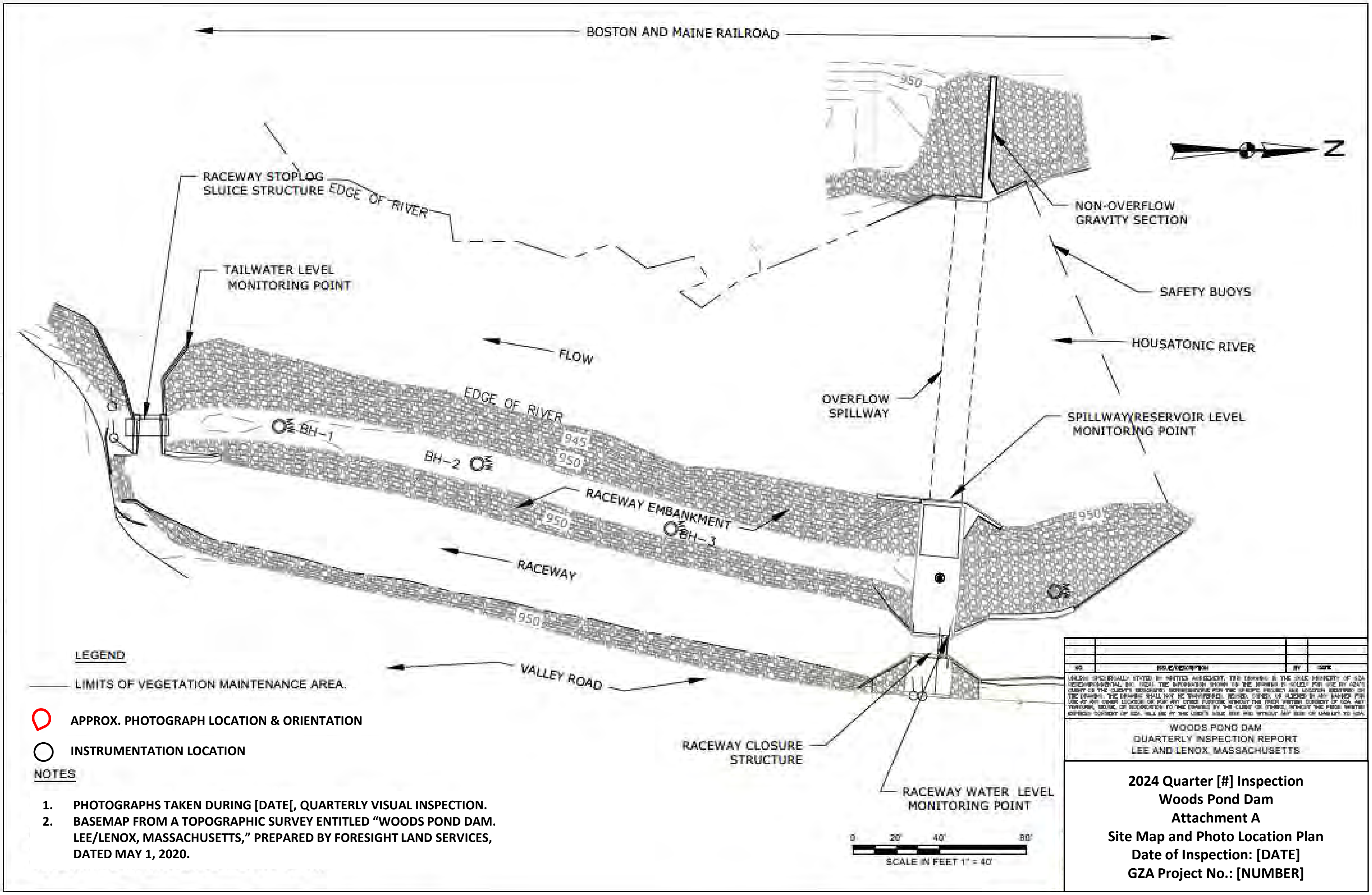
Comments:

8.0 RIGHT (WEST) ABUTMENT SECTION

Item	Condition Description	Observed during this inspection?		Observed during previous inspection?		Condition similar to or changed from previous inspection?
		YES	NO	YES	NO	
A.	Erosion of material upstream or downstream?					
B.	Settlement or cracking of concrete?					
C.	Dislocated or missing riprap?					
D.	Seepage around right end of abutment? (If YES, comment on clarity of seepage water)					
E.	Any change in vegetation, including any vegetation on downstream portion of dam, that may indicate presence of seepage?					
F.	Adverse conditions at material interfaces (i.e., earth fill/concrete, sheetpile/concrete, earth fill/sheetpile interfaces), such as displacement or gaps, seepage, erosion, deterioration of concrete?					
G.	Flow below (downstream of) non-overflow section?					
H.	Significant change in wetland area?					
I.	Deterioration or loss of safety signage?					
J.	Unusual conditions/vandalism?					

Comments:

ATTACHMENT A – SITE MAP AND PHOTO LOCATION PLAN



LEGEND

LIMITS OF VEGETATION MAINTENANCE AREA.

APPROX. PHOTOGRAPH LOCATION & ORIENTATION

INSTRUMENTATION LOCATION

NOTES

1. **PHOTOGRAPHS TAKEN DURING [DATE[, QUARTERLY VISUAL INSPECTION.**
2. **BASEMAP FROM A TOPOGRAPHIC SURVEY ENTITLED "WOODS POND DAM. LEE/LENOX, MASSACHUSETTS," PREPARED BY FORESIGHT LAND SERVICES, DATED MAY 1, 2020.**

2024 Quarter [#] Inspection
Woods Pond Dam
Attachment A
Site Map and Photo Location Plan
Date of Inspection: [DATE]
GZA Project No.: [NUMBER]

ATTACHMENT B – PHOTO LOG

[#] Quarterly Inspection Photographic Log

Client Name: General Electric Company	**Site Location:** Woods Pond Dam (MA00731), Lee/Lenox, MA	**Project No.**

Photo No. 1	**Date:**
Direction Photo Taken:	
Description:	

Photo No. 2	**Date:** 9/3/2024
Direction Photo Taken:	
Description:	

[#] Quarterly Inspection Photographic Log

Client Name:	Site Location:	Project No.
General Electric Company	Woods Pond Dam (MA00731), Lee/Lenox, MA	

Photo No.	Date:
3	
Direction Photo Taken:	
Description:	

Photo No.	Date:
4	
Direction Photo Taken: Upstream	
Description:	

[#] Quarterly Inspection Photographic Log

Client Name:	Site Location:	Project No.
General Electric Company	Woods Pond Dam (MA00731), Lee/Lenox, MA	

Photo No.	Date:
5	
Direction Photo Taken:	
Description:	

Photo No.	Date:
6	
Direction Photo Taken:	
Description:	

[#] Quarterly Inspection Photographic Log

Client Name: General Electric Company	Site Location: Woods Pond Dam (MA00731), Lee/Lenox, MA	Project No.

Photo No. 7	Date:
Direction Photo Taken:	
Description:	

Photo No. 8	Date:
Direction Photo Taken:	
Description:	

[#] Quarterly Inspection Photographic Log

Client Name: General Electric Company	Site Location: Woods Pond Dam (MA00731), Lee/Lenox, MA	Project No. 01.0019896.80

Photo No.	Date:
9	
Direction Photo Taken:	
Description:	

Photo No.	Date:
10	
Direction Photo Taken:	
Description:	

[#] Quarterly Inspection Photographic Log

Client Name: General Electric Company	Site Location: Woods Pond Dam (MA00731), Lee/Lenox, MA	Project No. 01.0019896.80

Photo No. 11	Date:
Direction Photo Taken:	
Description:	

Photo No. 12	Date:
Direction Photo Taken:	
Description:	

[#] Quarterly Inspection Photographic Log

Client Name:	Site Location:	Project No.
General Electric Company	Woods Pond Dam (MA00731), Lee/Lenox, MA	01.0019896.80

Photo No.	Date:	
13		
Direction Photo Taken:		
Description:		

Photo No.	Date:	
14		
Direction Photo Taken:		
Description:		

ATTACHMENT C – MONITORING TRACKING TABLE

Woods Pond Dam
Monitoring Tracking Table

Woods Pond Dam – Monitoring Tracking Table – (based on [DATE] Inspection)				
Condition Observed Requiring Monitoring	**When was the condition first observed?**	**Observed during this inspection?**	**Proposed Response**	**Status**
1.0 General				
2.0 Raceway Stoplog Sluice Structure				
3.0 Raceway Embankment				
4.0 Observation Wells				
5.0 Raceway Closure Structure				
6.0 Left (East) Abutment Section				
7.0 Concrete Overflow Spillway				
8.0 Right (West) Abutment Section				

(Remove items from table when addressed or no longer observed.)

ATTACHMENT D – MAINTENANCE TRACKING TABLE

Woods Pond Dam
Maintenance Tracking Table

Woods Pond Dam – Maintenance Tracking Table – (based on [DATE] Inspection)				
Condition Observed Requiring Maintenance	**When was the condition first observed?**	**Observed during this inspection?**	**Proposed Response**	**Status**
1.0 General				
2.0 Raceway Stoplog Sluice Structure				
3.0 Raceway Embankment				
4.0 Observation Wells				
5.0 Raceway Closure Structure				
6.0 Left (East) Abutment				
7.0 Concrete Overflow Spillway				
8.0 Right (West) Abutment				

(Remove items from table when addressed or no longer observed.)

APPENDIX E – BIENNIAL ENGINEERING PHASE 1 INSPECTION/EVALUATION CHECKLIST

DAM SAFETY INSPECTION CHECKLIST

NAME OF DAM: ____________________ STATE ID #: ____________________

REGISTERED: ☐ YES ☐ NO NID ID #: ____________________

STATE SIZE CLASSIFICATION: ____________________ STATE HAZARD CLASSIFICATION: ____________________

CHANGE IN HAZARD CLASSIFICATION REQUESTED?: ________

DAM LOCATION INFORMATION

CITY/TOWN: ____________________ COUNTY: #N/A

DAM LOCATION: ____________________ ALTERNATE DAM NAME: ____________________
(street address if known)

USGS QUAD.: ____________________ LAT.: __________ LONG.: __________

DRAINAGE BASIN: ____________________ RIVER: ____________________

IMPOUNDMENT NAME(S): ____________________

GENERAL DAM INFORMATION

TYPE OF DAM: ____________________ OVERALL LENGTH (FT): ____________________

PURPOSE OF DAM: ____________________ NORMAL POOL STORAGE (ACRE-FT): ____________________

YEAR BUILT: ____________________ MAXIMUM POOL STORAGE (ACRE-FT): ____________________

STRUCTURAL HEIGHT (FT): ____________________ EL. NORMAL POOL (FT): ____________________

HYDRAULIC HEIGHT (FT): ____________________ EL. MAXIMUM POOL (FT): ____________________

FOR INTERNAL MADCR USE ONLY

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

NAME OF DAM: 0 STATE ID #: 0

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

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 ______

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	NO

NAME OF INSPECTING ENGINEER: SIGNATURE:

NAME OF DAM: 0 | STATE ID #: 0
INSPECTION DATE: January 0, 1900 | NID ID #: 0

OWNER:		CARETAKER:	
ORGANIZATION		ORGANIZATION	
NAME/TITLE		NAME/TITLE	
STREET		STREET	
TOWN, STATE, ZIP		TOWN, STATE, ZIP	
PHONE		PHONE	
EMERGENCY PH. #		EMERGENCY PH. #	
FAX		FAX	
EMAIL		EMAIL	
OWNER TYPE			

PRIMARY SPILLWAY TYPE ______

SPILLWAY LENGTH (FT) ______ SPILLWAY CAPACITY (CFS) ______

AUXILIARY SPILLWAY TYPE ______ AUX. SPILLWAY CAPACITY (CFS) ______

NUMBER OF OUTLETS ______ OUTLET(S) CAPACITY (CFS) ______

TYPE OF OUTLETS ______ TOTAL DISCHARGE CAPACITY (CFS) ______

DRAINAGE AREA (SQ MI) ______ SPILLWAY DESIGN FLOOD (PERIOD/CFS) ______

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

FISH LADDER (LIST TYPE IF PRESENT) ______

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

PUBLIC BRIDGE WITHIN 50' OF DAM? ☐ YES ☐ NO IF YES, ROAD/BRIDGE NAME: ______
MHD BRIDGE NO. (IF APPLICABLE) ______

NAME OF DAM: 0 STATE ID #: 0

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

EMBANKMENT (CREST)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	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: 0 STATE ID #: 0

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

EMBANKMENT (D/S SLOPE)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	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: 0 STATE ID #: 0

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

EMBANKMENT (U/S SLOPE)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	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: 0 STATE ID #: 0

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

INSTRUMENTATION

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	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: 0 | STATE ID #: 0

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

DOWNSTREAM AREA

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	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: 0 | STATE ID #: 0

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

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: 0 STATE ID #: 0

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

PRIMARY SPILLWAY

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	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: 0 STATE ID #: 0

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

AUXILIARY SPILLWAY

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	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: 0 STATE ID #: 0

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

OUTLET WORKS

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	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: 0 STATE ID #: 0

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

CONCRETE/MASONRY DAMS (CREST)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
CREST	TYPE				
	SURFACE CONDITIONS				
	CONDITIONS OF JOINTS				
	UNUSUAL MOVEMENT				
	HORIZONTAL ALIGNMENT				
	VERTICAL ALIGNMENT				

ADDITIONAL COMMENTS:

NAME OF DAM: 0 STATE ID #: 0

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

CONCRETE/MASONRY DAMS (DOWNSTREAM FACE)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
D/S FACE	TYPE				
	SURFACE CONDITIONS				
	CONDITIONS OF JOINTS				
	UNUSUAL MOVEMENT				
	ABUTMENT CONTACT				
	LEAKAGE				

ADDITIONAL COMMENTS:

NAME OF DAM: 0 STATE ID #: 0

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

CONCRETE/MASONRY DAMS (UPSTREAM FACE)

AREA INSPECTED	CONDITION	OBSERVATIONS	NO ACTION	MONITOR	REPAIR
U/S FACE	TYPE				
	SURFACE CONDITIONS				
	CONDITIONS OF JOINTS				
	UNUSUAL MOVEMENT				
	ABUTMENT CONTACTS				

ADDITIONAL COMMENTS:

GZA GeoEnvironmental, Inc.

Woods Pond Dam 2024 OM&M Plan Revision Matrix

Section/Name	Item	Revision Rationale & Justification
1.0 Introduction & Background	General	Section 1.0 was revised to provide consistent organization and wording with the most recent Phase 1 Inspection/Evaluation Report.
2.0 Operations	General	Section 2.0 was revised to provide consistent organization and wording with the most recent Phase 1 Inspection/Evaluation Report, add the new USGS Lenoxdale stream gage, clarify responsibilities during normal and flood operations, and clarify responsibilities for equipment operations.
3.0 Surveillance & Monitoring Program	General	Section 3.0 was revised to clarify and organize better the descriptions of the required inspections and other surveillance and monitoring activities.
3.1 Visual Inspections	Pre-Storm Inspections	The separate pre-storm inspection requirement, including observations to identify debris in the spillway, was removed from this revision of the OM&M Plan because, based on our experience, the information from a pre-storm inspection would likely not be substantially different from the information from the preceding quarterly inspection. The Dam is regularly maintained between quarterly inspections, including removal of debris if impeding spillway hydraulic capacity. Debris buildup at dams tends to happen during and after storm events rather than before storm events. Nevertheless, GE has retained the requirement in Section 4.1 to make best efforts to remove debris from the spillway, if present and if practicable, when a high-flow event is forecasted. The requirement for post-storm inspections (Section 3.1.3) remains as an integral part of the Woods Pond Dam monitoring program. Post-storm inspections allow the dam safety engineer to observed potential changes in dam condition due to the significant storm event, and to recommend maintenance/repair actions as needed. Please note that Woods Pond Dam can safely pass the regulatory spillway design flood (SDF) without operator intervention.
	Observations during a major storm	The requirement to make observations during a major storm event was removed from this revision of the OM&M Plan. The primary reason that this requirement was removed is to protect the safety of the dam safety engineer.
3.2 Topographic & Bathymetric Surveys	Scour Hole	Section 3.2 was updated to include monitoring of the scour hole at the toe of the spillway during the five-year topographic and bathymetric surveys. Previously, the scour hole was monitored every 10 years.
3.3.1 Staff Gages	New staff gages	Section 3.3.1 was revised to include the newly installed staff gages at the Dam.
3.4 Conditions of Note	General	Section 3.4 was added to describe the actions to be taken should conditions at the dam requiring follow-up be noted during visual inspections, instrumentation readings, etc. The verbiage of this section was previously repeated in multiple locations within the Inspections section of the prior OM&M Plan. Collecting that repetitive verbiage into Section 3.4 aids clarity.
4.0 Maintenance & Repairs	General	Section 4.0 was revised to clarify and update the required maintenance and repair activities based on maintenance activities required since the prior OM&M Plan.
	General	Section 4.0 was revised to remove the monitoring requirements that were included in Section 4.0 of the prior OM&M Plan. All monitoring requirements are now included in Section 3.0 of the revised OM&M Plan. Clarifying text has been added to Section 4.0 of the revised OM&M Plan.
6.0 Training	General	Section 6.0 was revised to clarify the experience of GE's dam safety engineer and contractor. The previous OM&M training requirements were developed when inspections were performed by non-dam safety personnel that required yearly training. All inspections are now performed by or under the supervision of GE's dam safety engineer.
7.0 Recordkeeping & Reporting	General	Section 7.0 was revised to clarify the recordkeeping process and the reporting requirements for all monitoring and maintenance activities.
8.0 Schedule	General	Section 8.0 was revised to be consistent with the revisions made to the other sections of the revised OM&M Plan, as described above.
9.0 References	General	Section 9.0 was updated to include some of the references used to develop the revised OM&M Plan. Others are cited throughout the Plan.

<table>
<tr><th>Section/Name</th><th>Item</th><th>Revision Rationale & Justification</th></tr>
<tr><td>Appendix B: EAP</td><td>General</td><td>The EAP was revised to make the purpose and description of the Dam consistent with the comparable sections in the most recent Phase I Inspection/Evaluation Report and in the revised OM&M Plan, to update responsible party information, and to include the updated dam break analysis with associated inundation maps.</td></tr>
<tr><td rowspan="4">Appendix D: Quarterly Maintenance Inspection Checklist</td><td>General</td><td>The inspection form was revised and reorganized for ease of use during inspections and to better track conditions of note observed at Woods Pond Dam. The former single maintenance tracking table was separated into two separate table: one for tracking maintenance items and one for tracking monitoring items. This was done because maintenance is performed by GE’s contractor and monitoring is performed by GE’s dam safety engineer.</td></tr>
<tr><td>Section 4.0
Observation Wells</td><td>Additional details regarding the location of the observation wells, water level measurements, and sediment level measurements were added to the checklist.</td></tr>
<tr><td>Section 6.0
Left (East) Abutment</td><td>The former item G, “Excessive flow downstream of the abutment,” was removed from this section because it is a confusing item and is not a condition that is relevant to the Left (East) Abutment. The Left (East) Abutment is flanked on the right by the Concrete Overflow Spillway, which by design, allows river flows to safely pass from upstream to downstream, and is monitored in accordance with Section 7.0 of the inspection checklist. Immediately downstream of the Left (East) Abutment is the Raceway Embankment, whose presence prevents the mechanism of “Excessive flow downstream of the abutment” from initiating or being observed and is monitored in accordance with Section 3.0 of the inspection checklist. The Left (East) Abutment is flanked on the left by the Raceway Closure Structure, which includes stoplogs to prevent excessive flows from entering the raceway channel and is monitored in accordance with Section 5.0 of the inspection checklist. Seepage around the end of the abutment (e.g. along the interface with the left Spillway training wall and the Left Abutment) is already monitored by Item D in Section 6.0 of the inspection checklist. Therefore, the former item G is not an appropriate condition to monitor.</td></tr>
<tr><td>Attachments</td><td>Revised attachments to the quarterly inspection checklist are:
Attachment A – Site Map & Photo Location
Attachment B – Photo Log
Attachment C – Monitoring Tracking Table
Attachment D – Maintenance Tracking Table</td></tr>
</table>