



# Ohio Department of Natural Resources

MIKE DEWINE, GOVERNOR

MARY MERTZ, DIRECTOR

**Division of Water Resources**

***Dena C. Barnhouse, Chief***

2045 Morse Road/Building B-3

Columbus, Ohio 43229

614-265-6620

[water@dnr.state.oh.us](mailto:water@dnr.state.oh.us)

February 28, 2022

Portage Parks District  
Attn: Christine Craycroft, Director  
705 Oakwood St, Suite G-4  
Ravenna, Ohio 44266

Martha and Arden Sommers  
7598 Birkner Drive  
Kent, Ohio 44240

RE: Camp Spelman Lake Dam  
File Number: 1112-071  
Portage County

Dear Dam Owners:

In accordance with Ohio Administrative Code Rule 1501:21-15-06, an Operation, Maintenance, and Inspection (OMI) Manual for Camp Spelman Lake Dam was received from Environmental Design Group on January 18, 2022. Division of Water Resources staff have reviewed this document and found it acceptable; therefore, the OMI for Camp Spelman Lake Dam is approved.

One copy of the manual will be kept on file at the Division of Water Resources. A second copy of the manual has been sent to the Portage Parks District. This manual should be updated at least annually. Updated copies of the manual should be submitted to the Division of Water Resources.

Your cooperation to improve the safety of this structure and reduce the likelihood of damage to downstream property and residents is appreciated. Please contact Michael Becker of the Division of Water Resources at 614/265-6724 if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Dena C. Barnhouse".

Dena C. Barnhouse, P.E., Chief  
Division of Water Resources

DCB:mbb

cc/enc: via email only

Kellie Pike, P.E., Environmental Design Group  
Andrew Long, P.E., Environmental Design Group

Enclosures



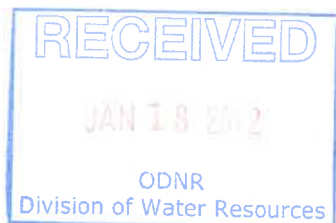
# **OPERATION, MAINTENANCE, AND INSPECTION MANUAL**

**FOR**

**CAMP SPELMAN LAKE DAM**

**PORTAGE COUNTY**

**FILE NO: 1112-071**



**January 13, 2022**

ODNR - Division of Water Resources  
DAM SAFETY PROGRAM

FEB 28 2022

*Jana C. Bruch*  
APPROVED



## **I. INTRODUCTION**

Camp Spelman Lake Dam, referred to by ODNR as File No 1112-071, is a Class I earth fill structure located in Portage County, Ohio and was only recently discovered to be a dam that falls under ODNR's jurisdiction; therefore, there is no design or as-built information available for this dam. The dam is ~23 ft tall, ~195 ft long, has a crest width of ~12 ft, has an upstream slope face of 3:1 and downstream slope face that varies from 3H:1V to 2H:1V. Camp Spelman Lake Dam controls drainage from a small area that is tributary to the West Lake of the Twin Lakes, which ultimately discharges into the Cuyahoga River just downstream of Lake Rockwell Dam. The surface area of Camp Spelman Lake at the top of dam is ~37.1 acres. The dam's principal spillway consists of a 24-in x 24-in concrete riser structure with a 12-in diameter PVC outlet pipe. The existing emergency spillway is a grassy open channel with a two-stage cross section. The first stage of this spillway has a bottom width of approximately 8 ft and the second stage has a bottom width of approximately 74 ft. The dam currently does not have a lake drain, and the Ownership and future use of the dam is being evaluated currently. The dam will use a pump lake drain during this interim period as a lake drain until a final decision about the dam's future is confirmed. This interim period is anticipated to last at least 12-18 months and may take up to 4-5 years.

Per field survey data, the top of dam crest is currently unlevel and the lowest surveyed top of dam elevation is currently at 1088.09 ft, the normal pool is at an elevation of 1084.66 ft, and the existing emergency spillway activates at elevation of 1085.35 ft, which is too frequent than allowed for a Class I dam according to recent hydrologic and hydraulic calculations. It is anticipated the dam crest will be improved so that it is level and that the existing emergency spillway will also be improved so that it doesn't activate too frequently.

Purpose of Dam	Parks and Recreation
Height (ft)	23
Freeboard (ft)	3.43 feet
Length (ft)	195
Top of Dam Elevation (ft-MSL)	1088.09
Top of Dam Area (Acre)	37.1
Top of Dam Storage (Acre-ft)	164.4
Principal Spillway Description	24-in x 24-in concrete riser structure with a 12-in diameter PVC outlet pipe
Principal Spillway Elevation (ft-MSL)	1084.66
Principal Spillway Area (Acre)	12.5
Principal Spillway Storage (Acre-ft)	69
Emergency Spillway Description	The existing emergency spillway is a grassy open channel with a two-stage cross section
Emergency Spillway Elevation (ft-MSL)	1085.35
Emergency Spillway Area (Acre)	13
Emergency Spillway Storage (Acre-ft)	77.8
Lake Drain	To be installed

## II. INSPECTION

Inspections should be documented using the Forms A, B1, and B2 found in Appendix A. Weekly inspections should be performed for this dam for most items/appurtenances and these inspections should be recorded using Forms A and B1. Quarterly inspections should be performed for some additional items and should include the use of Forms A and B2. Rainfall should be monitored continuously by the owner. In the event of a large rainfall event, an inspection should be performed using the weekly inspection procedures (Forms A and B1). The following Table summarizes the items to inspect and frequency at which they should be inspected for Camp Spelman Lake Dam:

The following is the inspection schedule for Camp Spelman Lake Dam:

FREQUENCY	PERSONNEL	ITEMS TO INSPECT/MONITOR	FORM NO.
As needed	Owner(s)	Rainfall	A
Weekly Inspections	Owner(s)	Pool Level Trash rack debris Slides/cracks Rodent activity Vandalism Seepage / wet areas Erosion Condition of vegetal cover Embankment condition Emergency spillway condition	A & B1
Quarterly Inspections	Owner(s)	Principal spillway condition Lake drain condition	A & B2
Periodic 3 to 5 years	ODNR/Engineer	Engineer's Safety Inspection	ODNR Report

Additional information regarding these items may be found on ODNR Dam Safety Fact Sheets. Currently there is no safety inspection report because this dam was recently discovered by ODNR; therefore, the initial site visit memo provided by ODNR for this dam may be found in Appendix B in lieu of an official safety inspection.

### III. MAINTENANCE

To maintain the integrity of the dam, periodic maintenance is required, and the following schedule has been established. Additionally, outstanding deficiencies not listed below but listed in ODNR's inspection reports shall be addressed as needed. Maintenance efforts should be recorded on Form A.

ITEM	FREQUENCY
Mow embankment and emergency spillway	As needed to maintain a grass height of 12-inches
Re-establish proper vegetal cover	as needed
Repair erosion and ruts	as needed
Repair rodent damage	as needed
Clean trashrack	as needed
Repair lake drain	as needed

### IV. OPERATION

Camp Spelman Lake Dam requires a diesel operated pump that has a recommended operation rates of 900 gpm (emergencies) or 500 gpm (non-emergencies) with a maximum head of 23 feet (or the height of the dam) in order to lower the lake level. Pump Calculations are provided in Appendix C. The pump and suction/discharge hoses can be rented from either of these 24-hour pump rental contacts:

Rain for Rent  
385 Technology Drive  
Triadelphia, WV 26059  
(304) 547-0479  
(800) 742-7246

Sunbelt Rental  
11220 Allisonville Rd  
Fishers, In 46038  
(317) 558-7439  
(800) 667-9328

**YEARLY** checks **MUST BE** made to both rental companies to make sure that the correct size pump is still available for rent.

Both rental companies can have the pump to the site typically in 3-5 days. The pump, hoses, and fuel (for initial start-up and operation) would be delivered to the site. Additional diesel gasoline for use in the pump would be stored in a container designated for diesel fuel and stored on or off-site.

The pump can be easily lifted and carried into different positions by a trailer or hitch mounting. The pump should be placed on the crest of the da so that the suction hose is far enough into the water to draw the water level down to the desired elevation and the discharge hose should reach far enough downstream to avoid any erosion of the downstream slope. Ideally, the pump should be placed near the spillway inlet, but discretion should be used depending on the location of any emergency condition. The pump should be monitored during operation to ensure that an adequate fuel level is maintained.

A safe drawdown rate is one foot per week. However, in an emergency, the lake shall be lowered as fast as possible until the lake is at a safe elevation.

The lake drain should be fully opened twice per year to ensure that it is functioning appropriately. Ensure that the rate of lake drawdown is appropriate for non-emergency conditions as discussed in Section V, Safe Rate Drawdown Plan. With the lake drain fully open, inspect the drain system and outlet area for flow amounts, leaks, erosion, and anything unusual. Monitoring for ease of operation and leakage is important to maintain a working lake drain system. If the valve appears to be

inoperable or if the operability of the lake drain system is in question, for example, if the valve does not completely close (seal) and allows an excessive amount of leakage, then a registered professional engineer or manufacturer's representative should be contacted. Operation actions should be noted on Form A.

ITEM/CONDITION	ACTION REQUIRED
Pool level drawdown for winter season	Lower pool at a safe rate if winter drawdown is desired
Record keeping	Maintain records of all maintenance and operation actions using Form A (including yearly check on pump rental availability)

## **V. SAFE RATE DRAWDOWN PLAN**

### **Non-emergency Drawdown Rates**

Non-emergency drawdown operations should be performed by allow for the lake to drawdown at a rate no faster than 1 foot per week.

### **Emergency Drawdown Rates**

Emergency drawdowns may be performed if serious problems are observed that may threaten the integrity of the dam. Examples of such situations are as follows: clogging of the primary spillway riser or spillway pipe which may lead to high lake levels and eventually dam overtopping, development of slides or cracks in the dam, severe seepage through the dam which may lead to a piping failure of the dam, and partial or total collapse of the spillway system. ODNR should be promptly notified of the occurring situation so that they may provide guidance on the proper draw down rate from the reservoir during emergency conditions.

## **VI. EMERGENCY ACTION PLAN (EAP)**

The Emergency Action Plan (EAP) for Camp Spelman Lake Dam is being created and will be held by the dam owner(s). Portage County EMA and ODNR will also have copies of the approved EAP.

## **VII. APPENDIX**

- A. Operation, maintenance, and inspection forms
- B. ODNR site visit report(s)
- C. Pump Lake Drain Calculations
- D. Sketch of the dam and appurtenances
- E. ODNR Dam Inventory Sheet



## **APPENDIX A: OPERATIONS, MAINTENANCE, AND INSPECTION FORMS**



## FORM A: RECORD KEEPING

[illegible]



# FORM B1: WEEKLY INSPECTION ITEMS

## CAMP SPELMAN LAKE DAM Portage County, File No.: 1112-071

Date: _____		Required Action					Comments
Inspector(s): _____	Temp. & Time: _____	Y/N	None	Monitor	Repair	Engineer	
<u>Dam Upstream Slope Face</u>			✓	✓	✓	✓	
Are there cracks, slides, or erosion?							
Is there woody debris or vegetation?							
Are there rodent burrows or depressions?							
Is the grass cover over 12-IN?							
Are there bare areas?							
<u>Dam Crest (grass)</u>							
Are there rodent burrows or depressions?							
Is the grass cover over 12-IN?							
Are there bare areas?							
Are there large cracks?							
Are there low areas or vehicle ruts?							
Is there woody debris on crest?							
<u>Dam Downstream Slope/Dam Toe</u>							
Are there cracks, slides, or erosion?							
Are there rodent burrows or depressions?							
Is the grass cover over 12-IN?							
Are there trees and brush encroaching on the dam slope?							
Are there bare areas?							
Are there wet areas or seepage?							
<u>Principal Spillway (Trash Rack)</u>							
Is the trash rack, riser, or pipe inlet obstructed?							
Is the trash rack deteriorated or damaged?							
<u>Emergency Spillway (Open Channel – Earthen)</u>							
Is the inlet obstructed?							
Is there erosion or bare areas in the channel?							
Is there woody debris in spillway area?							
Is the grass cover over 12-IN?							
Are there vehicle ruts?							



# FORM B2 - ADDITIONAL INSPECTION ITEMS (QUARTERLY)

## CAMP SPELMAN LAKE DAM Portage County, File No.: 1112-071

Date: \_\_\_\_\_  
Inspector(s): \_\_\_\_\_  
Temp. & Time: \_\_\_\_\_

	Required Action				
	Y/N	None	Monitor	Repair	Engineer
<b>Principal Spillway (Riser/Pipe/Basin)</b>					
Is the riser or pipe inlet obstructed?					
Is the trash rack deteriorated or damaged?					
Is the anti-vortex plate deteriorated or damaged?					
Are the riser and pipe joints sealed?					
Is there flow at the outlet but no flow through inlet (indicates leakage)?					
Is there seepage around/under the pipe outlet?					
Is the outlet pipe corroded or deteriorated?					
Are there cracks in the impact basin?					
Is the outlet area eroded or the rock riprap displaced?					
Is there brush in the outlet area?					
<b>Lake Drain</b>					
Is the valve and operator visibly damaged?					
Is the drainpipe corroded or deteriorated?					
Is there leakage?					
Is the system operable? (bi-annual, see Section IV, Operations)					





## **APPENDIX B: ODNR SITE VISIT REPORT(S)**





## SITE VISIT MEMORANDUM

**Project Name:** Camp Spelman Lake Dam **Date of Visit:** 5-29-19  
**File Number:** 1112-071 **County:** Portage  
**Site Conditions:** 75 Degrees, Raining  
**Inspectors:** Matthew Hook, P.E., Program Manager  
Ryan Heskett, E.I., Project Engineer  
Josh Garland, Construction Inspector

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### Introduction:

The Division was made aware of a potentially jurisdictional dam in Portage County. This site visit was made to inventory and survey the structure and assess the potential for downstream hazard.

### Observations:

**Upstream Slope:** The upstream slope was covered with brush and saplings making visual inspection difficult. It appeared that the slope gradient was approximately 3H:1V.

**Crest:** The crest was measured at 195 feet long. The crest was found to have a satisfactory grass cover. However, the vertical alignment of the crest varies by 1-2 feet.

**Downstream Slope:** The downstream slope was covered with brush and mature trees making visual inspection difficult. It appeared that the slope gradient was approximately 3H:1V.

**Principal Spillway:** The principal spillway was found to be a pipe and riser system. The riser was a 24-inch square concrete box riser and the outlet pipe was found to be 90-ft of 12-in-diameter PVC pipe. The riser included a trashrack with flat bars laying directly on the orifice. An anti-vortex device was not found. Some debris was building up on the trashrack. A visual inspection of the interiors of the pipe and riser were unable to be made due to flow through the system. The spillway outlet did not have an erosion control structure; however, little erosion was found.

**Emergency Spillway:** The emergency spillway was found to be a two-stage open channel with the first stage being 10-ft-wide at elevation 1084.5 and the second stage being an additional 75-ft-wide at elevation 1085.8. The side slopes were estimated at 4H:1V. Brush was found at the channel inlet and mature trees were located throughout the channel. It appears that the channel discharges in the direction of some homes located on Westlake Blvd.

**Lake Drain:** A lake drain was not found during this site visit.

**Downstream Hazard Assessment:** The downstream hazard was visually assessed and was found to include two houses located of the west side of Westlake Blvd. and Westlake Blvd. itself.

### Discussion:

Both owners were present during this visit. It was discussed that the dam embankment sits on the Park

Districts property and the spillways are located on the Sommers property. This was verified using the online parcel maps for Portage County.

Based on the survey of the dam, aerial mapping, and topographic information, the dam is 22.9 ft. tall (Class IV) with a top of dam storage volume of 166 acre-ft. (Class III). The potential downstream hazard includes two homes that could experience structural failure and/or loss of life (Class I). Therefore, the classification of Camp Spelman Lake Dam is Class I.

Hydrologic and Hydraulic modeling was completed to assess the flood capacity of Camp Spelman Lake Dam. The modeling concluded that while the dam experiences a very small and very brief amount of overtopping, failure from an overtopping event would be unlikely. Therefore, Camp Spelman Lake Dam is considered to pass its design storm. However, the modeling also shows that the emergency spillway flows more often than allowed by Ohio Administrative Code 1501:21-13-04 (F).

#### Conclusions:

Camp Spelman Lake Dam was found to be a Class I dam and as such is subject to the requirements of Ohio Revised Code Chapter 1521 and Ohio Administrative Code Chapter 1501:21.

While several required remedial measures are included below, the first periodic inspection for Camp Spelman is currently scheduled for Spring of 2021. The inspection will include a more detailed assessment of the dam and its appurtenances.

#### Required Remedial Measures:

##### **Engineer Repairs and Investigations**

The owner must retain the services of a registered professional engineer to address the following items. Plans, specifications, investigative reports, and other supporting documentation, as necessary, must be submitted to the Division of Water Resources for review and approval prior to construction. The owner must complete these items and implement all engineered plans for improvement within 5 years unless otherwise stated. Please refer to the fact sheets included in the Dam Safety Fact Sheet Booklet for additional information.

1. This dam must have a dam failure inundation study and map included in an Emergency Action Plan (EAP) in accordance with OAC Rule 1501:21-21-04. A registered professional engineer must prepare the inundation map and Section IV (Emergency Detection, Evaluation, and Classification) of the EAP. It is recommended that your engineer contact the Division of Water Resources prior to undertaking the engineering study for the inundation map. The inundation study and supporting calculations, including computer modeling, must be submitted to the Division of Water Resources for review and approval. See the Owner Dam Safety Program section of this report for additional information.
2. Every dam shall have a spillway system which will safely operate during the design flood without endangering the safety of the dam in accordance with OAC Rule 1501:21-13-03 and OAC Rule 1501:21-13-04 (F). Investigate the frequency of flow and the alignment of the emergency spillway and, as necessary, prepare plans and specifications for repairs. See the "Open Channel Spillways (Earth and Rock)" fact sheet for additional information.
3. This dam must have a device to permit draining of the reservoir within a reasonable period of time in accordance with OAC Rule 1501:21-13-06. Prepare plans and specifications for the installation of such a device. See the "Lake Drains" fact sheet for additional information.

4. The embankment crest alignment must be uniform. Investigate the variable vertical alignment of the crest and, as necessary, prepare plans and specifications for the correction of any problems.

### **Owner Repairs and Monitoring**

The dam owner must address the items below as part of the required dam maintenance. The owner may perform the work or hire a contractor. The owner must implement all owner repairs and monitoring items within a timely manner. Repair activities should be documented in the Operation, Maintenance, and Inspection Manual (OMI). Please refer to the fact sheets included in the Dam Safety Fact Sheet Booklet for additional information.

1. Remove the trees and brush from the upstream slope, downstream slope, and emergency spillway. Seed all disturbed areas to establish a proper grass cover. See the "Trees and Brush" fact sheet for additional information.
2. Replace the trashrack with an acceptable device and install an anti-vortex device at the inlet of the principal spillway. See the "Design and Maintenance of Trashracks" fact sheet for additional information.
3. Prepare an Emergency Action Plan (EAP) and submit for approval. A registered professional engineer must prepare a dam failure inundation map and Section IV (Emergency Detection, Evaluation, and Classification) of the EAP. Guidelines for the preparation of this document can be found online at: <http://water.ohiodnr.gov/safety/dam-safety#ADD>. The fillable EAP is not appropriate for Camp Spelman Lake Dam because of its Class I designation.
4. Prepare an Operation, Maintenance, and Inspection Manual (OMI) and submit for approval. Guidelines for the preparation of this document can be found online at: <http://water.ohiodnr.gov/safety/dam-safety#ADD>.
5. Monitor the erosion at the principal spillway outlet. See the "Open Channel Spillways (Earth and Rock)" fact sheet for additional information. Please note that engineered repairs may be needed if this problem worsens.

  
Inspector's Signature

12/2/2019  
Date

Map

Parcel

Basemap

Aerials

Addresses

- ☒

Addresses

☐

Parcels

☐

Acreage 100

☐

Acreage 150

☐

Acreage 200

☐

Dimensions 100

☐

Dimensions 150

☐

Dimensions 200

☐

Landmarks

☐

NPDES

☐

Neighborhoods

☐

2007 Sales

☐

2008 Sales

☐

2009 Sales

☐

2010 Sales



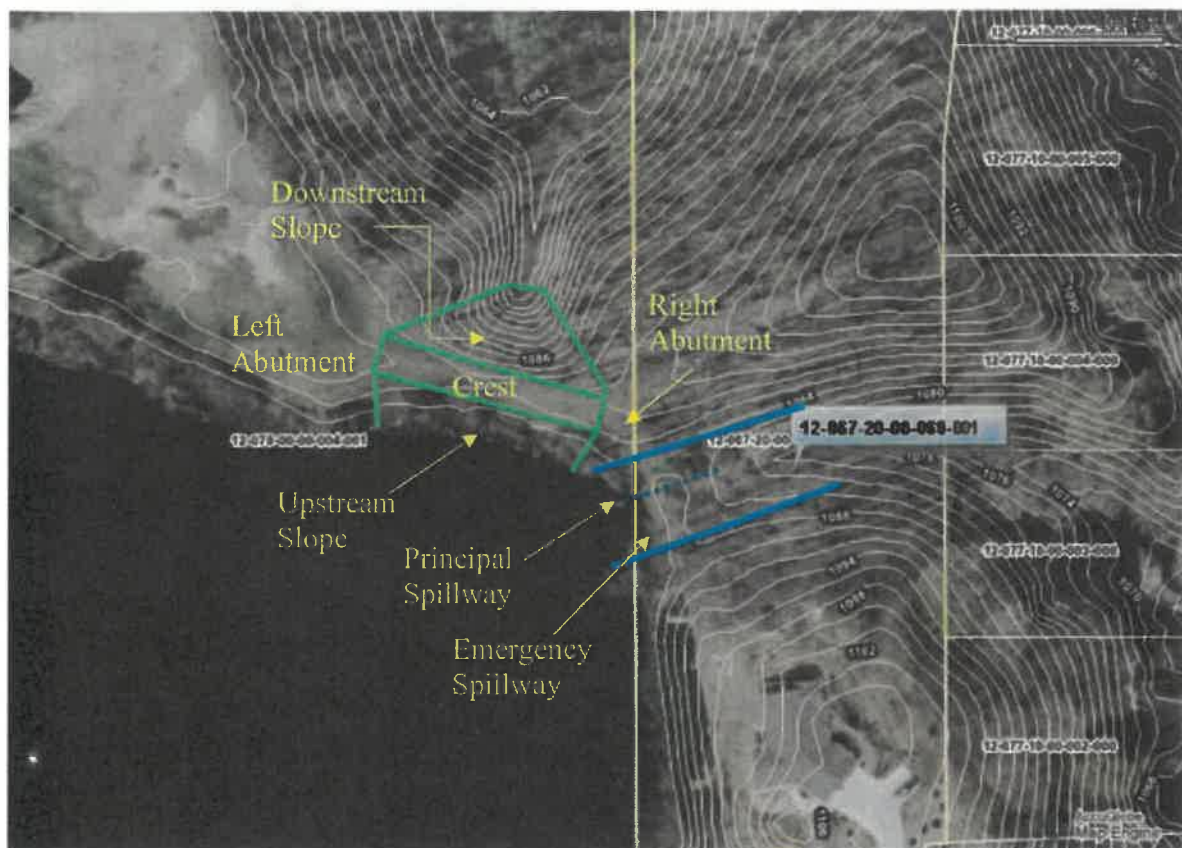
Selection

Parcel Number	
Zoom To	12-087-20-00-004-001
Zoom To	12-087-20-00-004-001
2 features selected	

Owner Name

SOMERS ARDEN P & MARTHA R (J&S)

PORTAGE PARL DISTRICT





**Camp Spelman Lake Dam**  
File Number: 1112-071, Portage County  
May 29, 2019



Trees and brush along the upstream slope.



View of the dam crest from the left abutment. Note the dense trees and brush on upstream and downstream slopes.



View of the upstream slope and crest from the right abutment. Again notice the trees and brush on the slopes.



View of the principal spillway riser.



Close-up of the principal spillway trashrack. Note the debris collection of the flat bars.



View of the principal spillway outlet.



**Camp Spelman Lake Dam**  
File Number: 1112-071, Portage County  
May 29, 2019



**Another view of the principal spillway outlet.**



**View of the emergency spillway. Note the trees and brush at the inlet.**

## Dam Inventory Sheet

<b>Name:</b> CAMP SPELMAN LAKE DAM		<b>File No:</b> 1112-071	
		<b>National #:</b>	
<b>Reservoir:</b>		<b>Permit No.:</b>	
		<b>Class (Ht-Vol):</b> I ( IV - III )	
<b>Owner Information</b>			
<b>Owner:</b> Multiple Owners - 1112-071		<b>Owner Type:</b> Private	
<b>Address:</b>		<b>Multi-Dams:</b> -	
		<b>Parcel No.:</b>	
<b>City:</b>		<b>State:</b>	
		<b>Zip:</b>	
<b>Contact:</b> Christine Craycroft		<b>Phone No.:</b> 330-297-7728	
<b>Location Information</b>			
<b>County:</b> Portage	<b>Latitude Deg.:</b> 41	<b>Min.:</b> 11	<b>Sec.:</b> 55
<b>Township:</b> Franklin	<b>Longitude Deg.:</b> 81	<b>Min.:</b> 21	<b>Sec.:</b> 0
<b>Stream:</b> Tributary To Cuyahoga River			
<b>USGS Quad.:</b> Kent		<b>USGS Basin No.:</b> 04110002	
<b>Design/Construction Information</b>			
<b>Designed By:</b>			
<b>Constructed By:</b>			
<b>Completed:</b>		<b>Plan Available:</b>	<b>At:</b>
<b>Failure/Incident/Breach:</b>			
<b>Structure Information</b>			
<b>Purpose:</b> Recreation			
<b>Type of Impound.:</b> Dam And Spillway			
<b>Type of Structure:</b> Earthfill			
<b>Drainage Area (sq. miles):</b> 0.18		<b>or (acres):</b> 115	
<b>Embankment Data</b>			
<b>Length (ft):</b> 195		<b>Upstream Slope:</b> 3H:1V	
<b>Height (ft):</b> 22.9		<b>Downstream Slope:</b> 3H:1V	
<b>Top Width (ft):</b> 12		<b>Volume of Fill (cub. yds.):</b>	
<b>Spillway Outlet Works Data</b>			
<b>Lake Drain:</b> UNKNOWN			
<b>Principal:</b> 24-IN-SQ CONCRETE RISER W/ 12-IN-DIA PVC OUTLET			
<b>Emergency:</b> 2 STAGE OPEN CHANNEL W/ 4:1 SS: 1ST, 10-FT-WD; 2ND, 85-FT-WD			
<b>Maximum Spillway Discharge (cfs):</b>		<b>Design Flood:</b> 1.0	<b>Flood Capacity:</b> 1.0
<b>Dam Reservoir Data</b>			
	<b>Elevation (ft-MSL)*</b>	<b>Area (acres)</b>	<b>Storage (acre-feet)</b>
<b>Top of Dam:</b>	1088.3	37	166
<b>Emergency Spillway:</b>	1084.5	13	75
<b>Principal Spillway:</b>	1084	12.5	69
<b>Streambed:</b>	1065.4		
<b>Foundation:</b>			
<b>Inspection Information</b>			
<b>Inspection</b>		<b>Phase I:</b>	
<b>History:</b>		<b>Other Visits:</b> 5/29/2019 INV - MJH	
		<b>Inspection Year:</b> E	
<b>Operation Information/Remarks</b>			

**Emergency Action Plan:** Not Approved

**Format:** No Plan

**OMI:** Not Approved  
**Last Entry:** 11/26/2019

# **Emergency Action Plan (EAP) Guidelines**

(Revised 9/11/2017)

## **Interagency Committee on Dam Safety (ICODS) Format**

The ICODS EAP Guidelines for Dam Owners is recommended for consistency and uniformity. The format also serves as a checklist for completeness. When completed, the EAP will have two sections: the basic EAP and the appendices.

## **Format and Content**

### **Title Page/Cover Sheet/Table of Contents**

- I. Notification Flowchart
- II. Statement of Purpose
- III. Project Description
- IV. Emergency Detection, Evaluation, and Classification
- V. General Responsibilities
  - A. Dam Owner
  - B. Notification
  - C. Evacuation
  - D. Termination and follow-up
  - E. EAP coordination
- VI. Preparedness
- VII. Inundation Maps
- VIII. Appendices
  - Appendix A: Investigation and Analyses of Dam Break Floods
  - Appendix B: Plans for Training, Exercising, Updating, and Posting EAP
  - Appendix C: Site-Specific Concerns
  - Appendix D: Approval of the EAP

### **TITLE PAGE/COVER SHEET/TABLE OF CONTENTS**

The purpose of the title page and cover sheet of an EAP is to identify the document as an EAP and to specify the name of the dam, classification, and file number. The table of contents, which will list all the major sections and subsections in the EAP, provides a quick means for locating information.

### **Section I: NOTIFICATION FLOWCHART**

The notification flowchart provides the hierarchy for notification in the event of an emergency. The flowchart must include the following essential information.

- Who notifies whom
- Names, titles, telephone numbers, alternate contacts, and communication mechanisms

The notification flowchart(s) should be brief, simple, and easy to follow. Notification must flow in both directions and the number of people notified by each individual should be limited. The

flowchart should be prominently displayed on the first page of the EAP and also posted as a stand-alone chart.

Color coding can be helpful as long as the color does not obscure the text. The individuals and entities that may be included on the notification flowchart:

- Dam Owner
- Appropriate Federal, State, and Local Agencies  
ODNR, Division of Water Resources office (614) 265-6731 and 24 hour emergency (614) 799-9538
- Residents and property owners downstream of the dam
- Operators of other dams
- Managers of recreational facilities
- National Weather Service (NWS)
- News Media
- Others

## **Section II: STATEMENT OF PURPOSE**

This section defines the purpose and scope of the EAP. (1 or 2 paragraphs)

## **Section III: PROJECT DESCRIPTION**

Must include the following:

- Description and drawing of the dam and appurtenant parts of the dam.
- Project location (vicinity map) (State and County)
- Note significant upstream and downstream dams
- Downstream communities potentially affected by a dam failure or flooding as a result of large operational releases
- Any other relevant information

## **Section IV: EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION**

- **Detection** of the emergency condition
  - Data and information collection system
  - Process for analyzing data
- **Evaluation** of information
  - Procedures for assessing information
  - Provisions for establishing the severity and magnitude of the emergency
- **Classification** of emergency based on urgency
  - Indicates urgency of the situation
  - Emergency classification chosen and agreed to by dam owner and emergency management officials
  - Must be relevant to emergency conditions
  - Must include the following three alert levels: Monitor, Watch, and Warning

The three classifications of dam alert statuses are listed below. The EAP should describe how each alert status applies to the particular dam. Information to assist the dam owner in

determining the appropriate emergency alert status should be developed and included in the EAP.

**Monitor** – A hazardous condition exists, requiring investigation and corrective action; potential for failure is being assessed; corrective measures are underway.

- Include procedures for investigation and assessment
- Include procedures for implementing interim risk reduction measures
- Notify the appropriate personnel and agencies

**Watch** – Potential failure situation is developing.

- Include procedures for assessing the possible mode of failure
- Include procedures for implementing corrective measures
- Notify the appropriate personnel and agencies
- Include procedures for the possible transition from a Watch to a Warning alert level

**Warning** – Dam failure is occurring or is imminent.

- Time to failure is impossible to determine but should be assumed to be very short
- Assume that corrective measures at the dam are not possible
- Public protective actions are required
- Notify the appropriate personnel and agencies

## **Section V: GENERAL RESPONSIBILITIES**

The General Responsibilities section of the EAP are:

- Dam owner responsibilities
- Responsibility for notification
- Responsibility for evacuation
- Responsibility for duration, termination, security, and follow-up
- EAP coordinator responsibility

### **Dam Owner Responsibilities**

The responsibilities of the dam owner must be clearly and specifically defined. The following responsibilities should be delineated:

- The decision-making process, including the selection of the appropriate emergency condition
- Specific actions to be taken
- Who will take the actions
- Internal (at the dam) and external (off-site) notification activities

This section should provide guidance on communicating the emergency situation to others and should spell out the chain of command and specific emergency actions.

### **Responsibility for Notification**

Clearly identify the dam owner personnel authorized to notify local officials. The most important elements of this section are:

- Specificity
- Delegation of responsibility and authority
- Timely notification
- Procedures for notifying agencies such as the National Weather Service
- Procedures for notifying media
- Sample messages

### **Responsibility for Evacuation**

Agencies with a statutory obligation are responsible for evacuation. The dam owner:

- Should **not** assume agency responsibility
- Should coordinate with appropriate officials

This section of the EAP should specify coordinated and agreed-to evacuation responsibilities of the dam owner, if any. Inundation maps help the evacuation effort.

### **Responsibility for Duration, Security, Termination, and Follow-Up**

- The dam owner and dam personnel must monitor the emergency situation at the dam and keep the authorities informed of developing conditions.
- The dam owner must specify security measures at the dam during the emergency.
- Officials and agencies are responsible for terminating emergency status in affected areas.
- The dam owner terminates the emergency of the dam.
- There should be a follow-up evaluation by the participants involved in the emergency.

### **EAP Coordinator Responsibility**

The name of the EAP Coordinator must be specifically identified in the EAP. The following are responsibilities of the EAP coordinator:

- Revised EAP
- Establishes training seminars
- Coordinated EAP exercises
- Serves as the EAP contact for:
  - emergencies
  - non-emergencies

## **Section VI: PREPAREDNESS**

There are two primary objectives to this section of the EAP: to describe preplanned and emergency actions and to specify emergency measures. The rationale for the first objective of this section is to describe preplanned and emergency actions. This may:

- Prevent a failure from developing
- If possible, minimize loss of life and property damage
- Issue timely warning, and facilitate operation of the dam

The seven areas that must be considered in the development of the section on emergency measures are:

- Surveillance
- Response during periods of darkness
- Access to the site
- Response during weekends and holidays
- Response during adverse weather
- Alternate means of communication
- Emergency supplies and resources

### **Surveillance**

- Provisions for prompt detection and evacuation
- Instrumental and/or physical inspections
- Unattended dams (not continuously attended 24 hours a day)
  - Surveillance procedures and systems, such as remote detection systems
  - Instrumental, telemetry, audible alarms
  - Headwater/tailwater detectors
  - Coordination of special procedures with local authorities

### **Response During Periods of Darkness**

- Actions to illuminate the dam to facilitate gate and other operations
- Operation of equipment during power failure
- Procedures for notifying officials
- Impact on expected response times
- Non-business hours
- Other instructions

### **Access to Site**

- Primary and secondary routes
- Means for reaching the site under various conditions (e.g. foot, boat, car, snowmobile)
- Expected travel times
- Special instructions

### **Response During Weekends and Holidays**

- Planned actions based on the dam operators schedule
- Special instructions

### **Response During Periods of Adverse Weather**

- Actions to be taken for different conditions, including when the dam will not be attended
- Methods of access
- Expected response time
- Special instructions

### **Alternate Systems of Communication**

- Availability and use of alternative systems
- Alternative channels
- Proper procedures
- Special instructions

### **Emergency Supplies and Resources**

- The stockpiling of materials and equipment
- Coordination of information on flood flows
  - National Weather Service, dam owners (up and downstream)
  - Actions to lower the reservoir (i.e., reduce inflow and increase outflow)
  - Who, when, and how to take action
  - Provisions of alternative sources of power, including location, mode of operation, and transportation
  - Site-specific actions

## **Section VII: INUNDATION MAPS**

The inundation maps are of extreme importance in the development of the notification flowchart.

The following are considerations in the development of the inundation maps for the EAP:

- The inundation maps are the responsibility of the dam owner to have completed. An engineer is usually required.
- The development of the maps must be coordinated with relevant agencies.
  - Maps must provide information required by the agencies because the agencies will depend on the maps for evacuation
- The maps must be usable and of appropriate scale. They must be clear and not cluttered with extraneous information.
- If possible, the base map must be the most recent aerial photograph. Roads and other structures must be clearly identifiable and labeled.
- The dam and lake area must be labeled and color-shaded.
- Three failure scenarios must be analyzed unless otherwise approved.
  - Inflow design flood must be fully documented
  - For on-stream dams, the scenarios must include a “sunny day”, 100-year (or possibly 25% PMF), and PMF base condition. Each scenario must be shown on the maps unless otherwise approved.
  - For upground reservoirs or lagoons, the scenarios must include a “sunny day” scenario that assumes the reservoir is at its normal operating level and no flooding conditions on receiving streams. The scenarios must also include a 100-year scenario that assumes the reservoir level is at the top of the dam and there is a 100-year flood occurring on the receiving stream.
  - Color or cross-hatching should be used for different scenarios.



- When developing inundation maps for Class II or III dams, the design flood of 50% or 25% of the PMF, respectively, can be used as the largest dam failure scenario.
- The maps must show peak discharge, maximum flood elevation, and travel time.
- The maps must include a legend that describes each failure scenario, a definition of travel time, scale, north arrow, and any other information depicted on the maps.
- A note must be included on the maps that explain why the study terminates at the chosen location.
- An index should be used if the map covers several pages.
- Existing field conditions should be shown on the base map.
- The accuracy and limitation of the maps should be described.
- The maps should be supplemented with a narrative description of the areas affected by the dam break, with surface profiles, and with a characteristic of the failure condition assumed in the preparation of the inundation maps.

## **Section VIII: APPENDICES**

There are four appendices to be developed for the EAP:

- Appendix A: Investigation and Analyses of Dam Break Floods.
- Appendix B: Plans for Training, Exercising, Updating, and Posting the EAP
- Appendix C: Site-Specific Concerns
- Appendix D: Approval of the EAP

### **Appendix A: Investigation and Analysis of Dam Break Floods**

Appendix A must include data on the following:

- Methodology
- Prevailing streamflow conditions
- Breach assumptions
- Termination of downstream routing

### **Appendix B: Plans for Training, Exercising, Updating, and Posting the EAP**

#### **Training**

- Training plan and schedule, with provisions for annual training
- Familiarity with EAP
- Problem detection and evaluation

#### **Exercising**

- Exercising plan and schedule, with provisions for annual drills
- Tabletop and functional exercises
- Test remote sensing equipment
- Evaluation of exercises
- Follow-up on recommendation

The follow-up training course focuses on exercising the EAP.

**Updating**

- Process for revisions
  - Annual review
  - Updating for personnel changes
  - Exercise lessons learned
- Distribution of updated plans

**Posting the EAP**

- Posting must be up-to-date
- Place EAP in prominent locations
- Post copies of complete and up-to-date EAP in a location near the posted flowcharts

**Appendix C: Site-Specific Concerns**

Appendix C should include the following:

- Site-Specific concerns that affect the EAP
- A Glossary, if needed

**Appendix D: Approval of the EAP**

The documentation included in Appendix D:

- Must be signed by all parties
- Indicates the approval and acceptance of responsibilities
- Helps ensure that all parties understand the EAP and their roles and responsibilities

## **APPENDIX C: PUMP LAKE DRAIN CALCULATIONS**



**Pump Lake Drain  
Calculation Sheet**

Camp Spelman Lake Dam  
Portage County  
File No: 1112-071

Normal Pool Area: 12.5 acres  
Drainage Basin Area: 117 acres

User Input Cells

**1. FIND THE VOLUME NEEDED TO BE REMOVED IN ORDER TO LOWER POOL BY 1 FT.**

Normal Pool (acres) x 1 ft. x 325,851 gal/acre-ft

Volume to lower pool by one foot: 4,073,138 gal

**2. FIND FLOW RATE NEEDED TO LOWER POOL BY 1 FT IN A SET TIME PERIOD. THE TIME PERIOD IS TYPICALLY 7 DAYS FOR ROUTINE SITUATION AND 3.5 DAYS FOR EMERGENCIES.**

Volume required to lower 1 ft (gal) / Time to lower (min) = Lowering Flowrate (gpm)

7 days : 10,080 min

3.5 days : 5,040 min

Flow rate to lower pool by one foot

Emergencies: 808 gpm for emergencies

Non-emergencies: 404 gpm for non-emergencies

**3. FIND BASEFLOW. BASEFLOW IS THE AMOUNT OF FLOW IN THE STREAM ON A NORMAL SUNNY DAY. THE RULE OF THUMB FOR OHIO IS TYPICALLY 0.7 GAL PER MIN FOR EACH ACRE OF DRAINAGE BASIN.**

Drainage Area (acres) x 0.7 (gpm/acre) = Baseflow (gpm)

Baseflow: 81.9 gpm

**4. COMBINE LOWERING FLOWRATE AND BASEFLOW TO FIND TOTAL REQUIRED FLOWRATE.**

Lowering flowrate (gpm) + Baseflow (gpm) = Total Required Flowrate (gpm)

Emergencies: 890 gpm for emergencies

Non-emergencies: 486 gpm for non-emergencies

Dam Height (Max. Head) 23 feet

*Calculation Sheet originated from ODNR Pump Lake Drain Guidance*

**Calculations by:** WRMT

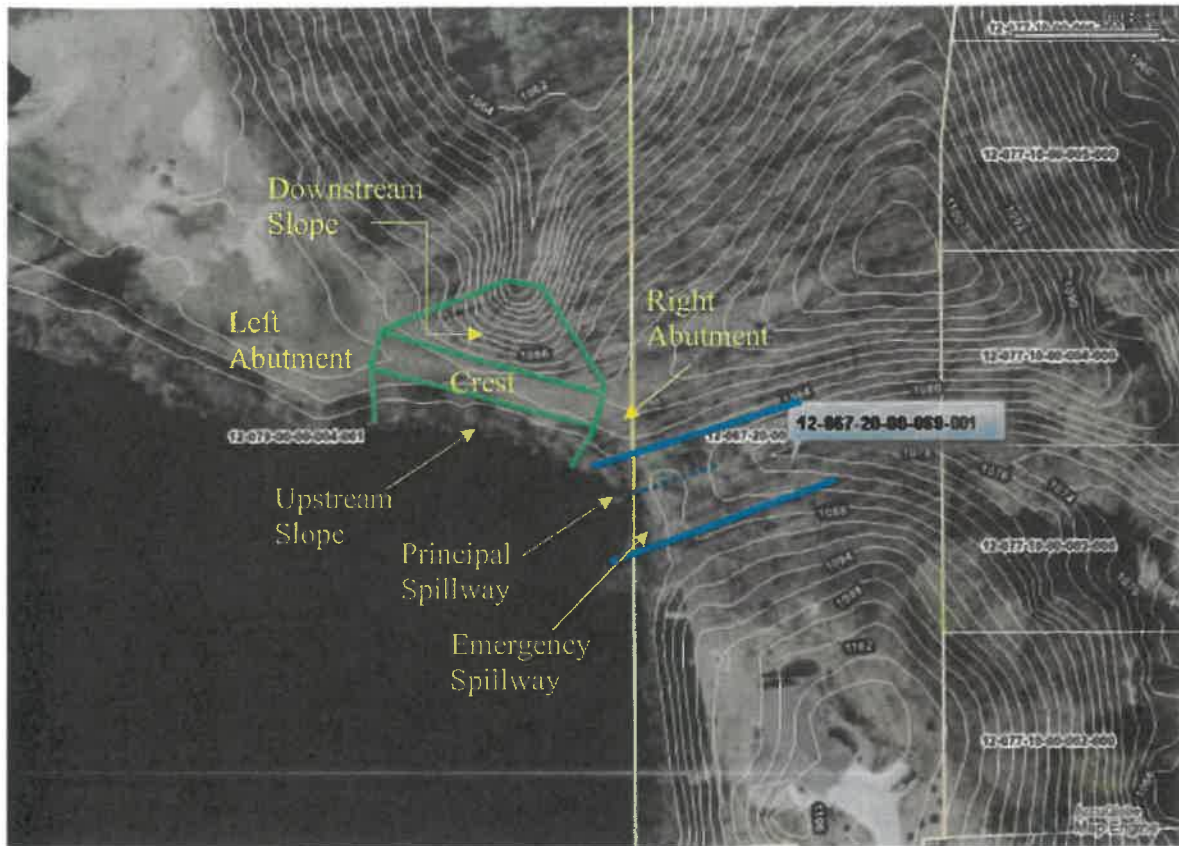
**Checked by:** KEP



## **APPENDIX D: SKETCH OF DAM AND APPURTENANCES**









## **APPENDIX E: ODNR DAM INVENTORY SHEET**



## ***Dam Inventory Sheet***

<b>Name:</b> CAMP SPELMAN LAKE DAM		<b>File No:</b> 1112-071	
		<b>National #:</b>	
<b>Reservoir:</b>		<b>Permit No.:</b>	
		<b>Class (Ht-Vol):</b> I ( IV - III )	
<b>Owner Information</b>			
<b>Owner:</b>	Multiple Owners - 1112-071	<b>Owner Type:</b>	Private
<b>Address:</b>		<b>Multi-Dams:</b>	-
		<b>Parcel No.:</b>	
<b>City:</b>		<b>State:</b>	<b>Zip:</b>
<b>Contact:</b>	Christine Craycroft	<b>Phone No.:</b> 330-297-7728	
<b>Location Information</b>			
<b>County:</b>	Portage	<b>Latitude Deg.:</b> 41	<b>Min.:</b> 11 <b>Sec.:</b> 55
<b>Township:</b>	Franklin	<b>Longitude Deg.:</b> 81	<b>Min.:</b> 21 <b>Sec.:</b> 0
<b>Stream:</b>	Tributary To Cuyahoga River		
<b>USGS Quad.:</b>	Kent	<b>USGS Basin No.:</b> 04110002	
<b>Design/Construction Information</b>			
<b>Designed By:</b>			
<b>Constructed By:</b>			
<b>Completed:</b>	<b>Plan Available:</b>	<b>At:</b>	
<b>Failure/Incident/Breach:</b>			
<b>Structure Information</b>			
<b>Purpose:</b>	Recreation		
<b>Type of Impound.:</b>	Dam And Spillway		
<b>Type of Structure:</b>	Earthfill		
<b>Drainage Area (sq. miles):</b>	0.18	<b>or (acres):</b>	115
<b>Embankment Data</b>			
<b>Length (ft):</b>	195	<b>Upstream Slope:</b>	3H:1V
<b>Height (ft):</b>	22.9	<b>Downstream Slope:</b>	3H:1V
<b>Top Width (ft):</b>	12	<b>Volume of Fill (cub. yds.):</b>	
<b>Spillway Outlet Works Data</b>			
<b>Lake Drain:</b> UNKNOWN			
<b>Principal:</b> 24-IN-SQ CONCRETE RISER W/ 12-IN-DIA PVC OUTLET			
<b>Emergency:</b> 2 STAGE OPEN CHANNEL W/ 4:1 SS: 1ST, 10-FT-WD; 2ND, 85-FT-WD			
<b>Maximum Spillway Discharge (cfs):</b>		<b>Design Flood:</b> 1.0	<b>Flood Capacity:</b> 1.0
<b>Dam Reservoir Data</b>			
	<b>Elevation (ft-MSL)*</b>	<b>Area (acres)</b>	<b>Storage (acre-feet)</b>
<b>Top of Dam:</b>	1088.3	37	166
<b>Emergency Spillway:</b>	1084.5	13	75
<b>Principal Spillway:</b>	1084	12.5	69
<b>Streambed:</b>	1065.4		
<b>Foundation:</b>			
<b>Inspection Information</b>			
<b>Inspection</b>	<b>Phase I:</b>		
<b>History:</b>	<b>Other Visits:</b> 5/29/2019 INV - MJH		
	<b>Inspection Year:</b>	E	
<b>Operation Information/Remarks</b>			

**Emergency Action Plan:** Not Approved

**Format:** No Plan

**OMI:** Not Approved  
**Last Entry:** 11/26/2019

