

# **Emergency Action Plan (EAP)**

## **Page Park Pond Dam**

### **Page Park Pond**

**Connecticut Dam ID No. 1702**

**Hazard Class “B” (Significant)**

**Location: City of Bristol, County of Hartford, Connecticut**

**Owner: City of Bristol Parks, Recreation, Youth & Community Services Department**

**August 9, 2022**

**Revision Date: August 9, 2022**



Prepared by:

GZA GeoEnvironmental  
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### Professional Engineer Certification

The following certification must be signed by a Professional Engineer

"I hereby certify that the inundation map and the monitoring intervals were prepared and determined by me and are true and correct to the best of my knowledge, belief, and professional judgment."

8/9/2022

Signature of Professional Engineer

Date

James F. Davis

Sr. Project Manager

31013

Printed Name of Professional Engineer

Title

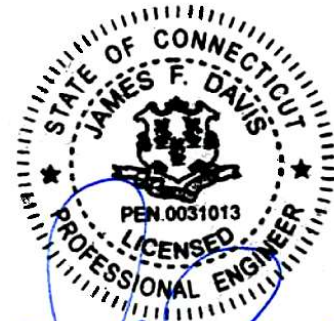
CT P.E. Number

GZA GeoEnvironmental, Inc.

Name of Firm

95 Glastonbury Boulevard, Glastonbury, CT 06033

Address of Firm



Affix P.E. Stamp Here

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# 1 EXECUTIVE SUMMARY

## 1.1 Purpose

The purpose of this EAP is to reduce the risk of human life loss and injury and minimize property damage during an unusual or emergency event at Page Park Pond Dam.

## 1.2 Facility Information

Page Park Pond Dam is located at Dewitt Page Park Road in Bristol, Connecticut. The dam impounds Page Park Pond which is fed from an unnamed tributary. The dam is owned and operated by the City of Bristol Parks, Recreation, Youth and Community Services Department.

### ***Physical Description of Dam & Related Components***

Page Park Pond Dam consists of an approximate 270-foot-long earthen embankment with a stone masonry, broad-crested weir spillway. The top of the earthen embankment is about 20 feet wide and is an asphalt-paved road. The upstream slope is relatively flat (less than 5 horizontal to 1 vertical or 5H:1V) and is a mix of grass vegetated and bare soil with no armoring. A portion of the upstream slope to the left of the spillway consists of a stone masonry wall. The downstream slope is approximately 3H:1V and is vegetated with brush and trees.

The spillway is a masonry wall located on the right side of the embankment. The spillway appears to be stepped with a lower “notched” area and a higher area that is capped with concrete. The higher capped concrete portion of the weir is about the same elevation as the top of embankment. Thus, during high flow events, activation of the higher portion of the weir will occur roughly concurrent with overtopping of the dam. The lower notched portion of the spillway has slots for a screen.

The spillway discharges onto a paved concrete apron and through the embankment via a square, stone masonry culvert. It is not known if the apron concrete paving has steel reinforcement.

There is a 12-inch diameter low-level outlet (LLO) that discharges onto the downstream slope with no headwall or outlet erosion protection. The LLO pipe material is reportedly Corrugated Metal Pipe (CMP). It is unknown what the condition or whether there is an intake structure on the upstream end of the LLO pipe. A capped 8-inch riser pipe in the impoundment reportedly provides access to the LLO gate.

Year Built: Unknown

Height: 7.7 ft

Drainage Area: 0.1 sq mi

Hazard Classification: B, Significant

Latitude: 41°41'07.3"N Longitude:  
72°55'45.1"W

Record Water Surface Elevation:

\_\_\_\_ N/A \_\_\_\_ ft (NAVD 88) \_\_\_\_\_ (date)

\_\_\_\_ N/A \_\_\_\_ ft (below dam crest)

Dam Owner: City of Bristol Parks, Recreation,  
Youth and Community Services

Dam Operator: City of Bristol Parks, Recreation,  
Youth and Community Services

Dam Designer: Unknown

Outflow Location: Outlet and Spillway

See location map and dam sketch provided in *Appendix C*.

## ***History of the Dam***

The dam design and construction history is unknown. There are no known available records of the dam showing either design or as-built conditions. Page Park Pond Dam was visually inspected by CTDEEP (formerly DEP) in 1996 and 2011 and by GZA in 2021.

The 1996 and 2011 CTDEEP inspections documented the following:

- The dam shows signs of overtopping;
- Several trees and woody vegetation present on downstream embankment;
- Voids and sinkholes below spillway apron;
- “Very wet area” on the downstream slope; and
- Several areas of seepage and boils along the downstream channel and around the low-level outlet pipe. The seepage showed signs of soil movement.

GZA’s 2021 inspection documented the following:

- Trees and brush located within 25 feet of the embankment;
- Debris in the spillway downstream culvert beneath the embankment;
- Missing sections of concrete cap on the left spillway training wall;
- Significant seepage in the downstream channel;
- Erosion/undermining of the spillway apron at the right training wall abutment;
- Deteriorated and cracked asphalt on the embankment crest, with depressed areas above the spillway culvert;
- Animal burrows on the downstream slope;
- Cracked and missing grout on the downstream face of the spillway training walls; and
- Vegetation debris in the discharge end of the low-level outlet pipe.

The following recommendations were made in GZA’s 2021 inspection report:

1. Remove brush and trees on and within 25 feet of the earthen embankment;
2. Seed and establish grass on the upstream embankment slope;
3. Clear debris from the downstream end of the spillway discharge conduit;

4. Repair the cracked and missing concrete/joints in the spillway training walls;
5. Fill in eroded/undermined areas of the spillway apron on the right training wall abutment;
6. Repoint the downstream headwall of the spillway outlet culvert;
7. Clear the vegetative debris on the discharge end of the low-level outlet. Operate the low-level outlet at least annually to evaluate functionality. Perform maintenance as required.
8. Fill in burrows and eradicate burrowing animals.

## **Drainage Area & Watercourse**

The drainage area of Page Park Pond Dam is approximately 0.1 square miles and extends through the City of Bristol. Soils underlying the watershed are primarily Hydrologic Soil Group C, D or C/D (57%).

The Page Park Pond Dam discharges into an unnamed brook that converges into another unnamed brook approximately 1,500 feet downstream, and eventually into the Pequabuck River about 1.5 miles downstream of Page Park Pond.

### **1.3 Dam Breach Flood**

An analysis has been performed for Page Park Pond Dam to estimate the downstream areas that could be inundated by flood waters in the event of a breach of this structure. The analysis was completed in February 2022 by GZA. The hypothetical dam breach flood and downstream inundated areas were developed using the U.S. Army Corps of Engineers' (USACE) Hydrologic Engineering Center's River Analysis System (HEC-RAS) computer program. The HEC-RAS model is based on the Saint Venant equations of conservation of mass and momentum, which describe the changes in momentum and acceleration a large flood wave undergoes as it progresses downstream.

The assumptions applied to the breach analysis and the potentially inundated areas are summarized below. Detailed information on the impacted areas, including inundation mapping and a listing of streets at risk, is provided in *Section 3*. A discussion and supporting documentation for the dam breach analysis is provided in *Appendix E*.

### **Dam Breach Modeling Assumptions**

The potential area of inundation due to a breach of Page Park Pond Dam as presented in this EAP is based on the following assumptions:

1. The pre-breach water level in the impoundment is at the top of embankment.
2. The time from breach initiation to full formation is 0.5 hours.
3. The breach width was approximately 16 feet.
4. Downstream bridge openings are not blocked.

For the purposes for this EAP, breach initiation is defined as the beginning of rapid uncontrolled growth of the breach and full formation is defined as the point when significant lateral expansion has stopped.

This analysis estimates the dam breach outflow and the potentially inundated downstream areas. However, the actual magnitude of the flood wave and the resulting downstream flood levels will be dependent on numerous factors that cannot be predicted in advance. For example, the dam breach flood wave would be greater in magnitude if the water level in the impoundment is higher at the beginning of the failure. Furthermore, downstream flood levels could be increased due to conditions such as debris clogging bridge/culvert crossings and others. If these conditions exist, additional nearby properties may need to be evacuated.

### ***Potentially Impacted Downstream Areas***

The inundation area resulting from a hypothetical dam breach at Page Park Pond Dam extends through the City of Bristol. The hypothetical dam breach inundation map is provided in Section 3.5. The following areas were estimated to be in the inundation area during a hypothetical dam breach:

- Orchard Park Road which is located along the top of the dam;
- Dewitt Page Park Road, immediately downstream of the dam. The surrounding area is generally grassed, wooded or developed with roadways and playing fields (baseball and tennis).
- King Street (Route 229), approximately 1,100 feet downstream of the dam. The area around King Street is a combination of grass, pavement and buildings (both residential and commercial).
- Rich Lane, Spark Avenue, Arlene Drive, Carpenter Avenue, and Stonecrest Drive, all of which are east of King Street and are generally developed with residences.
- Sheriden Woods Health Care Center, approximately 0.6 miles south and east of the dam.
- Holt Place and Holt Street, residential streets approximately 0.8 miles south and east of the dam.
- The following residences:
  - 404-568, 623 King Street
  - 12-71 Rich Lane
  - 5021 Arline Drive
  - 10-114 Carpenter Avenue
  - 280-290, 321 Stonecrest Drive
  - 15-67 Holt Street
  - 63-69 Holt Place
- The downstream limit of mapping was where the incremental distance in water surface elevation due to dam failure was anticipated to be 1 feet, which is located approximately 1 mile downstream from the dam at the intersection of the inundation and West Washington Street.

See *Section 3* for information on the residents, businesses and infrastructure at risk of being flooded should the dam fail and the estimated time for the flood wave to travel from the dam to those locations.

## 1.4 Directions to Dam

The location of the dam is shown on the *Dam Location Map* provided in *Section 3.4*.

If using a GPS satellite-based navigation system, the dam can be located using the following information:

- Latitude: 41.685597 Longitude: -72.929187
- Approximate Street Address: Approximately 1,125 feet west of the intersection of Dewitt Page Park Road and King Street, Bristol, Connecticut

Otherwise, detailed directions to the dam starting from Route 6 (Farmington Avenue) are as follows:

- From the East: Head west on Route 6 (Farmington Avenue). Turn left onto Route 229 (King Street). After 0.3 miles, turn right onto Dewitt Page Park Road. After about 0.2 miles, Page Park Pond Dam will be on the left.
- From the West: Head east on Route 6 (Farmington Avenue). Turn right onto Page Avenue. After about 300 feet, turn left onto Moody Street then take a nearly immediate right onto Dewitt Page Park Road. After 0.1 miles, stay left on Dewitt Page Park Road. Page Park Pond Dam will be located about 0.15 miles on the right.

## 1.5 Location of Emergency Operations Center

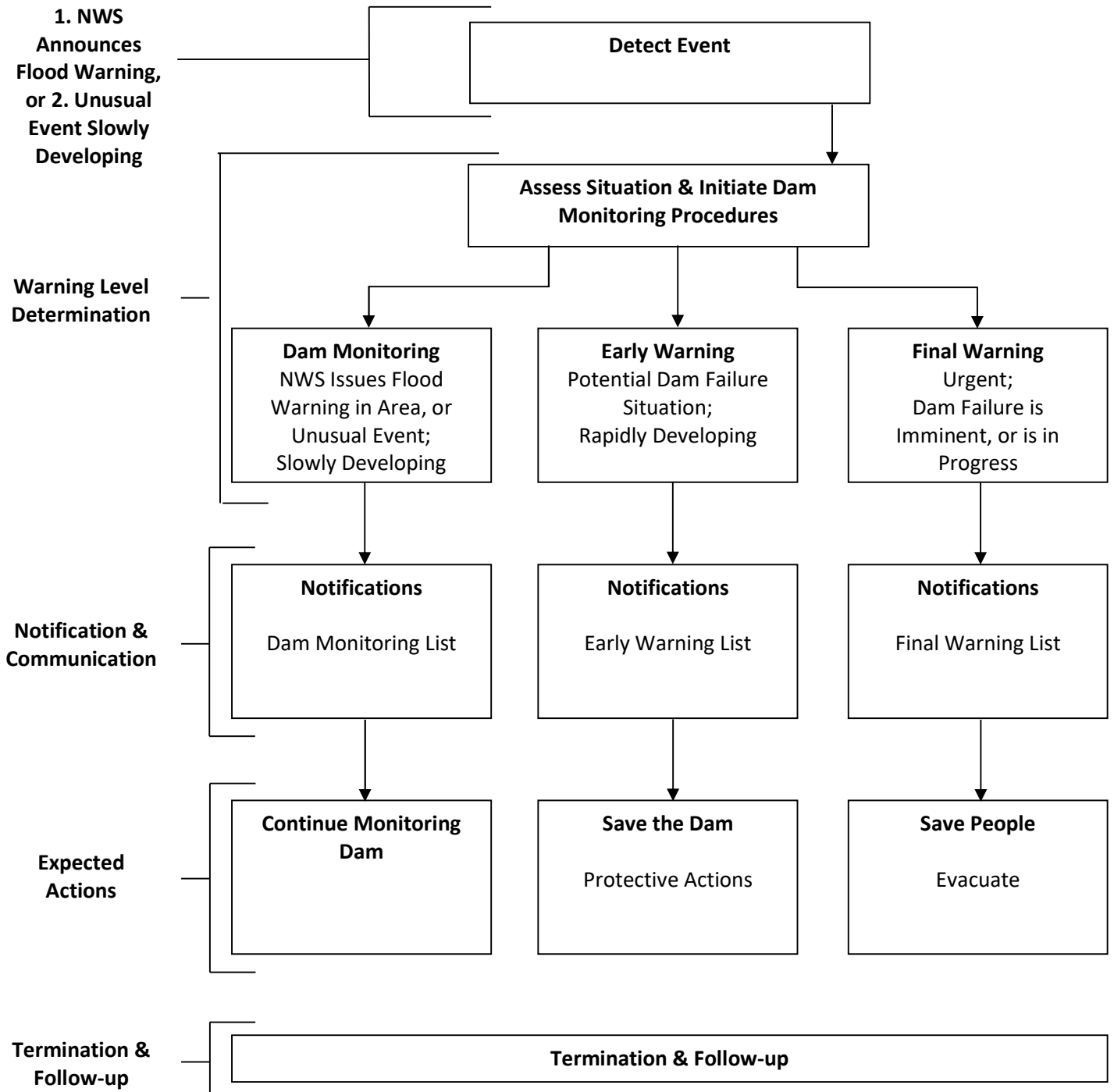
The City Emergency Operations Center (City EOC) is located at the City of Bristol Police Department. The address and contact information is listed below:

- Street Address: 131 North Main Street, Bristol, CT
- Latitude: 41.674098 Longitude: -72.946458
- Phone Number: (860) 584-3011 (Dispatch)

The location of the City EOC is also shown on the *Dam Location Map* provided in *Section 3.4*.

## 2 THE FIVE-STEP EAP PROCESS

### 2.1 EAP Overview



### 2.2 Warning Level Determination

After monitoring of the dam has been initiated, the dam owner, operator, or their representative is responsible for determining if conditions warrant one of the following warning levels:



**Dam Monitoring - Nonemergency event, slowly developing:**

Monitoring of the dam shall be initiated when the National Weather Service announces a *Flood Warning* for the area or when the owner, operator, their representative, or engineer observes any of the following conditions:

- A marked increase in seepage through an embankment, particularly if evidence of a boil (release of seepage under pressure which tends to “float” away the material through which it flows) is observed.
- An increase in the rate of rise of the impoundment such that a non-overflow section(s) of the dam may be overtopped.
- Erosion or undermining, potentially due to previous high flow conditions, that appear to threaten stability of the dam, or spillway.

Once any of the above conditions are observed, the City shall immediately initiate monitoring of the dam and contact a professional engineer. Continuous monitoring should be maintained until the engineer has inspected the dam and evaluated the situation to establish an appropriate monitoring frequent/procedure.

**Responsible Personnel**

Personnel responsible for monitoring of the dam, decision making, and implementing emergency repairs can be the owner, operator, or their designee(s). The following individuals are responsible for monitoring activities:

<b>Personnel</b>	<b>Affiliation</b>	<b>Phone Number(s)</b>
<b><i>Joshua Medeiros Superintendent of Parks, Recreation, Youth and Community Services</i></b>	<b><i>Owner</i></b>	Office: 860-584-6159 Mobile: 860-912-6331
<b><i>Sarah Larson Deputy Superintendent of Parks, Recreation, Youth and Community Services</i></b>	<b><i>Acting Owner (in absence of Superintendent)</i></b>	Office: 860-584-6280 Mobile: 860-877-6169

The following individuals are responsible for coordinating and implementing emergency repairs at the dam:

<b>Personnel</b>	<b>Affiliation</b>	<b>Phone Number(s)</b>
<b><i>Robert Lincoln Parks, Grounds and Facilities Supervisor</i></b>	<b><i>Supervisor of Parks</i></b>	Office: 860-584-7799 Mobile: 860-919-5031
<b><i>Doug Trillo Assistant Parks, Grounds and Facilities Supervisor</i></b>	<b><i>Acting Supervisor (in absence of Parks Supervisor)</i></b>	Office: 860-584-7799 Mobile: 860-384-3690

## Monitoring Procedures

The personnel listed in the *Notification Chart* shall be notified that monitoring procedures have been initiated in accordance with this EAP.

Monitoring activities shall include viewing the dam and, if it is safe to do so, walking the dam crest at regular intervals to determine if any sloughing of the embankment, cracking, settlement, or movement of the dam has occurred. This shall also include the inspection of the toe of the dam and the abutment contacts to detect any signs of deterioration of the dam or its components, and inspection of the spillway(s) and outlet structure(s) for accumulations of debris.

All monitoring activities shall be documented on the *Unusual or Emergency Event Log* provided as *Appendix B-2*. At a minimum, the documentation shall include the following:

- The date and time of each inspection interval, rainfall data, and reservoir level.
- Observation of any changes in the dam including sloughing of the embankments, cracking, settlement, movement, erosion, seepage, deterioration of abutment contacts, debris obstructing the spillway(s) or outlet structure(s), or any other sign the dam is deteriorating.
- When observing seepage, the written record shall comment on location, amount of flow and whether the flow is clear, cloudy or muddy.
- The written record shall comment on the extent, depth, and location of said conditions when observing movement, sloughing, or erosion of the dam.

**Note:** See *Guidance for Warning Level Determination* table (*End of this Section*) for assistance in evaluating specific events to determine if they are unusual or potential emergency situations.

### **Early Warning - 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. Remedial actions may be able to save the dam. If an engineer has been designated, time permitting, they should be contacted to evaluate the situation and recommend remedial actions to prevent failure of the dam. The dam owner, operator, or their representative should initiate remedial repairs (note local resources that may be available - see *Appendix A*). Time available to employ remedial actions may be hours or days.

This warning level is also applicable when the water level in the impoundment is rising at a rate that may cause the outflow from the dam to increase significantly such that downstream areas and roads could be flooded, or people near the downstream channel could be endangered.

The City of Bristol, their representative, or engineer should closely monitor the condition of the dam and periodically report the status of the situation to the emergency management authority. If the condition

worsens and failure becomes imminent, the dam owner, operator, their representative, or engineer must immediately notify the emergency management authority that conditions warrant issuing a *Final Warning*.

### **Final Warning - Urgent; dam failure appears imminent or is in progress:**

This is an extremely urgent situation when a dam failure is about to occur or is occurring and cannot be prevented. Flash flooding will occur downstream of the dam.

### **Monitoring Equipment & Supplies**

All inspections should be performed with proper safety equipment. Means of remote communication (e.g., mobile phone or two way radio) should be maintained to allow prompt contact with emergency officials if unsafe conditions are found at the dam. The City of Bristol will rent floodlights from Just Ask Rental in the case of emergency night work.

See *Appendix A* for an inventory of the Parks, Recreation, Youth and Community Services Department available equipment, materials and manpower that can be utilized to respond to emergencies at the site. This list should be maintained by the dam owner, operator, or their representative and revised as necessary. It may be possible to enlist the service of a reliable construction contractor(s) who can be made available to supply needed manpower and equipment for emergency situations. This equipment should be used to buttress the dam structure (e.g., raise the crest of the dam or buttress eroded embankment areas, tipping walls, etc.) before water levels rise appreciably, or if possible, to perform emergency repairs during flooding. The City of Bristol Parks, Recreation, Youth and Community Services Department preferred contractors for equipment and supplies include:

Contractor	Address	Phone Number
SUPERIOR LAWN CARE	18 JUDD RD TERRYVILLE CT 06786	(860) 583-9339
OAKLAND LLC	PO BOX 531 BRISTOL CT 06011-0531	(860) 221-5936
SUPREME FOREST PRODUCTS INC.	49 DEPAOLO DRIVE SOUTHINGTON CT 06489	860-485-0343
TABACCO & SON BUILDERS INC	145 BURLINGTON AVE BRISTOL CT 06010	(860) 250-6160
MARTIN LAVIERO CONTRACTOR, INC.	611 NORTH MAIN STREET PO BOX 1659 BRISTOL CT 06011-1659	(860) 882-8879
D'AMATO CONSTRUCTION CO	10 MAIN ST, 5TH FL BRISTOL CT 06010	(860) 583-3489

### **Guidance for Warning Level Determination [Optional]**

Guidance for determining the appropriate warning level for Page Park Pond Dam is provided in the table below. Examples of conditions that would constitute an Early Warning or Final Warning at the dam are provided in *Appendix D*.

<b>Event</b>	<b>Situation</b>	<b>Warning Level</b>
Water Surface Elevation	A flood warning has been issued by the National Weather Service for the area in the general vicinity of the dam.	Monitor
	This is similar to a first fill situation as the embankment has not had impounded at this elevation before	Monitor
	Minor flow in spillway with no active gully erosion	Early Warning
	Spillway flow that would result in flooding of people downstream if the reservoir level continues to rise	Final Warning
	Spillway flowing with an advancing headcut that is threatening the control section	Final Warning
	The impoundment level is within 1 foot from the top of the dam and is rising at a rate such that a non-overflow section of the dam will be overtopped within 30 minutes, or is currently overtopping	Final Warning
Seepage	New seepage areas in or near the dam	Monitor
	New seepage areas with cloudy discharge or increasing flow rate	Early Warning
	Seepage with discharge greater than <b>50</b> gallons per minute	Final Warning
Sinkholes	Observation of new sinkhole in reservoir area or on embankment	Early Warning
	Rapidly enlarging sinkhole	Final Warning
Embankment cracking	New cracks in the embankment greater than ¼-inch wide without seepage	Monitor
	Cracks in the embankment with seepage	Early Warning
Embankment movement	Visual movement/slippage of the embankment slope	Monitor
	Sudden or rapidly proceeding slides of the embankment slopes	Final Warning
Instruments	Instrumentation readings beyond predetermined values	Monitor
Earthquake	Measurable earthquake felt or reported on or within 50 miles of the dam	Monitor
	Earthquake resulting in visible damage to the dam or appurtenances	Early Warning
	Earthquake resulting in uncontrolled release of water from the dam	Final Warning
Security threat	Verified bomb threat that, if carried out, could result in damage to the dam Damage to dam or appurtenances with no impacts to the functioning of the dam	Early Warning
	Detonated bomb that has resulted in damage to the dam or appurtenances	Final Warning
Sabotage/ vandalism	Damage to dam or appurtenance with no impacts to the functioning of the dam	Monitor
	Modification to the dam or appurtenances that could adversely impact the functioning of the dam	Monitor
	Damage to dam or appurtenances that has resulted in seepage flow	Early Warning
	Damage to dam or appurtenances that has resulted in uncontrolled water release	Final Warning

## 2.3 Notification & Communication

After the warning level has been determined, the emergency management authority shall be notified immediately.

### Communication with Authorities

**Initiation of Dam Monitoring** - The dam owner, operator, their representative, or engineer should contact the emergency management authority. The dam owner(s) or operator's engineer should also be contacted, if one has been designated. Describe the situation, and request engineering assistance on the next steps that should be taken.

### **Early Warning - Emergency event, potential dam failure situation; rapidly developing:**

The following message may be used to help the dam owner, operator, representative or engineer to describe the emergency situation to emergency management authority:

*“This is \_\_\_\_\_ [Give your name and title, and provide name of owner & operator, if different].*

*I am, OR [name of person is] presently on site monitoring the dam.*

*There is an emergency condition at Page Park Pond Dam located at Page Park off of Dewitt Page Park Road.*

*I have activated the Emergency Action Plan for this dam. The following conditions have been observed [identify the conditions] and indicate the dam may be compromised and could lead to a potential failure.*

*These conditions warrant an **Early Warning** notification, i.e. residents within the limits of the inundation area as depicted in the EAP should be warned that an evacuation of this area may be necessary and first responders should be prepared to evacuate the inundation area.*

*Reference the Inundation Map, Structures and Roads At-Risk (Section 3) and evacuation routes identified in your copy of the Emergency Action Plan.*

*I will advise you when the situation is resolved or if the situation gets worse.*

*I can be contacted at the following number [give phone number]. If you cannot reach me, please call the following alternative number \_\_\_\_\_.”*

**Final Warning - Urgent event; dam failure appears imminent or is in progress:**

The following message may be used to help the dam owner, operator, representative or engineer to describe the emergency situation to emergency management authority:

*“This is \_\_\_\_\_ [Give your name and title, and provide name of owner & operator, if different].*

*I am, OR [name of person is] presently on site monitoring the dam.*

*There is an emergency condition at Page Park Pond Dam, located at Page Park off of Dewitt Page Park Road.*

*I have activated the Emergency Action Plan for this dam. The following conditions have been observed [identify the conditions] and indicate the dam **is in imminent danger of failing, or is failing.***

*This is a **Final Warning**, i.e. residents within the limits of the inundation area as depicted in the EAP should be warned that an evacuation of this area is necessary.*

*Reference the Inundation Map, Structures and Roads At-Risk (Section 3) and evacuation routes identified in your copy of the Emergency Action Plan.*

*I will continue to contact you and keep you up to date on the condition of the dam.*

*I can be contacted at the following number [give phone number]. If you cannot reach me, please call the following alternative number \_\_\_\_\_.”*

**SAMPLE MESSAGE FOR EMERGENCY MANAGEMENT AUTHORITY**

*The following is a guide for the emergency management authority to communicate the status of the emergency with the public.*

**EARLY WARNING (Potential failure/possible evacuation)**

This is [Name and title of the Emergency Management Authority]

There is an emergency at Page Park Pond Dam located at Page Park off of Dewitt Page Park Road.

The Emergency Action Plan has been activated for this dam due to current conditions that may cause the dam to fail.

Please be prepared for a possible evacuation if conditions at the dam worsen. You will be notified when the situation is resolved or the situation gets worse.



**FINAL WARNING (Imminent Failure/evacuate those at risk downstream)**

This is [Name and title of the Emergency Management Authority]

This is an emergency. Page Park Pond Dam located at Page Park off of Dewitt Page Park Road in Bristol, CT is failing/ or has failed.

Residents located in the downstream area must evacuate immediately.

Repeat. Page Park Pond Dam located at Page Park off of Dewitt Page Park Road in Bristol, CT is failing/ or has failed.

Evacuate immediately using the following evacuation route(s), or proceed immediately to high ground if you feel you can't get to the evacuation route in time.

Evacuations Routes are as follows:

- Take King Street (Route 229) southbound
- Take Woodland Street westbound
- Take Washington Street eastbound

The following roads are closed:

- Dewitt Page Park Road
- King Street (Route 229) approximately 0.5 mile south and 0.1 mile north of Bristol Eastern High School
- Rich Lane
- Spark Avenue
- Arline Drive
- Priscilla Lane
- Carpenter Avenue
- Stonecrest Drive
- Holt Street
- Holt Place

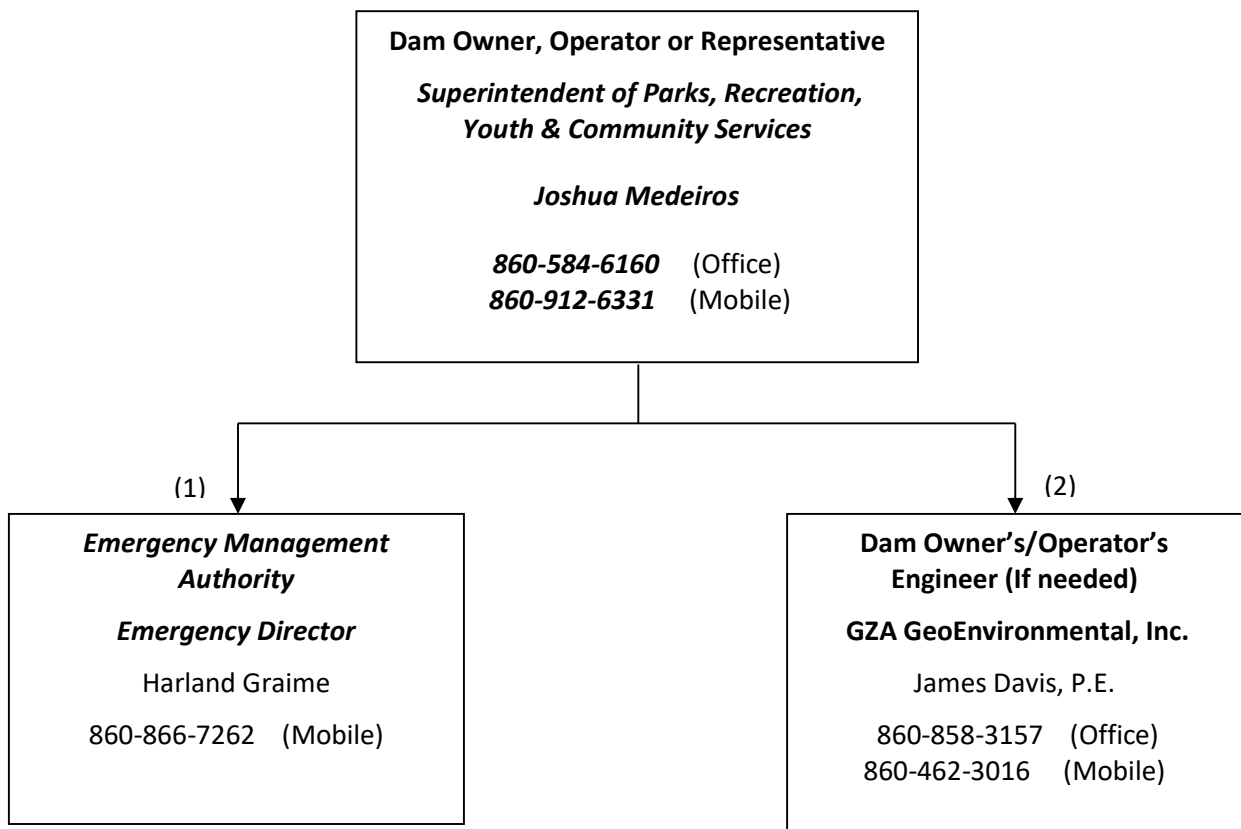
## Dam Monitoring Notifications

### Nonemergency

National Weather Service issues a Flood Warning for the Area,

OR

Unusual event; slowly developing



## Early Warning Notifications

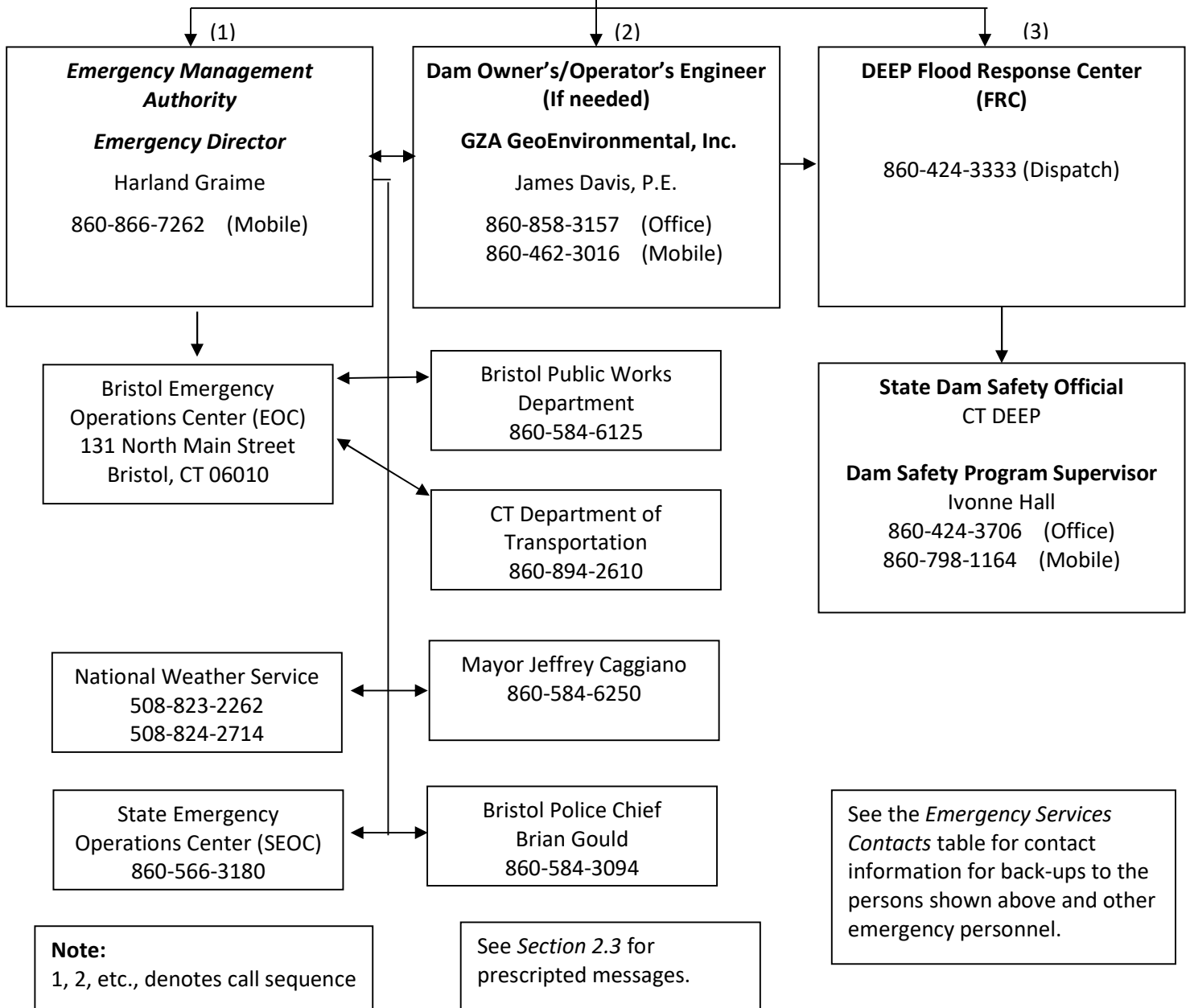
**Emergency event rapidly developing;  
 potential for dam failure**

**Dam Owner, Operator or Representative**  
**Superintendent of Parks, Recreation, Youth  
 & Community Services**

**Joshua Medeiros**

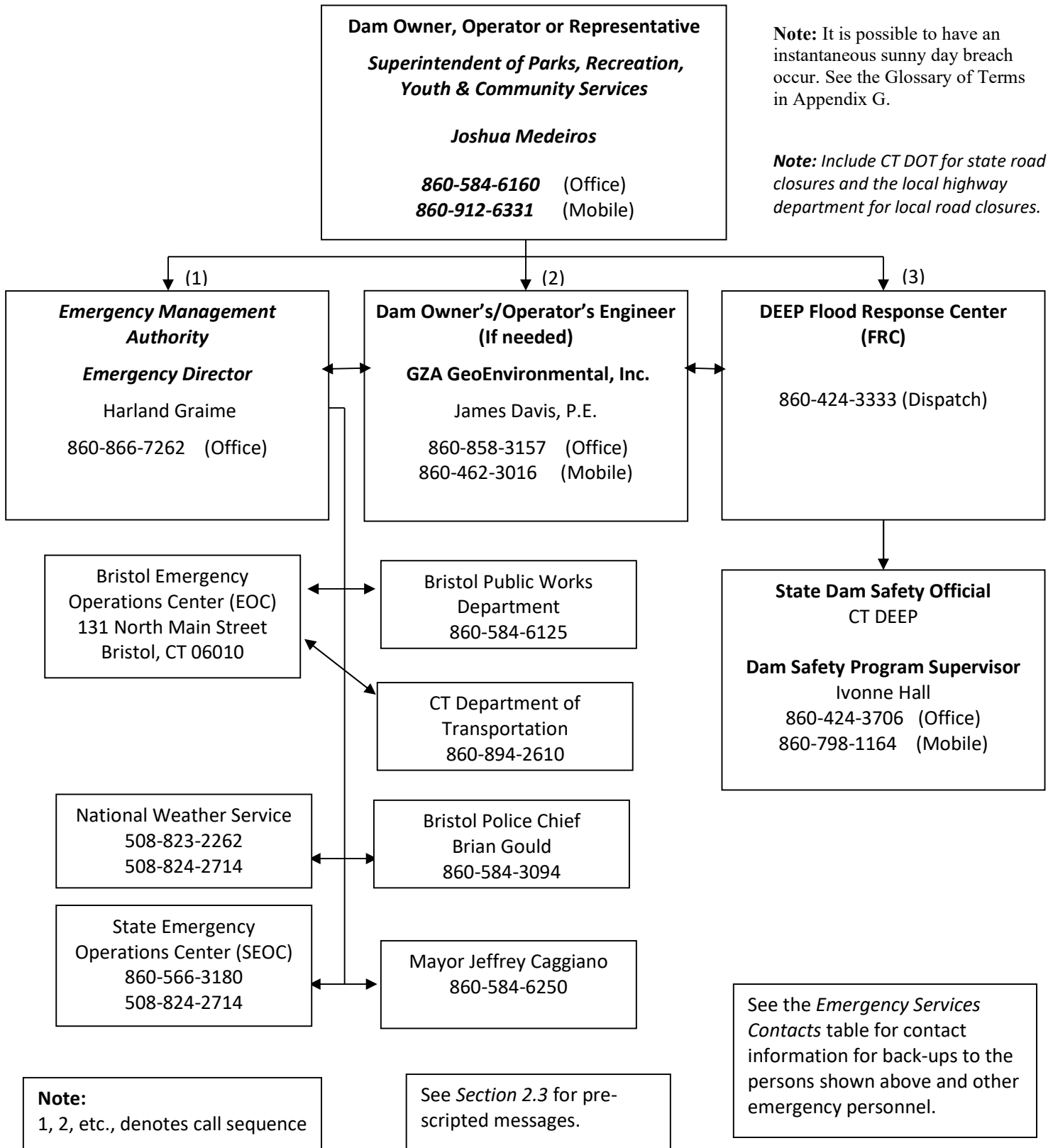
**860-584-6160** (Office)  
**860-912-6331** (Mobile)

*Note: Include CT DOT for state road closures and the local highway department for local road closures.*



## Final Warning Notifications

### Imminent dam failure; Evacuate downstream area



**Note:** It is possible to have an instantaneous sunny day breach occur. See the Glossary of Terms in Appendix G.

**Note:** Include CT DOT for state road closures and the local highway department for local road closures.

**Note:**  
1, 2, etc., denotes call sequence

See Section 2.3 for pre-scripted messages.

See the *Emergency Services Contacts* table for contact information for back-ups to the persons shown above and other emergency personnel.

## Emergency Services Radio Frequencies

Agency/Organization	Radio Frequency (MHz)
DEMHS Region 3	153.935
State Emergency Operations Center (SEOC)	46.16 (State Fire Radio Network) 145.11 (amateur radio) 145.03 (packet radio)
Bristol Police	855.7375
Bristol Fire Department	857.2625

## Emergency Services Contacts

	Agency / Organization	Principal contact	Address	Office telephone number	Alternate telephone numbers
<b>STATE</b>	DEEP Flood Response Center (FRC)	24 hour Emergency Locator Number	79 Elm St. 3 <sup>rd</sup> Floor Hartford, CT		860-424-3333 Dispatch
	State Dam Safety Official DEEP Dam Safety Program	Ivonne Hall	79 Elm St., Hartford, CT	860-424-3706	860-798-1164 (C)
	State Emergency Operations Center (SEOC)		CT National Guard Armory, 360 Broad St, Hartford, CT	860-566-3180	
	CT Department of Emergency Management & Homeland Security (DEHMS) Director	William H. Turner III			
	DEHMS Operations Chief				
	CT Department of Transportation 24 Hour Emergency number			800-695-0444	
	CT State Police Message Center			860-685-8190	
<b>TOWN</b>	Bristol Emergency Management Authority	Harland Graime	111 N. Main Street Bristol, CT	860-866-7262	
	Bristol Public Works	Raymond Rogozinski (Director of Public Works)	111 N Main St, Bristol, CT 06010	860-584-6125	
	Bristol Mayor's Office	Jeff Caggiano	111 N. Main Street Bristol, CT	860-584-6250	
	Bristol Fire Department	Richard Hart (Fire Chief)	181 N Main St, Bristol, CT 06010	860-584-7964	Kristopher Lambert (Fire Marshal) 860-584-7964 ext, 8102
	Bristol Police Department	Brian Gould (Police Chief)	131 N Main St, Bristol, CT 06010	(860) 584-3094	860-584-3000



## 2.4 Expected Actions

If the police or fire department receives a 911 call (or anyone else receive notice) regarding observations of an unusual or emergency event at the dam, they should immediately contact the dam owner, operator, their representative, or engineer. After the dam owner, operator, their representative, or engineer determines the warning level, the actions listed below should be taken. If time permits, the dam owner, operator, representative, or engineer (if there is one) should be contacted for consultation.

### **Dam Monitoring - Nonemergency, unusual event; slowly developing:**

- A. The dam owner, operator, their representative, or engineer should inspect the dam. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also, check the impoundment area, abutments, and downstream channel for signs of changing conditions. If increased seepage, erosion, cracking, or settlement are observed, refer to the *Guidance for Warning Level Determination (Section 2.2)* for guidance in determining the appropriate warning level for the new condition and recommended actions.
- B. All contacts should be made per the Dam Monitoring notification chart.
- C. Record all contacts that were made on the *Contact Checklist (Appendix B-1)*. Record all information, observations, and actions taken in the *Unusual or Emergency Event Log (Appendix B-2)*. Note the time of changing conditions. Document the situation with photographs and video, if possible.

### **Early Warning - Potential dam failure situation; rapidly developing:**

- A. All contacts should be made per the *Early Warning* notification chart. If an engineer has been designated, and time permits, request that he/she investigate the situation and recommend corrective actions.
- B. The dam owner, operator, their representative, or engineer should contact the emergency management authority to inform him/her that conditions exist to warrant issuing an **EARLY WARNING** and if current conditions get worse, an emergency situation may require evacuation. The emergency management authority should begin preparations for possible road closures and evacuations.
- C. The dam owner, operator, their representative, or engineer should provide updates to the emergency management authority. These updates can assist emergency management authority in making timely decisions concerning the need for warnings, road closures, and evacuations.
- D. The emergency management authority should issue the **EARLY WARNING** to residents and businesses in the inundation/evacuation area using local notification procedures.
- E. The emergency management authority should also issue an **EARLY WARNING** through the National Weather Service.
- F. The emergency management authority should warn the Department of Transportation (DOT) and the local DPW/highway department(s) about possible impacts to bridges and roadways.
- G. The DOT is responsible for state road closures and detours. The local DPW/highway department(s) is responsible for local road closures and detours.

- H. If time permits, the dam owner, operator, their representative, or engineer should inspect the dam. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also, check the impoundment area, abutments, and downstream channel for signs of changing conditions. If increased seepage, erosion, cracking, or settlement are observed, refer to the *Guidance for Warning Level Determination* table (Section 3.2) for guidance in determining the appropriate warning level for the new condition and recommended actions.
- I. Record all contacts that were made on the *Contact Checklist (Appendix B-1)*. Record all information, observations, and actions taken on the *Unusual or Emergency Event Log (Appendix B-2)*. Note the time of changing conditions. Document the situation with photographs and video, if possible.
- J. See the following discussion regarding possible remedial actions.

### **Possible Remedial Actions**

If time permits, the following emergency remedial actions should be considered for *Early Warning* conditions. Immediate implementation of these remedial actions may delay, moderate, or prevent the failure of the dam. Several of the listed adverse or unusual conditions may be apparent at the dam at the same time, requiring implementation of several modes of remedial actions. Following implementation, the dam must be closely monitored to confirm the success of the remedial actions. Time permitting, the actions should be developed in consultation with the dam owner's or operator's engineer, if one has been designated. See *Appendix A* for sources of equipment and materials.

### Embankment Overtopping

1. If the water level in the impoundment is no longer rising, place sandbags along the low areas of the top of the dam to control wave action, reduce the likelihood of flow concentration during minor overtopping, and to safely direct more water through the spillway.
2. Cover the weak areas of the top of the dam and downstream slope with riprap, sandbags, plastic sheets, or other materials to provide erosion-resistant protection.

### Seepage & Sinkholes

1. If the entrance to the seepage origination point is observed in the impoundment (possible whirlpool) and is accessible, attempt to reduce the flow by plugging the entrance with readily available materials such as hay bales, bentonite, soil or rockfill, or plastic sheeting.
2. Cover the seepage exit area(s) with several feet of sand/gravel to hold fine-grained embankment or foundation materials in place. Alternatively, construct sandbag or other types of ring dikes around seepage exit areas to retain a pool of water, providing backpressure and reducing the erosive nature of the seepage.
3. Prevent vehicles and equipment from driving between the seepage exit points and the embankment to avoid potential loss from the collapse of an underground void.

### Embankment Movement

1. Open outlet(s) and lower the impoundment to a safe level at a rate commensurate with the urgency and severity of the condition of the slide or slump. Pumping or siphoning may be required.

2. Repair settlement of the crest by placing sandbags or earth and rockfill materials in the damaged area to restore freeboard.
3. Stabilize slides by placing a soil or rockfill buttress against the toe of the slide.

### Earthquake

1. Immediately conduct a general overall visual inspection of the dam.
2. Perform a field survey to determine if there has been any settlement and movement of the dam embankment, spillway, and low-level outlet works.
3. Drain the impoundment, if possible or if required.

### **Final Warning - Urgent; dam failure appears imminent or is in progress:**

- A. All contacts should be made per the *Final Warning* notification chart.
- B. The emergency management authority must alert the public and immediately issue a **FINAL WARNING** to evacuate at-risk people and close roads as necessary using local notification procedures.
- C. The emergency management authority shall lead the efforts to carry out warnings, close roads, and evacuate people at risk downstream from the dam.
- D. The dam owner, operator, their representative, or engineer should provide updates to the emergency management authority to help him/her make timely decisions concerning the need for warnings, road closures, and evacuations.
- E. All parties should record all contacts that were made on the *Contact Checklist (Appendix B-1)*.
- F. The dam owner, operator, their representative, or engineer should record all information, observations, and actions taken on the *Unusual or Emergency Event Log (Appendix B-2)*. Note the time of changing conditions. Document the situation with photographs and video, if possible.
- G. Advise people monitoring the dam to follow safe procedures. Everyone should stay away from any of the failing structures or slopes and out of the potential breach inundation areas.
- H. The emergency management authority should also issue an **FINAL WARNING** through the National Weather Service.
- I. The emergency management authority should warn the Department of Transportation (DOT) if state-owned roads could be impacted, and the local DPW/highway department about possible impacts to state and local bridges and roadways.
- J. The DOT is responsible for state road closures and detours. The local DPW/highway department(s) is responsible for local road closures and detours.

## **2.5 TERMINATION**

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.

## Termination Responsibilities

The emergency management authority is responsible for terminating EAP operations and relaying this decision to the Bristol Emergency Operations Center (EOC) and the State DEEP Flood Response Center (FRC). The following conditions and procedures are required prior to termination of a *Final Warning* event that has not caused the dam to fail:

- The event has passed (water level is receding).
- The dam has been inspected by the dam owner's engineer and deemed safe.
- The State DEEP Dam Safety Official has been contacted and agrees with the safe determination.
- The emergency management authority has been informed of the engineer's determination and DEEP's concurrence.
- The emergency management authority gives the all-clear notice.

It is then the responsibility of each group/person in the notification charts to make sure that the contacts listed above and below them is notified that the event has been terminated. The emergency management authority should contact the following to terminate the emergency:

- The National Weather Service
- Department of Transportation
- Local Department of Public Works
- Any other private or public services that were assisting to issue warnings
- Downstream residents and business owners.

**Note:** *The City of Bristol, or their representative shall have the engineer who inspected the dam complete the Dam Safety Emergency Situation Report (Appendix B-3) to document the emergency event and all actions that were taken. The dam owner, operator, their representative, or engineer must distribute copies of the completed report to the State DEEP Dam Safety Official and the emergency management authority who coordinated the event.*

## 3 INUNDATION AREAS

### 3.1 Residents, Businesses & Infrastructure at Risk

A major flood caused by a breach of the dam is estimated to inundate numerous homes, businesses, and roadways. The following list can be used to help coordinate evacuations. The properties are approximately listed starting near the dam then moving downstream. Refer to the inundation map provided in Section 3.5.

Street Number	Address	Residence/Business
All	Dewitt Page Park Road	Page Park
623	King Street	High School
404-586	King Street	Residences/Businesses
12-71	Rich Lane	Residences
5-21	Arline Drive	Residences
10-114	Carpenter Ave	Residences
280-290	Stonecrest Drive	Residences
321	Stonecrest Drive	Health Care Center
15-67	Holt Street	Residences
63-69	Holt Place	Residences

The table below lists the flood wave arrival times and flood depths at select downstream locations.

Location	Distance from Dam (feet)	Est. Peak Breach Travel Time (min)*	Est. Max. Water Depth Increase (feet)	Description of Est. Max. Water Depth Relative to Infrastructure
Dewitt Page Park Road, King Street	0.23	19	4.4	1.3 feet above street
Carpenter Avenue Culvert	0.57	43	4.5	0.1 feet above street
Stonecrest Drive Culvert	0.64	40	3.4	0.3 feet above street
West Washington Street	0.99	133	5.8	0.3 feet above street

\*Estimated time for the peak of the breach flood wave to travel from the dam to downstream locations. Breach flooding will occur before the arrival of the peak of the flood wave.

### 3.2 Evacuation Routes & Road Closures

The local emergency management authority has responsibility for establishing evacuation routes and road closures. Bristol evacuation routes and road closures were not provided by the city. The evacuation routes and road closures provided are suggested by the City's engineer, GZA. The following evacuation routes and road closures are provided for information only. The local emergency management authority is responsible for assessing actual conditions and closing roadways.

Evacuations Routes are as follows:

- Take King Street (Route 229) southbound
- Take Woodland Street westbound
- Take Washington Street eastbound

The following roads are closed:

- Dewitt Page Park Road
- King Street (Route 229) approximately 0.5 mile south and 0.1 mile north of Bristol Eastern High School
- Rich Lane
- Spark Avenue
- Arline Drive
- Priscilla Lane
- Carpenter Avenue
- Stonecrest Drive
- Holt Street
- Holt Place

### **3.3 Emergency Shelters**

#### **Bristol Emergency Shelter:**

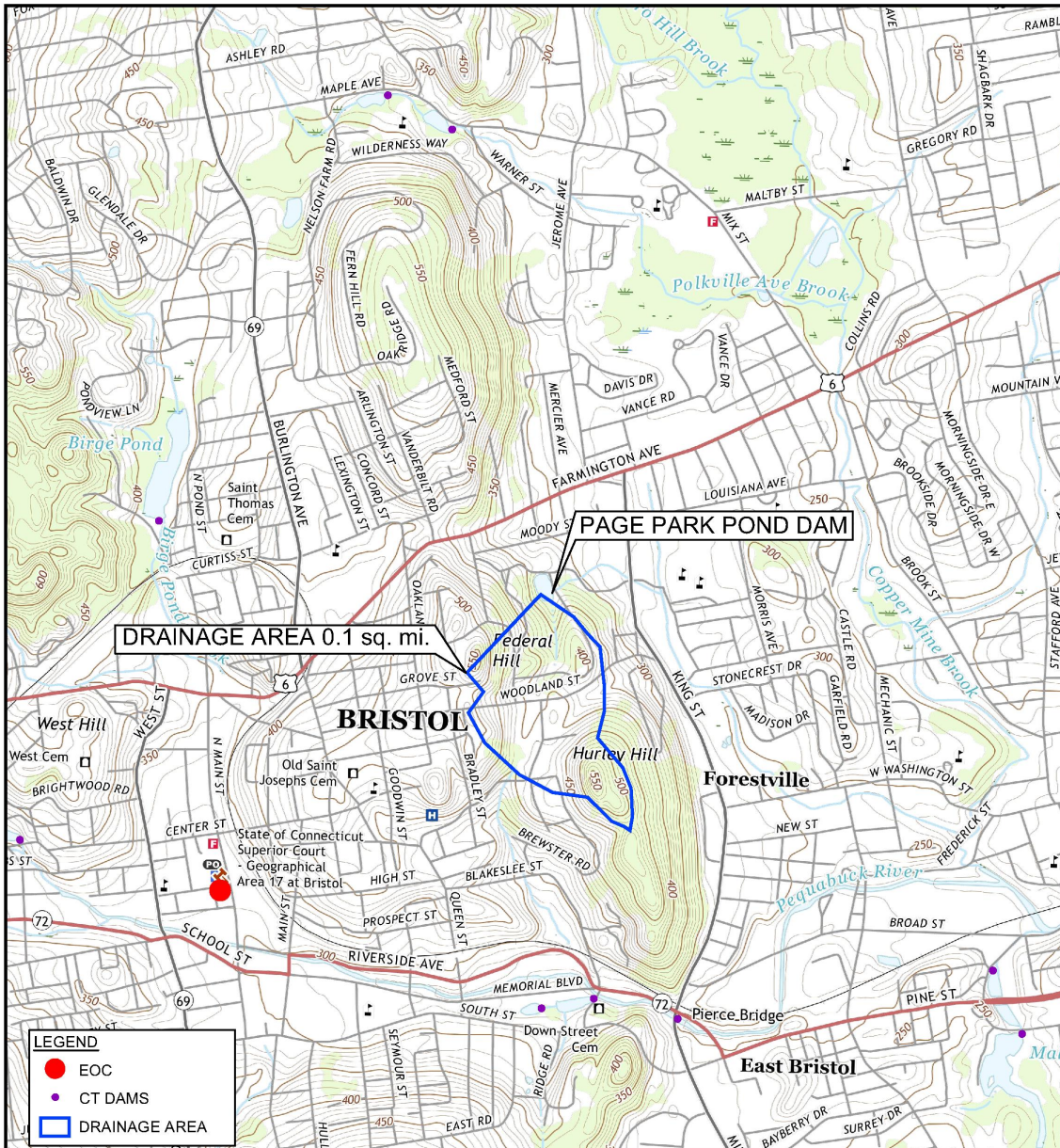
Bristol Senior Center

240 Stafford Avenue

Bristol, CT



### 3.4 DAM LOCATION MAP



DRAINAGE AREA 0.1 sq. mi.

PAGE PARK POND DAM

BRISTOL

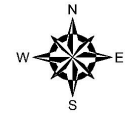
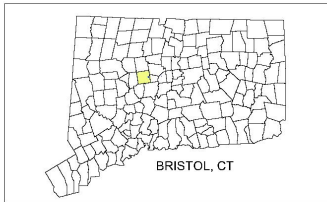
Forestville

East Bristol


**LEGEND**

- EOC
- CT DAMS
- DRAINAGE AREA

SOURCE:USGS TOPOGRAPHIC MAP OF BRISTOL, CT, 2021.



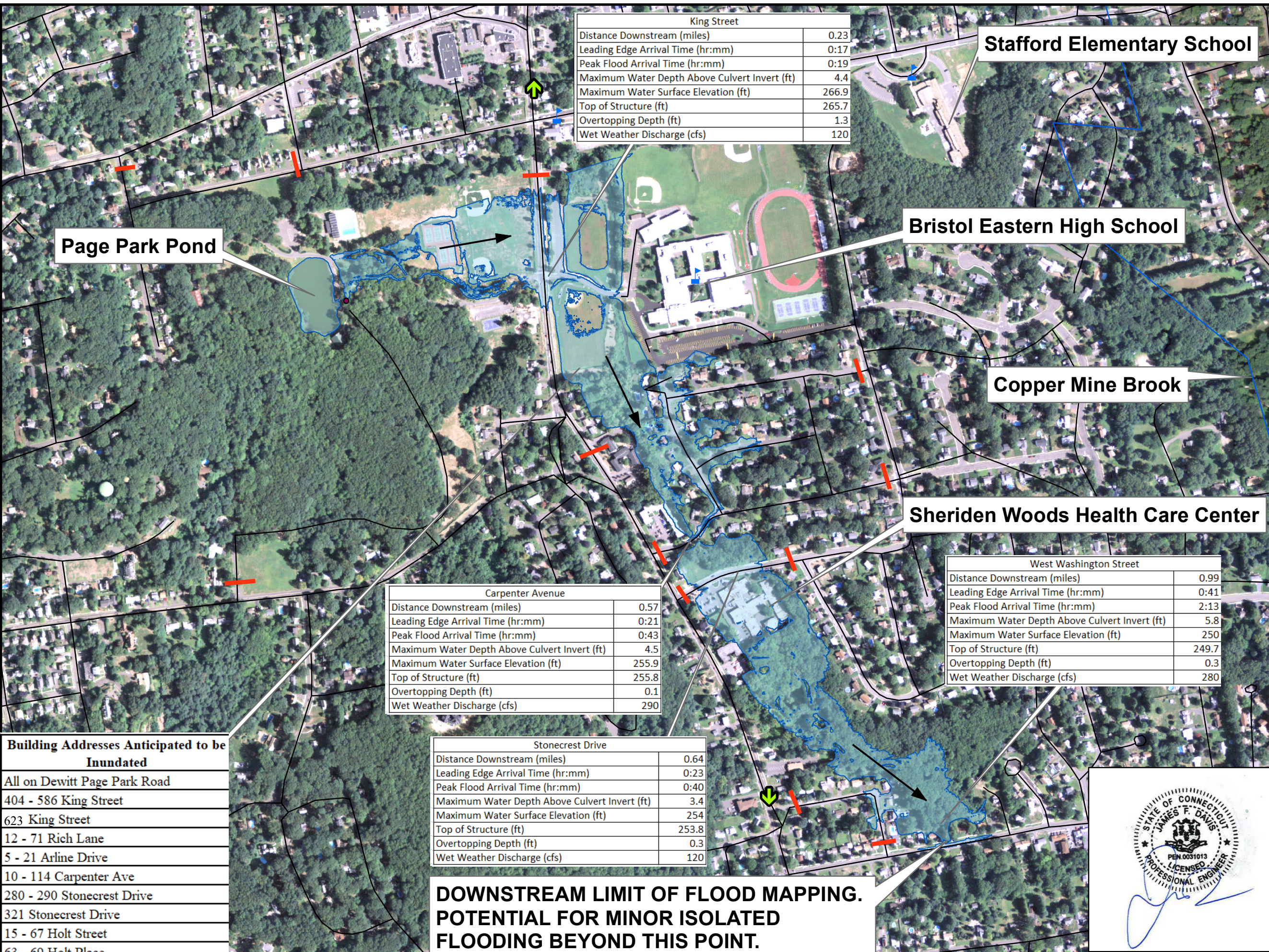
©2018 - GZA GeoEnvironmental, Inc. \gzzglst\Jobs\46\_500-46\_399\46866.n86 City of Bristol\46866-01\_f01\CAD\Figures\F1\_LOCUS AND F2\_AERIAL PAGE & BIRGE.dwg, martha harris

	PROJ MGR: JFD DESIGNED BY: MSH REVIEWED BY: DMB DRAWN BY: MSH	<b>PAGE PARK DAM LOCUS</b>	PROJECT NO.: 05.0046866.01
	DATE: 3-14-2021	UNIVERSITY OF CONNECTICUT OFFICE OF ENVIRONMENTAL PLANNING STORRS, CONNECTICUT	FIGURE NO. <b>1</b>

### 3.5 DAM BREACH INUNDATION MAP



Document Path: \\gzaglast\jobs\_46,500-46,999\46866.h66 City of Bristol\46866-00.jfd\GIS\mxd\Inundation Map2.28.22.mxd



King Street	
Distance Downstream (miles)	0.23
Leading Edge Arrival Time (hr:mm)	0:17
Peak Flood Arrival Time (hr:mm)	0:19
Maximum Water Depth Above Culvert Invert (ft)	4.4
Maximum Water Surface Elevation (ft)	266.9
Top of Structure (ft)	265.7
Overtopping Depth (ft)	1.3
Wet Weather Discharge (cfs)	120

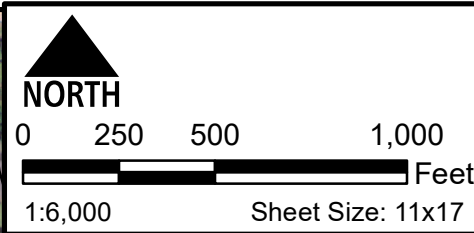
Carpenter Avenue	
Distance Downstream (miles)	0.57
Leading Edge Arrival Time (hr:mm)	0:21
Peak Flood Arrival Time (hr:mm)	0:43
Maximum Water Depth Above Culvert Invert (ft)	4.5
Maximum Water Surface Elevation (ft)	255.9
Top of Structure (ft)	255.8
Overtopping Depth (ft)	0.1
Wet Weather Discharge (cfs)	290

West Washington Street	
Distance Downstream (miles)	0.99
Leading Edge Arrival Time (hr:mm)	0:41
Peak Flood Arrival Time (hr:mm)	2:13
Maximum Water Depth Above Culvert Invert (ft)	5.8
Maximum Water Surface Elevation (ft)	250
Top of Structure (ft)	249.7
Overtopping Depth (ft)	0.3
Wet Weather Discharge (cfs)	280

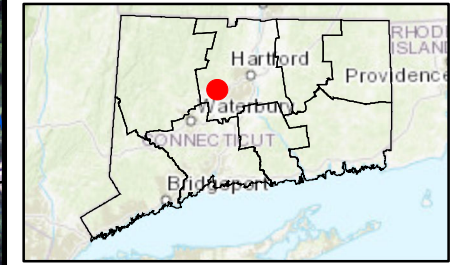
Stonecrest Drive	
Distance Downstream (miles)	0.64
Leading Edge Arrival Time (hr:mm)	0:23
Peak Flood Arrival Time (hr:mm)	0:40
Maximum Water Depth Above Culvert Invert (ft)	3.4
Maximum Water Surface Elevation (ft)	254
Top of Structure (ft)	253.8
Overtopping Depth (ft)	0.3
Wet Weather Discharge (cfs)	120

Building Addresses Anticipated to be Inundated
All on Dewitt Page Park Road
404 - 586 King Street
623 King Street
12 - 71 Rich Lane
5 - 21 Arline Drive
10 - 114 Carpenter Ave
280 - 290 Stonecrest Drive
321 Stonecrest Drive
15 - 67 Holt Street
63 - 69 Holt Place

**DOWNSTREAM LIMIT OF FLOOD MAPPING. POTENTIAL FOR MINOR ISOLATED FLOODING BEYOND THIS POINT.**



- Legend**
- Camp Grounds
  - Emergency Shelters
  - Evacuation Routes
  - Hospitals
  - Schools
  - Flow Direction
  - Road Closures
  - Railroads
  - River Centerline
  - Roads
  - CT Dams
  - Area Flooded by Dam Breach



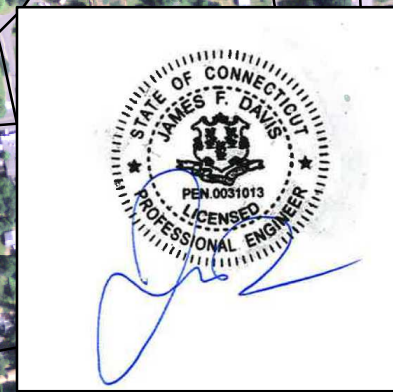
**NOTES:**

- DATUM IS FEET NAVD 88.
- ORTHO PHOTOGRAPHY OBTAINED FROM CT DEEP.
- SCHOOLS AND HOSPITAL LOCATIONS FROM GOOGLE MAPS. SCHOOLS INCLUDE HIGH SCHOOLS, MIDDLE SCHOOLS, AND ELEMENTARY SCHOOLS.
- 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 THE PAGE PARK POND DAM.
- THE INUNDATION AREA SHOWN IS APPROXIMATE AND SHOULD BE USED AS A GUIDE TO ESTABLISH EVACUATION ZONES.
- ACTUAL INUNDATION ZONES WILL DEPEND ON ACTUAL FAILURE CONDITIONS AND MAY DIFFER FROM THIS MAP.
- INUNDATION AREA WAS CALCULATED BY SIMULATING DAM FAILURE USING HEC-RAS 6.1 COMPUTER SOFTWARE.
- WET WEATHER DAM FAILURE WAS SIMULATED WITH MAXIMUM WATER SURFACE ELEVATION RESULTING FROM 100-YEAR FLOOD INFLOW FROM PAGE PARK POND WATERSHED (200 CFS).

**INUNDATION MAP  
PAGE PARK POND DAM  
BRISTOL, CT**

Prepared For:  
**TOWN OF BRISTOL**

Prepared By:  
**GZA GeoEnvironmental, Inc.**  
95 Glastonbury Blvd, 3rd Floor  
Glastonbury, Connecticut  
Phone: (860) 286-8900 Fax: (860) 633-5699



Proj. Mgr.: JFD	Dwg. Date: 2/28/2022	Map No.: 1
Designed By: AND		
Reviewed By: JFD	Job No.: 05.0046866.01	
Operator: MSH		



## 4 MAINTENANCE - EAP REVIEW & UPDATE

### 4.1 EAP Periodic Review

The dam owner, operator, or their representative will review and, if needed, update the EAP at least once every two years, or more frequently as necessary to reflect significant changes. The EAP review will include the following:

- Calling all contacts on the three notification charts in the EAP to verify that the phone numbers and persons in the specified positions are current. The EAP will be updated if any of the contacts have changed.
- In addition, the dam owner, operator, or their representative will ask if the person contacted knows where the EAP is kept and if responsibilities described in the EAP are understood.
- Calling the locally available resources to verify that the phone numbers, addresses, and services are current (See Appendix A).

### 4.2 EAP Exercise

Section 22a-411a-2 RCSA requires EAPs to include a description of an exercise, or test to be conducted at a minimum of once every two years. The exercise shall include participation of all appropriate personnel identified in the EAP that are responsible for providing emergency services in the event the EAP is initiated.

**The City of Bristol Park and Recreation Department's preferred exercise method is The Call-Out Exercise**

For the purposes of the exercises described below 'City of Bristol' may refer to the City of Bristol Parks, Recreation, Youth and Community Services Department, their Representative, or Engineer.

#### **[Example] Call-Out Exercise**

The City of Bristol will conduct the Call-Out Exercise. The City of Bristol will verify that all persons and telephone numbers on the *Early Warning* and *Final Warning Notification Charts* are current. In addition to verifying personnel and contact information, the City of Bristol will verify that each contact can locate their copy of the EAP and that they understand their roles and responsibilities in the event of an emergency, as described in the EAP.

The City of Bristol will contact the locally available resources provided in the EAP to verify contact information and ensure that the services are current.

The City of Bristol will review the most recent Dam Inspection Report Form, any significant development or construction activity downstream of the dam, and any modifications to the dam or spillway. The EAP must be updated to reflect any significant changes to the dam or downstream area and any changes in personnel or contact information.

### **[Example] Tabletop Exercise**

The Tabletop Exercise will be facilitated by the City of Bristol. The exercise will consist of a meeting and subsequent review of the EAP. The City of Bristol, a representative from the City, and any others with key responsibilities as identified in the EAP, should be present at the exercise.

The Tabletop Exercise will begin with the facilitator presenting a scenario of an unusual or emergency event at the dam. The scenario will be developed prior to the exercise. Once the scenario has been presented, the participants will discuss the responses and actions that they would take to address, mitigate and resolve the scenario. The facilitator will control the discussion, ensuring realistic responses and developing the scenario throughout the exercise.

The City of Bristol will also verify that all persons and telephone numbers on the *Early Warning* and *Final Warning Notification Charts* are current. In addition to verifying personnel and contact information, the City of Bristol will verify that each contact can locate their copy of the EAP and that they understand their roles and responsibilities in the event of an emergency, as described in the EAP. The City of Bristol will also contact the locally available resources provided in the EAP in order to verify contact information and ensure the services are current.

The City of Bristol will review the most recent Dam Inspection Report Form, note any significant development or construction activity downstream of the dam, and any modifications to the dam or spillway. The EAP must be updated to reflect any significant changes to the dam or downstream area and any changes in personnel or contact information.

### **[Example] Drill Exercise**

The Drill Exercise will be facilitated by the City of Bristol and will consist of a visit to the dam site, a simulated exercise, and subsequent review of the EAP. The Dam Owner, persons responsible for the Dam Monitoring Procedure, a representative from the City, and any others with key responsibilities as identified in the EAP should be present at the Drill Exercise.

Participants of the Drill Exercise will visit the dam to familiarize themselves with the site prior to the initiation of the exercise. If a site visit is not possible to coordinate, exercise participants may familiarize themselves with the site through the use of aerial photographs or topographical maps, and a review of the most recent inspection report for the dam. Following the site visit, exercise participants will meet at the Emergency Operations Center (EOC) as identified in the EAP, to hold the exercise. If the EOC is not available, an alternate location may be used.

The facilitator will present a scenario of an unusual or emergency event at the dam. The scenario will be developed prior to the exercise. Once the scenario has been presented, participants will respond and activate the EAP as if the scenario were a real-life event. The facilitator will develop the scenario throughout the exercise. Once the scenario has been completed, the participants will discuss the responses

and actions taken to address, mitigate, and resolve the scenario. The facilitator will prepare a written summary of the exercise and the EAP should be updated as necessary.

**Note:** *While the Drill Exercise should be treated as an actual event, participants should clearly verbalize that this is a drill and not a real life event while making phone calls. No actions should actually be taken (i.e. mobilizing emergency equipment, evacuations, etc.). The purpose of the Drill Exercise is to test the EAP and facilitate the response to an actual event.*

### **4.3 Updates**

The dam owner, operator, their representative, or engineer is responsible for updating the EAP document. The EAP document held by the dam owner, operator, their representative, or engineer is the master document. When revisions occur, the City of Bristol, their representative, or engineer will provide a new complete EAP document with the update summary page (see *Appendix F-2*) to all the EAP document holders (see *Appendix F-1*).

## 5 ROLES AND RESPONSIBILITIES

### City of Bristol Parks, Recreation, Youth and Community Services

#### Department, or Representative

- Distribute this EAP to appropriate Control Copy Holders (see Appendix F-1).
- Review this EAP at least every two years and make revisions as needed (See Appendix F-2).
- Provide updated pages and an updates list to all EAP Control Copy Holders.
- Host and facilitate a periodic test of this EAP at least once every 2 years (See Section 4.2)
- Provide a list identifying personnel and their alternate(s) that would be utilized by the dam owner or operator(s) responsible for decision making and for implementing emergency repairs when the owner is absent.
- Initiate monitoring of the dam at the onset of conditions identified in this EAP and notify the emergency management authority that monitoring has begun (see notification charts).
- Determine if conditions warrant the notification of an *Early Warning* or *Final Warning*. If not, continue monitoring the dam.
- If an *Early Warning* or *Final Warning* is warranted, immediately notify the emergency management authority (see notification charts).
- Provide updates of the situation to the emergency management authority to help her/him make timely and accurate decisions regarding warnings and evacuations.
- Provide leadership to assure the EAP is reviewed and updated annually and copies of the updated EAP are distributed to all who received copies of the original EAP.

**Note:** *It is important to remember that it is the responsibility of the dam owner, operator, their representative, or engineer to contact the emergency management authority to inform them of an emergency condition at the dam and issue the appropriate warning notification. The emergency management authority then has responsibility to order an evacuation and contact residents and businesses in the impacted areas if required.*

## CT Licensed Professional Engineer retained by dam owner (GZA)

- Advise the City of Bristol, their representative, of the warning level determination, if time permits.
- Advise the dam owner, operator, their representative, of remedial actions to take if an *Early Warning* event occurs, if time permits.
- In the event a *Final Warning* is issued, inspect the dam after flood waters begin to recede and provide the inspection report to the State Dam Safety Official for review and concurrence.

## State Dam Safety Agency (CT DEEP, Dam Safety Section)

- State-wide monitoring during flood emergencies; provide support and communication with the local emergency management authority(s).
- Prior to a *Final Warning* being terminated by the emergency management authority, review and provide concurrence with the assessment provided by the dam owner's engineer that the dam is in a safe condition
- Contact the National Weather Service (NWS) to coordinate the state-wide flood outlook.

## Emergency Management Authority (Harland Graime)

- Serve as the primary contact person responsible for coordination of all emergency actions.
- Maintain communications with the media.
- When an *Early Warning* is issued:
  - Prepare emergency management personnel to evacuate people at risk downstream if conditions worsen and a *Final Warning* is issued.
  - Initiate the warnings that an evacuation *may* be necessary to people at risk downstream of the dam.
  - Alert the general public.
- When a *Final Warning* is issued:
  - Initiate the order to emergency management personnel to begin evacuation of people at risk downstream of the dam.
  - Alert the general public.
- Decide when to terminate the emergency (see guidance provided in *Section 3.5*).
- Participate in an annual review and update of the EAP.

**Note:** For the purposes of this EAP, engineer refers to a professional engineer, licensed in the State of Connecticut, with experience in dam safety. The Dam owner is not required to designate a professional engineer to be listed in the EAP. However, in the event that an



**Early or *Final Warning*** is issued and evacuations take place, the dam owner shall hire an engineer with the above qualifications to inspect the dam. The ***Final Warning*** cannot be terminated until the dam has been deemed safe by the inspecting engineer, and the State Dam Safety Official concurs with his/her decision. Refer to the termination procedures in *Section 2.5*.

## **Appendices - Forms, Glossary, Maps, and Supporting Data**

### **Appendix A – Resources Available (Equipment, Materials & Manpower)**

### **Appendix B – Forms**

B-1 Contact Log

B-2 Unusual or Emergency Event Log

B-3 Dam Emergency Situation Report

### **Appendix C – Facility Plans & Supporting Information**

C-1 Plan View of Dam

### **Appendix D – Examples of Emergency Situations**

### **Appendix E – Dam Breach Inundation Analysis**

### **Appendix F – Record Holders & Concurrences**

F-1 Record Holders of Control Copies

F-2 Record of Updates to EAP

F-3 Concurrences

### **Appendix G – Glossary of Terms**

## Appendix A

### Resources Available (Equipment, Materials & Manpower)

The City of Bristol has the following resources that can be utilized in the event of an emergency:

Equipment	Equipment Location	Materials
Bobcat Skid Steer	240 Jacob Street, Bristol, CT 06010	
Backhoe	240 Jacob Street, Bristol, CT 06010	

Locally available resources include:

Heavy Equipment Service & Rental	Sand & Gravel Supply	Ready-mix Concrete Supply
<i>Just Ask Rental</i> <a href="#"><u>742 Farmington Ave, Bristol,</u></a> <a href="#"><u>CT 06010</u></a> <a href="#"><u>(860) 582-7166</u></a>	<i>City of Bristol Department of            Public Works</i> <i>95 Vincent P Kelly Rd</i> <i>Bristol, CT 06010</i> <i>860-584-6125</i>	<i>The Home Depot</i> <i>1149 Farmington Ave</i> <i>Bristol, CT 06010</i> <a href="#"><u>(860)582-5329</u></a>
<b>TABACCO &amp; SON            BUILDERS INC</b> <b>145 BURLINGTON AVE</b> <b>BRISTOL CT 06010</b> <b>(860) 250-6160</b>	<i>Dunning Industries Inc.</i> <i>105 Brickyard Road</i> <i>Farmington, CT 06032</i> <a href="#"><u>860.677.1616</u></a>	
<b>MARTIN LAVIERO            CONTRACTOR, INC.</b> <b>611 NORTH MAIN STREET</b> <b>BRISTOL CT 06011-1659</b> <b>(860) 882-8879</b>		
<b>D'AMATO CONSTRUCTION            CO</b> <b>10 MAIN ST, 5TH FL</b> <b>BRISTOL CT 06010</b> <b>(860) 583-3489</b>		

<b>Pumps</b>	<b>Diving Contractor</b>	<b>Sand Bags</b>
<p><i>City of Bristol Water Department 119 Riverside Ave Bristol, CT 06010 860-584-4900</i></p> <p><i>[Source/Company Name] [Address] [City/Town], CT [Phone Number]</i></p>	<p><i>Region 5 Dive Team <a href="#"><u>65 Tucker Hill Rd, Middlebury, CT 06762</u></a> <a href="#"><u>(203) 758-0521</u></a></i></p>	<p><i>City of Bristol Department of Public Works 95 Vincent P Kelly Rd Bristol, CT 06010 860-584-6125</i></p>

## Appendix B - 1

### Contact Log

Dam name: Page Park Pond Dam

Location: North end of Orchard Park Road, Bristol, CT Date \_\_\_\_\_

The following contacts should be made immediately after the dam monitoring has been initiated and/or when the warning level has been determined. (See *Section 2.2*). The person making the contacts should initial and record the time of the call and who was notified for each contact made. See the *Notification Charts* for critical contact information and *Emergency Services Contacts* for contact information for other possible emergency services.

<b>DAM MONITORING (see page X)</b>	Person Contacted	Time Contacted	Contacted by
___ Emergency Management Authority	_____	_____	_____
___ Dam Owner's Engineer (if needed)	_____	_____	_____

<b>EARLY WARNING (see page X)</b>	Person Contacted	Time Contacted	Contacted by
___ Emergency Management Authority	_____	_____	_____
___ Dam Owner's Engineer	_____	_____	_____
___ DEEP Flood Response Center	_____	_____	_____
___ State Dam Safety Official	_____	_____	_____

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<b>FINAL WARNING (see page X)</b>	Person Contacted	Time Contacted	Contacted by
___ Emergency Management Authority	_____	_____	_____
___ Dam Owner's Engineer	_____	_____	_____
___ DEEP Flood Response Center	_____	_____	_____
___ State Dam Safety Official	_____	_____	_____

## Appendix B - 2

### Unusual or Emergency Event Log (to be completed during the emergency)

Dam name: *Page Park Pond Dam*

Emergency Management Authority: Harland Graime (Emergency Management Director)

When and how was the event detected? If the event started with a weather flood warning, then that should be listed here: \_\_\_\_\_

Weather conditions: \_\_\_\_\_

General description of the emergency situation: \_\_\_\_\_

Warning level determination: \_\_\_\_\_

Made by: \_\_\_\_\_

#### Actions & Event Progression

Date	Time	Rainfall Data	Reservoir Level	Action/Event Progression	Recorded By

Report prepared by: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix B - 3

### Dam Emergency Situation Report (Complete following the termination of the emergency)

Dam name: Page Park Pond Dam

Emergency Management Authority: Harland Graime (Emergency Management Director)

CT Dam ID No.:1702

Dam location: North end of Orchard Park Road, Bristol, Connecticut

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Weather conditions: \_\_\_\_\_

General description of emergency situation: \_\_\_\_\_

\_\_\_\_\_

Area(s) of dam affected: \_\_\_\_\_

\_\_\_\_\_

Extent of dam damage: \_\_\_\_\_

\_\_\_\_\_

Possible cause(s): \_\_\_\_\_

\_\_\_\_\_

Effect on dam's operation: \_\_\_\_\_

\_\_\_\_\_

Initial reservoir elevation: \_\_\_\_\_ Time: \_\_\_\_\_

Maximum reservoir elevation: \_\_\_\_\_ Time: \_\_\_\_\_

Final reservoir elevation: \_\_\_\_\_ Time: \_\_\_\_\_

Description of area flooded downstream/damages/injuries/loss of life: \_\_\_\_\_

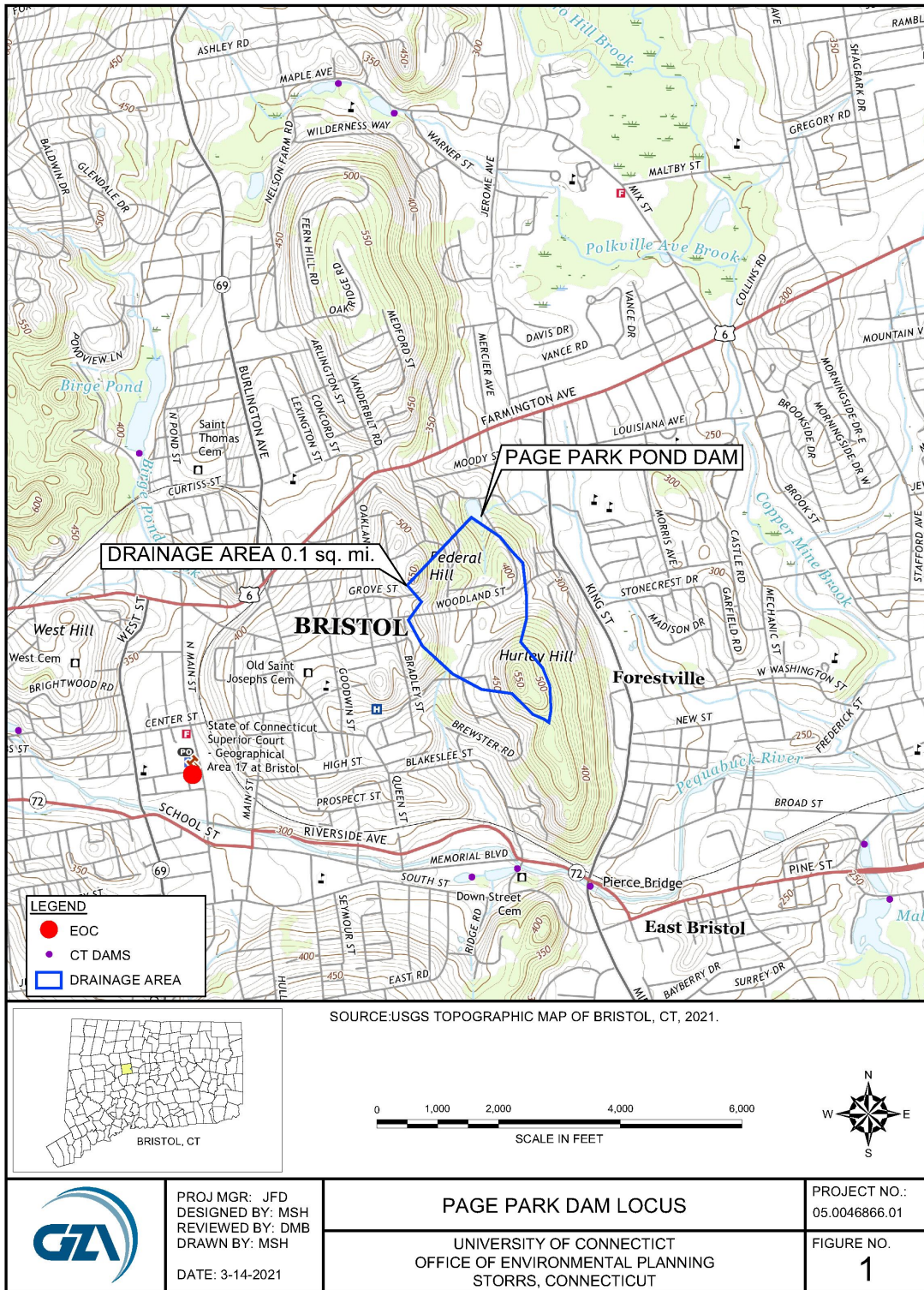
\_\_\_\_\_

Other data and comments: \_\_\_\_\_

Observer's name and telephone number: \_\_\_\_\_

Report prepared by: \_\_\_\_\_ Date: \_\_\_\_\_

# Appendix C – 1: Plan View of Dam



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## Appendix D

### Examples of Emergency Situations

The following are examples of conditions that usually constitute an emergency situation that may occur at a dam. Adverse or unusual conditions that can cause the failure of a dam are typically related to aging or design and construction oversights. Extreme weather events that exceed the original design conditions can cause significant flow through the auxiliary spillway or overtopping of the embankment. However, accidental or intentional damage to the dam may also result in emergency conditions. The conditions have been grouped to identify the most likely emergency-level condition. The groupings are provided as guidance only. Not all emergency conditions may be listed, and the dam owner, operator, or their representative is urged to use conservative judgment in determining whether a specific condition should be defined as an emergency situation at the dam.

**Pre-existing conditions on this dam:** The primary dam safety deficiencies as noted in the December 2021 inspection, were trees within 25 feet of the embankment, missing sections of concrete cap on the left spillway training wall, significant seepage in the downstream channel, erosion/undermining of the spillway apron at the right training wall abutment, deteriorated and cracked asphalt on the embankment crest, crack and missing grout on the downstream face of the spillway training walls, and animal burrows on the downstream slope.

#### ***General Conditions***

##### **Early Warning- Potential dam failure situation; rapidly developing:**

1. Conditions are developing at the dam that could lead to a potential failure of the dam and may make evacuations necessary.

##### **Final Warning- Urgent; dam failure appears imminent or is in progress:**

1. Conditions exist at the dam that are likely to result in a failure of the dam.

#### ***Earth Spillway Flows***

##### **Early Warning - Potential dam failure situation; rapidly developing:**

1. Significant erosion or headcutting of the spillway is occurring, but the rate does not appear to threaten an imminent breach of the spillway crest that would result in an uncontrolled release of the impoundment.

##### **Final Warning - Urgent; dam failure appears imminent or is in progress:**

1. Significant erosion or headcutting of the spillway is occurring at a rapid rate, and a breach of the control section appears imminent.

## ***Embankment Overtopping***

### **Early Warning - Potential dam failure situation; rapidly developing:**

1. The water is rising at a rate such that a non-overflow section of the dam may be overtopped.

### **Final Warning - Urgent; dam failure appears imminent or is in progress:**

1. The impoundment level is within 1 foot from the top of the lowest point on the dam crest and is rising at a rate such that a non-overflow section of the dam will be overtopped with 30 minutes, or is currently overtopping the dam.

## ***Seepage & Sinkholes***

### **Early Warning - Potential dam failure situation; rapidly developing:**

1. Cloudy seepage or soil deposits are observed at seepage exit points or from internal drain outlet pipes.
2. New or increased areas of wet or muddy soils are present on the downstream slope, abutment, and/or foundation of the dam, and there is an easily detectable and unusual increase in volume of downstream seepage.
3. There is a marked increase in seepage particularly if a boil carrying soil has formed.
4. Significant new or enlarging sinkhole(s) near the dam or settlement of the dam is observed.
5. Impoundment level is falling without apparent cause.
6. The following known dam defects are or will soon be inundated by a rise in the reservoir:
  - Sinkhole(s) located on the upstream slope, crest, abutment, and/or foundation of the dam; or
  - Transverse cracks extending through the dam, abutments, or foundation.

### **Final Warning - Urgent; dam failure appears imminent or is in progress:**

1. Rapidly increasing cloudy seepage or soil deposits at seepage exit points to the extent that failure appears imminent or is in progress.
2. Rapid increase in volume of downstream seepage to the extent that failure appears imminent or is in progress.
3. Water flowing out of holes in the downstream slope, abutment, and/or foundation of the dam to the extent that failure appears imminent or is in progress.
4. Whirlpools or other evidence exists indicating that the reservoir is draining rapidly through the dam or foundation.
5. Rapidly enlarging sinkhole(s) are forming on the dam or abutments to the extent that failure appears imminent or is in progress.
6. Rapidly increasing flow through crack(s) eroding materials to the extent that failure appears imminent or is in progress.

## ***Embankment Movement & Cracking***

### **Early Warning - Potential dam failure situation; rapidly developing:**

1. Settlement of the crest, slopes, abutments and/or foundation of the dam that may eventually result in breaching of the dam.
2. Significant increase in length, width, or offset of cracks in the crest, slopes, abutments, and/or foundation of the dam that may eventually result in breaching of the dam.

### **Final Warning - Urgent; dam failure appears imminent or is in progress:**

1. Sudden or rapidly proceeding slides, settlement, or cracking of the embankment crest, slopes, abutments, and/or foundation, and breaching of the dam appears imminent or is in progress.

## ***Masonry Movement &/or Cracking***

### **Early Warning- Potential dam failure situation; rapidly developing:**

1. Cracking, settlement and or movement of the masonry spillway, training walls or other appurtenance of the dam training walls have occurred. The location of the cracking or settlement along with the severity of the cracking or movement does not pose an immediate threat to the safety of the dam.

### **Final Warning- Urgent; dam failure appears imminent or is in progress:**

1. Cracking, settlement and or movement of the masonry spillway, training walls or other appurtenance of the dam training walls have occurred. The location of the cracking or settlement along with the severity of the cracking or movement is alarming and the stability of the dam can be considered compromised.

## **Appendix E**

### **Dam Breach Inundation Analysis**

The objective of the dam breach modeling was to estimate the downstream inundation areas and the corresponding time to flooding, thus identifying critical downstream areas affected by a dam failure (i.e., sudden, uncontrolled release of water) for purposes of emergency action planning. GZA used the dam breach model to calculate various flood wave characteristics such as the arrival time, time to peak stage, peak discharge flow rate, and flood crest profile, which are incorporated into an inundation map.

#### **Methodology**

GZA used the US Army Corps of Engineers (USACE) Hydrological Engineering Center – River Analysis System (HEC-RAS) Version 6.1.0 model to simulate the hypothetical dam failure and flood wave routing. GZA developed a two-dimensional model. The two-dimensional model is a mesh element that represents the terrain and encompasses the Page Park Pond Dam drainage area, Copper Mine Brook and the Pequabuck River. GZA created one HEC-RAS model to model the failure of the Page Park Pond Dam. Per CTDEEP criteria, the dam failure simulation was conducted under so-called wet weather (100-year flood) conditions. The computed 100-year flood hydrographs were input directly into the impoundment of Page Park Pond. A further discussion of GZA’s hydrologic analysis is provide below. The Page Park Pond Dam was failed and the flood wave was then routed through the mesh until the junction of Copper Mine Brook and the Pequabuck River. Elevations are listed in NAVD88.

#### **Dam Break Input**

GZA’s HEC-RAS model included approximately 580 acres of land downstream of Page Park Pond Dam. The mesh contained about 4,770 cells with an average cell size of 402 sq. ft. GZA used Connecticut State LiDAR data dated 2016 and channel invert information from Federal Emergency Management Agency (FEMA) Flood Insurance Studies (FIS) for Hartford county to develop the terrain.

Manning’s “n” roughness coefficients used in the HEC-RAS model ranged from 0.035 to 0.1. GZA assigned Manning’s n values to the terrain based on land cover from the 2011 National Land Cover Database.

The model includes geometry for fourteen river crossings, modeled as culverts. GZA used data from existing plans obtained from the CT DEEP, the FEMA FIS for Hartford County, and aerial imagery.

The 100-year hydrograph (peak flow of 200 cfs) was used as inflow to the Page Park Pond Dam. GZA developed a model in the USACE Hydrological Engineering Center - Hydrologic Modeling System (HEC-HMS) using the Type-III rainfall distribution to create the inflow hydrographs. The location map showing drainage area can be found in Section 3.4. GZA used the 24-hr, 100-yr rainfall obtained from the National Oceanic and Atmosphere Administration (NOAA) Atlas 14 Point Precipitation Frequency Estimate as input to the HEC-HMS model.

The initial starting water surface elevation for the Page Park Pond was set at the spillway crest (El. 326.3 feet). The dam break failure for the wet weather scenarios were initiated at the resulting maximum water

surface elevation for Page Park Pond Dam. The downstream boundary condition was assigned a normal depth energy slope.

#### Trapezoidal Breach Formation

Maximum Breach Bottom Width: 15.9 ft

Final Breach Side Slope: 0.5 Horizontal: 1 Vertical

Time to Maximum Breach 0.5 hour

Trigger Elevation: 327.1 feet

### **Results**

The results for the wet weather failure scenario are presented on the inundation map provided in Section 3.5. The model covers the area downstream of Page Park Pond to the junction of Copper Mine Brook and the Pequabuck River.

The hypothetical wet weather failure of Page Park Pond Dam is assumed to occur when the pond is at the highest water surface elevation. The maximum discharge through the breach opening is approximately - 21.4 cfs. The initial breach failure began at hour 1, with the maximum breach width occurring 0.5 hours later. The arrival time of the leading edge along Page Park Road is estimated to be 17 minutes to the intersection of King Street (Route 229). Peak flood depths range from about 1.3 feet at the intersection of King Street and Dewitt Page Park Road to about 0.1 feet at Carpenter Avenue. GZA terminated mapping where the incremental water surface elevation due to dam breach was anticipated to be 0.5 feet or less.

**Appendix F - 1****Record Holders of Control Copies**

<b>Copy Number</b>	<b>Organization</b>	<b>Person Receiving Copy</b>
1	<i>City of Bristol- Park, Recreation, Youth and Community Services Department 111 North Main Street Bristol, CT 06010</i>	<i>Superintendent Joshua Medeiros</i>
2	<i>Bristol Emergency Management Office 131 North Main Street Bristol, CT 06010</i>	<i>Emergency Management Director Harland Graime</i>
3	<i>CTDEEP Dam Safety Program Water Planning &amp; Management Division 79 Elm Street Hartford, CT 06106</i>	<i>Supervising Civil Engineer Ivonne Hall</i>
4		
5		
6		
7		
8		

## Appendix F – 2

### Record of Updates to EAP

Update Number	Date	Revisions Made	By Whom
1			

## Appendix G

### Glossary of Terms

<b>Abutment</b>	The natural ground that borders on either end of the dam structure.
<b>Appurtenance</b>	Any structure or mechanism other than the dam itself which is associated with its operation.
<b>Arterial Roadway</b>	A roadway that provides a high level of mobility and that is frequently the route of choice for buses and trucks, as provided in the U.S. Department of Transportation document entitled “Highway Functional Classification Concepts, Criteria and Procedures, 2013 edition”.
<b>Boil</b>	A disruption of the soil surface due to water discharging from below the surface. Eroded soil may be deposited in the form of a ring (miniature volcano) around the disruption.
<b>Breach</b>	An alteration of a dam either deliberately or accidentally in such a way as to release its impounded waters resulting in partial or total failure of the dam.
<b>Class B Dam</b>	A significant hazard potential dam which, if it were to fail, would result in any of the following: (i) possible loss of life; (ii) minor damage to habitable structures, residences, including but not limited to, industrial or commercial buildings, hospitals, convalescent homes, or schools; (iii) damage to local utility facilities including water supply, sewage treatment plants, fuel storage facilities, power plants, cable or telephone infrastructure, causing localized interruption of these services; (iv) damage to collector roadways and railroads; or (v) significant economic loss.
<b>Class C Dam</b>	A Class C dam is a high hazard potential dam which, if it were to fail, would result in any of the following: (i) probable loss of life; (ii) major damage to habitable structures, residences, including, but not limited to, industrial or commercial buildings, hospitals, convalescent homes, or schools; (iii) damage to major facilities, including public water supply, sewage treatment plants, fuel storage facilities, power plants, or electrical substations causing widespread interruption of these services; (iv) damage to arterial roadways; or (v) great economic loss.
<b>Collector Roadway</b>	A roadway that collects traffic from local roadways and connects traffic to arterial roadways, as provided in the U.S. Department of Transportation document entitled “Highway Functional Classification Concepts, Criteria and Procedures, 2013 edition”.
<b>Conduit</b>	A closed channel (round pipe or rectangular box) that conveys water through, around, or under the dam.
<b>Control Section</b>	A usually level segment in the profile of an open channel spillway above which water in the reservoir discharges through the spillway.



<b>Cross Section</b>	A slice through the dam showing elevation vertically and direction of natural water flow horizontally from left to right. Also, a slice through a spillway showing elevation vertically and left and right, looking downstream.
<b>CT ID Number</b>	A unique identifying number assigned to a dam registered and regulated by the State of Connecticut.
<b>Dam</b>	Any barrier of any kind whatsoever which is capable of impounding or controlling the flow of water, including but not limited to storm water retention or detention dams, flood control structures, dikes, and incompletely breached dams.
<b>Dam Failure</b>	A catastrophic breach characterized by the sudden, rapid, and uncontrolled release of impounded water, or a lesser breach that adversely affects the dam's primary function of impounding water.
<b>Dam Height</b>	The vertical distance from the crest of the dam or similar structure to the downstream toe of such dam or similar structure.
<b>Dam Operator</b>	The person(s) in control of, or having responsibility for, the daily operation of the dam as designated by the owner on the dam registration form required by Section 22a-409-1(b) of the Regulations of Connecticut State Agencies (RCSA).
<b>Dam Owner</b>	The person(s) having legal ownership of the dam.
<b>Drains: toe, foundation, or blanket</b>	A water collection system of sand and gravel that typically pipes along the downstream portion of the dam to collect seepage and convey it to a safe outlet.
<b>Drainage Area (watershed)</b>	The geographic area on which rainfall flows into the dam. The drainage area can be delineated using USGS StreamStats. StreamStats is an on-line GIS application that is available to the public free-of-charge. <a href="http://water.usgs.gov/osw/streamstats/connecticut.html">http://water.usgs.gov/osw/streamstats/connecticut.html</a>
<b>Drawdown</b>	The lowering or releasing of the water level in a reservoir over time or the volume lowered or released over a particular period of time.
<b>Early Warning Notification</b>	An alert stage in which the local authorities are informed by the dam owner that a situation exists at a dam that could develop into a serious hazard to downstream inhabitants, making evacuation necessary.
<b>Emergency</b>	A condition of a serious nature which develops unexpectedly, endangers the structural integrity of a Class C or Class B dam, and requires immediate action.
<b>Emergency Action Plan (EAP)</b>	A formal document required to be submitted to the commissioner in accordance with section 22a-411a-2 of the Regulations of Connecticut State Agencies.
<b>Emergency Management Authority</b>	Any local, state, federal, or tribal agency responsible for emergency operations, planning, mitigation, preparedness, response, and recovery for all hazards.
<b>Emergency Operations Center (EOC)</b>	The location or facility where responsible officials gather during an emergency to direct and coordinate emergency operations, to communicate with other jurisdictions and with field emergency forces, and to formulate protective action decisions and

	recommendations during an emergency.
<b>Evacuation Map</b>	A map showing the geographic area downstream of a dam that should be evacuated if it is threatened to be flooded by a breach of the dam or other large discharge.
<b>Final Warning Notification</b>	A warning in which the local authorities are informed by the dam owner that a failure of the dam is a likely possibility and residents downstream should be evacuated immediately.
<b>Flood</b>	Any high flow, overflow, or inundation by water which causes or threatens damage to persons or property.
<b>Flood Response Center (FRC)</b>	The state DEEP coordination center for major flood events affecting the State of CT.
<b>Freeboard</b>	Vertical distance between a stated water level in the reservoir and the top of dam.
<b>Gate, slide or sluice</b>	An operable, watertight valve to manage the discharge of water from the dam.
<b>Groin</b>	The area along the intersection of the face of a dam and the abutment.
<b>Hazard Potential</b>	The probable damage that would occur if the structure failed, in terms of loss of human life and economic loss or environmental damage.
<b>Instantaneous Sunny Day Breach</b>	A condition where there is a dam breach with no concurrent flooding from other sources. This is considered a dangerous breach event because people are not expecting a flood without a storm or snowmelt. For modeling purposes, instantaneous means that the full breach of the dam occurs with zero formation time.
<b>Instrumentation</b>	An arrangement of devices installed into or near dams that provide measurements to evaluate the structural behavior and other performance parameters of the dam and appurtenant structures.
<b>Inundation Map</b>	A map sufficient in graphic detail and of a scale that clearly shows the downstream inhabited areas and the inundation zones with features and other related information required in section 22a-411a-2(b) of the Regulations of Connecticut State Agencies.
<b>Outlet Works (principal spillway)</b>	An appurtenant structure that provides for controlled passage of normal water flows through the dam.
<b>Piping</b>	The progressive development of internal erosion through a dam by water, appearing downstream as a hole or seam discharging water that contains soil particles.
<b>Probable Maximum, Precipitation (PMP), or Flood (PMF)</b>	The theoretically greatest precipitation or resulting flood that is meteorologically feasible for a given duration over specific drainage area at a particular geographical location.
<b>Riprap</b>	A layer of large angular rock generally placed on an embankment or along a watercourse as protection against wave action, erosion, or scour.
<b>Risk</b>	A measure of the likelihood and severity of an adverse consequence.

<b>Seepage</b>	The natural movement of water through the embankment, foundation, or abutments of the dam.
<b>Slide</b>	The movement of a mass of earth down a slope on the embankment or abutment of the dam.
<b>Spillway (auxiliary or emergency)</b>	The appurtenant structure that provides the controlled conveyance of excess water through, over, or around the dam.
<b>Spillway Capacity</b>	The maximum discharge the spillway can safely convey with the reservoir at the maximum design elevation.
<b>Spillway Design Flood or "SDF"</b>	The largest flood that a given structure is designed to pass safely.
<b>Spillway Crest</b>	The lowest level at which impoundment water can flow through/over the spillway.
<b>State Emergency Operations Center (SEOC)</b>	The State's coordination center for emergency services during any major emergency affecting the State of Connecticut.
<b>Structure</b>	The dam, its appurtenances, abutments and foundation.
<b>Tailwater</b>	The body of water immediately downstream of the embankment at a specific point in time.
<b>Toe of Dam</b>	The base portion of the impounding structure which intersects with natural ground at the upstream and downstream sides.
<b>Top of Dam (crest of dam)</b>	The elevation of the uppermost surface of a dam embankment which can impound water.