Document
Control No. ____

2024

Hudson River - Black River Regulating District

Emergency Action Plan

Sixth Lake Dam

Hazard Classification: Class C, High Hazard
N.Y.S. D.E.C. Dam Safety Id. No. 140 – 0860
National Dam Id. No. NY00318
Latitude 43˚ 33’ 00” N., Longitude -74˚ 45’ 00” W.
Vertical Datum: NGVD 1929

Project Location:

Sixth Lake Dam Rd., Town of Inlet, NY, 13360, Hamilton County
Sixth Lake Reservoir, Fulton Chain of Lakes, Middle Branch of the Moose River.

Inundation Area:

Potential flooding upstream along the shoreline of 6th and 7th Lakes and downstream along the shoreline of 5th, 4th, 3rd, 2nd and 1st Lakes, Hamilton and Herkimer Counties.

Quick Reference:

How should this plan be implemented? – Part 1, Section D

Who are the key players and what do they do? – Part 1, Section E

Who should be called and in what order? – Part 1, Section A

If the dam breaks, which areas are threatened? – Part 1, Section G

Confidential
Critical Energy Infrastructure
Information (CEII)
Do Not Release

Emergency Action Plan

Sixth Lake Dam

N.Y.S. Dam Id. No. 140–0860
National Dam Id. No. NY00318

Vertical Datum: NGVD 1929

Hudson River-Black River Regulating District
54 State St., Suite 501
Albany, New York 12207

518-465-3491
hrao@hrbrrd.ny.gov

Table of Contents

Part I, Section A

Emergency Condition Communications Sheets

&

Notification Flow Charts

HIGH FLOW CONDITION

FLOODING IS OCCURRING
NO DAM FAILURE

HIGH FLOW CONDITION – NO DAM FAILURE

Generally, the High Flow Condition should be used when there is no danger of dam failure, but reservoir and river flow conditions are such that flooding is expected to occur upstream and/or downstream of the dam. Non-Failure Emergency Conditions are more common than the emergency conditions associated with Dam Failures. Use of the EAP can provide an early warning to downstream areas during flood conditions or large spillway releases. Based upon the severity of the flooding, local site conditions, consultations with local emergency response agencies, and standard operating procedures used at the dam, the EAP may not need to be activated during a non-failure emergency condition. However, it may become necessary to fully activate the EAP if conditions escalate to levels agreed to beforehand by all involved participants. Therefore, an important application of the EAP is when there is a flood occurring on the river system, but there may be no apparent threat to the integrity of the dam.

Whenever a possible emergency situation has been identified by an observer or alarm and received by HR-BRRD personnel, the Chief Engineer will be notified. The Chief Engineer will determine the proper level of plan implementation.

EMERGENCY SITUATION - COMMUNICATION

High Flow Emergency Condition

1. This is _____, _____with the Hudson River - Black
(Name) (Title)
River Regulating District.

2. A High Flow Emergency Condition has been identified for the Sixth Lake Dam, upstream of Fifth Lake, Hamilton County.

3. **Presently there is no danger of dam failure**; however, the Regulating District has made the following changes to the release from the Sixth Lake Dam. The Changes are as follows:_____
_____
_____
_____
_____
(Briefly describe situation)

4. The emergency situation was identified pat about _____.
(hours)

5. We expect flooding of the flood-prone areas in the vicinity of the (river/creek)._____
_____
_____
_____

5a. If conditions worsen, flooding may occur._____
_____
_____
_____
_____

6. Current Emergency High Flow Conditions flow is _____, estimated at the Sixth Lake Dam.
(c.f.s.)

7. The estimated time of peak flood at the Sixth Lake Dam will be at _____on_____.
(hours) (date)

8. The estimated peak flood at the Sixth Lake Dam will be _____.
(c.f.s.)

9. When the Emergency condition becomes upgraded or downgraded, you will be notified by Regulating District Staff.

10. Refer to Part II, Appendix E, **Extreme Event Operation Plan & Notification Procedures** for a Table Summary of Reservoir Outflows, Operation Procedures, Probable Impacts and Actions Taken.

Emergency Action Summary Form/Log

NON-FAILURE CONDITION

NO DAM FAILURE
ADDITIONAL INVESTIGATION REQUIRED

NON-FAILURE CONDITION – NO DAM FAILURE, ADDITIONAL INVESTIGATION IS REQUIRED

The Non-Failure emergency level is appropriate for an event at a dam that will not, by itself, lead to a failure, but requires investigation and notification of internal and/or external personnel. Examples are (1) new seepage or leakage on the downstream side of the dam, (2) presence of unauthorized personnel at the dam, and (3) malfunction of a gate.

Some incidents, such as new seepage, may only require an internal response from the dam owner. Others, such as a gate malfunction, may lead to unexpected high releases that could pose a hazard to the downstream public and would require the notification of outside agencies.

EMERGENCY SITUATION - COMMUNICATION

Non-Failure Emergency Condition

1. This is _____, _____with the Hudson River – Black
(Name) (Title)
River Regulating District.

2. A Non-Failure Emergency Condition has been identified and confirmed by visual inspection at the Sixth Lake Dam, upstream of Fifth Lake, Hamilton County.

3. Failure has not occurred however, the Regulating District has made the following changes to the release from the Sixth Lake Dam in order to mitigate failure. The changes are as follows,_____
_____
_____
_____
(Briefly describe situation)

4. The emergency situation was identified at about _____ hours.

5. We expect flooding of the flood-prone areas in the vicinity of the (river/creek)._____
_____
_____
_____

5a. If conditions worsen, flooding may occur._____
_____
_____
_____

6. Current Non-Failure Emergency Conditions flow is _____, estimated at the Sixth Lake Dam.
(c.f.s.)

7. The estimated time of peak flood at the Sixth Lake Dam will be at _____on_____.
(hours) (date)

8. The estimated peak flood at the Sixth Lake Dam will be _____.
(c.f.s.)

9. When the Emergency condition becomes upgraded or downgraded, you will be notified by Regulating District Staff.

Emergency Action Summary Form/Log

POTENTIAL-FAILURE CONDITION

CONDTIONS ARE DEVELOPING THAT COULD LEAD TO DAM FAILURE

POTENTIAL -FAILURE CONDITION –ADDITIONAL INVESTIGATION IS REQUIRED

The Potential Failure emergency level indicates that conditions are developing at the dam that could lead to a dam failure. Some examples are (1) rising reservoir levels that are approaching the top of the non-overflow section of the dam, (2) transverse cracking of an embankment, and (3) a verified bomb threat. Potential Failure should convey that time is available for analyses, decisions, and actions before the dam could fail. A failure may occur, but predetermined response actions may moderate or alleviate failure.

The Regulating District will assess the situation and determine the appropriate Condition/warning level. Based on the Regulating District's assessment the emergency management authorities will be placed on alert and it is up to the emergency management authorities to determine the appropriate course of action.

If it appears that a situation may take days or weeks before it could develop into a failure situation, the local emergency management authorities may decide on one course of action. Periodic status report updates from the Regulating District are important because when it appears that the situation is continuing to worsen at the dam, in spite of the actions being taken to moderate or alleviate failure, the local emergency management authorities may decide to change their course of action. Depending on the location of downstream residents with respect to the dam and the estimated warning time available, the emergency management authorities/evacuating authorities should consider the prudence of early evacuation, or heightened awareness, of certain downstream areas until the emergency has passed.

To assist the emergency management authorities/evacuating authorities in selecting their appropriate course of action and to provide a proper transition from “potential failure” level to “imminent failure” level, the Regulating District will clearly communicate their assessment of the situation to the emergency management authorities. The Regulating District will place the emergency management authorities on an initial alert and provide periodic updates on the situation as it develops so that the emergency management authorities can assess when they should implement their evacuation procedures.

EMERGENCY SITUATION - COMMUNICATION

Potential-Failure Condition

1. This is _____, _____with the Hudson River – Black
(Name) (Title)
River Regulating District.

2. A Potential-Failure Emergency Condition has been identified and confirmed by visual inspection at Sixth Lake Dam, upstream of Fifth Lake, Hamilton County.

3. Failure has not occurred however, the Regulating District has made the following changes to the release from the Sixth Lake Dam in order to mitigate failure. The changes are as follows,_____
_____
_____
_____
(Briefly describe situation)

4. The emergency situation was identified at about _____ hours.

5. We expect flooding of the flood-prone areas in the vicinity of the (river/creek)._____
_____
_____
_____

5a. If conditions worsen, flooding may occur._____
_____
_____
_____

6. Current Non-Failure Emergency Conditions flow is _____, estimated at the Sixth Lake Dam.
(c.f.s.)

7. The estimated time of peak flood at the Sixth Lake Dam will be at _____on_____.
(hours) (date)

8. The estimated peak flood at the Sixth Lake Dam will be _____.
(c.f.s.)

9. When the Emergency condition becomes upgraded or downgraded, you will be notified by Regulating District Staff.

10. Refer to **Inundation Maps and Breach Analysis Summary** for location of Inundation Areas and timing of potential flood along the shoreline of Fifth and Fourth Lakes.

Emergency Action Summary Form/Log

IMMINENT-FAILURE CONDITION

**THE DAM HAS FAILED
OR IS ABOUT TO FAIL**

IMMINENT-FAILURE CONDITION –DAM HAS FAILED OR IS ABOUT TO FAIL

The Imminent Failure emergency level indicates that time has run out, and the dam has failed, is failing, or is about to fail. Imminent Failure typically involves a continuing and progressive loss of material from the dam. It is not usually possible to determine how long a complete breach of a dam will take. Therefore, once a decision is made that there is no time to prevent failure, the Imminent Failure warning must be issued. For purposes of evacuation, emergency management authorities should assume the worst-case condition that failure has already occurred.

Notification and Communication

After the emergency level at the dam has been determined, notifications are made in accordance with the EAP's Notification Flowchart(s) located at the end of this section.

When developing notification and communication procedures, the Regulating District will open a conference call line for emergency management authorities to call in for live updates. All parties must understand that the formal declaration of public emergency by emergency management authorities can be a very difficult decision. During this step, the Regulating District will provide available information that will assist in that decision. An early decision and declaration are critical to maximizing available response time.

To assist with Notification and Communication, see pre-scripted messages/Communication to the right.

If it appears that the situation is continuing to deteriorate despite actions being taken to moderate or alleviate failure, local authorities may decide to change their course of action. Depending on the location of downstream residents and the estimated time required to warn them, the evacuating authorities may consider early evacuation or continued warnings until the emergency has passed.

Emergency Actions

After the initial notifications have been made, the Regulating District will act to save the dam and minimize impacts to life, property, and the environment. During this step, there is a continuous process of taking actions, assessing the status of the situation, and keeping others informed through communication channels established during the initial notifications. The EAP may go through multiple emergency levels as the situation improves or deteriorates.

Refer to **Extreme Event Operation Plan & Notification Procedures** for a Table Summary of Reservoir Outflows, Operation Procedures, Probable Impacts and Actions Taken. Refer to **Inundation Maps and Breach Analysis Summary** for location of Inundation Areas and timing of potential flood along the Sacandaga and Hudson Rivers.

During an incident, safety and security measures should be implemented to secure the affected operational areas at the dam to protect operations personnel and the public, and permit an effective performance of emergency response actions.

Termination and Follow-up

The Chief Engineer or Regulating District Staff will notify Emergency Responders that the condition of the dam has been stabilized. Government officials are responsible for declaring an end to the public emergency response.

Following the termination of an incident, the Regulating District will conduct an After-Action Review of the Emergency Situation, Events and Conditions.

EMERGENCY SITUATION - COMMUNICATION

Imminent-Failure Emergency Condition

1. This is _____, _____with the Hudson River – Black
(Name) (Title)
River Regulating District.

2. An Imminent-Failure Emergency Condition has been identified and confirmed by visual inspection at Sixth Lake Dam, upstream of Fifth Lake, Hamilton County.

3. Failure (has occurred/is imminent) due to _____
_____
_____
_____
(Briefly describe situation)

4. The emergency situation was identified at about _____.
(hours)

5. We expect flooding of the flood-prone areas in the vicinity of the (river/creek).___
_____
_____
_____
_____

5a. If conditions worsen, flooding may occur._____
_____
_____

6. Current Emergency Conditions A flow is _____, estimated at the Sixth Lake Dam.
(c.f.s.)

7. The estimated time of peak flood at the Sixth Lake Dam will be at _____on_____.
(hours) (date)

8. The estimated peak flood at the Sixth Lake Dam will be _____.
(c.f.s.)

9. When the Emergency condition becomes downgraded, you will be notified by the Regulating District Staff.

10. Refer to **Inundation Maps and Breach Analysis Summary** for location of Inundation Areas and timing of potential flood along the shoreline of Fifth and Fourth Lakes.

Emergency Action Summary Form/Log

Notification Flow Chart

"First On - Site"
(Visual Inspection / Observation)
- **Verify Emergency Condition**

In absence of Chief Engineer,
Operations Engineer will become the primary contact.

HR-BRRD Operations Engineer	office	518-465-3491
Michael Mosher	cell	518-366-8959

(Perform call out notification per Operations Engineer Flow Chart.)

HR-BRRD Chief Engineer		
Robert Foltan	office	518-465-3491
	cell	518-461-6927
(Perform call out notification per Chief Engineer Flow Chart.)	home	518-439-3486

HR-BRRD Black River Area Administrator	
Watertown Office	315-788-5440
Albany Office	518-465-3491

(Perform call out notification per Administrator Flow Chart.)

HR-BRRD Executive Director		
John Callaghan	office	518-465-3491
	cell	518-590-4785

(Provide updates as available)

Director of Administrative Services		
Stephanie Ruzycky	office	518-661-5535
	cell	518-848-4262
	home	518-883-6238

HR-BRRD Staff
Establish Communication Center
Control Access to Dam
Perform Emergency Operations/Measures
(Perform call out notification per Staff Flow Chart.)

Communication with State Agencies
Communication with Public & News Media

Activate Internal Communication Systems

In absence of Area Administrator,
Executive Director will fill in as Area Administrator.

HR-BRRD Executive Director		
John Callaghan	office	518-465-3491
	cell	518-590-4785

(Perform call out notification per Administrator Flow Chart.)

HR-BRRD Available Staff

Hudson River Staff

Matt Ginter, Operations Manager	cell	518-332-5545
Thomas Baker, Engineering Assistant	cell	315-842-0438
Eric Johnson, Senior Plant Operator	cell	518-848-2651
Stephanie Porter, Administrative Assistant	Sacandaga Field Office	518-661-5535

Black River Staff

Mike Dicob, Black River Area Superintendent	cell	315-778-9883
Josh Rice, Plant Operator	cell	315-286-7350
Megan Cole, Administrative Assistant	Watertown Office	315-788-5440
Kimberly Scott, Sr. Administrative Assistant	Watertown Office	315-788-5440

(Color Print to 11 x 17 inch paper, Landscape Orientation, Single Sided, Three Hole Punch on Left Margin, Fold Twice Beginning at Center.)

Notification Flow Chart

Emergency Condition
Sixth Lake Dam

Observer

(Conference) **HR-BRRD Chief Engineer** (Confirmation)
Robert Foltan office 518-465-3491
cell 518-461-6927
home 518-439-3486

Confirmation of Emergency Conditions
Visual Inspection/Observation

Mike Dicob, Black River Area Superintendent	cell	315-778-9883
Josh Rice, Plant Operator	cell	315-286-7350
Herkimer County 911 Center	(24 hrs.)	315-866-0974

Herkimer County responds to 911 calls at Sixth Lake.

(Conference)

Internal Conference Call [Chief Engineer & HR-BRRD Staff]
(Review Outline for Emergency Notification)
- **HR-BRRD Staff Assists with Notifications**

Hamilton County Sheriffs Department 1

Emergency Dispatch		(24 hrs.)	518-548-6111
Sheriff	Karl G. Abrams	office	518-548-3113

Herkimer County Emergency Services 2

Herkimer County 911 Center	(24 hrs.)	315-866-0974
Emergency Dispatcher		

Herkimer County Office of Emergency Services Dispatches for the Towns of Webb, Inlet, Old Forge and Eagle Bay

National Weather Service 3

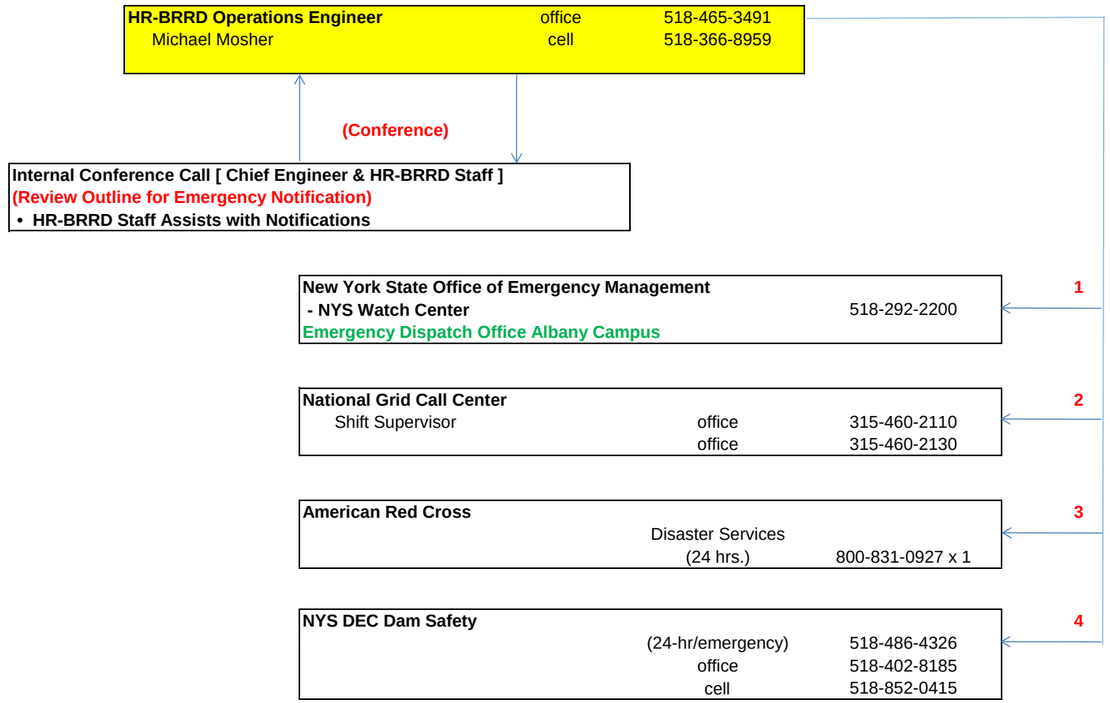
		Albany Weather Forecast Center	800-342-4511
Lead Forecaster	Britt Westergard	Albany Office-24 Hr	518-626-7572
Program Mngr.	Kirk Appfel	Buffalo Office	716-565-9404

County Emergency Manager's Conference Call 4

Legend:
- **Numbers** above indicate call sequence.

(Color Print to 11 x 17 inch paper, Landscape Orientation, Single Sided, Three Hole Punch on Left Margin, Fold Twice Beginning at Center.)

Notification Flow Chart



Legend:
• **Numbers** above indicate call sequence.

(Color Print to 11 x 17 inch paper, Landscape Orientation, Single Sided, Three Hole Punch on Left Margin, Fold Twice Beginning at Center.)

Notification Flow Chart

HR-BRRD Administrator

In absence of Area Administrator,
Executive Director will fill in as Area Administrator.

2

HR-BRRD Executive Director	Sacandaga Field Office	518-661-5535
John Callaghan	Watertown Office	315-788-5440
	cell	518-590-4785

1

Internal Conference Call [Chief Engineer & HR-BRRD Staff]
(Review Outline for Emergency Notification)
- **HR-BRRD Staff Assists with Notifications**

HR-BRRD Available Staff

Black River Staff		
Mike Dicob, Superintendent	cell	315-778-9883
Josh Rice, Plant Operator	cell	315-369-8184
Megan Cole, Administrative Assistant	Watertown Office	315-788-5440
Kimberly Scott, Sr. Administrative Assistant	Watertown Office	315-788-5440
Hudson River Staff		
Matt Ginter, Operations Manager	cell	518-332-5545
Thomas Baker, Engineering Assistant	cell	315-842-0438
Eric Johnson, Senior Plant Operator	cell	518-848-2651
Stephanie Ruzycky, Director of Administrative Services	cell	518-848-4262
Stephanie Porter, Administrative Assistant	Sacandaga Field Office	518-661-5535

Legend:
- **Numbers** above indicate call sequence.

(Color Print to 11 x 17 inch paper, Landscape Orientation, Single Sided, Three Hole Punch on Left Margin, Fold Twice Beginning at Center.)

Notification Flow Chart

Hamilton County Sheriff's Office
Sheriff — Karl G. Abrams
Emergency Dispatch 518-548-6111
Business Office 518-548-3113

1

Emergency Manager's Conference Call
(Conference telephone line will be established for live updates.)
- **HR-BRRD Staff Assists with Updates**

Hamilton County Office of Emergency Services — 2
Director — Jill Dunham
office 518-548-6223
cell 518-774-7065

New York State Police — 3

Desk Trooper	Raybrook	dispatch	518-897-2000
Station Commander	Indian Lake	office	518-648-5833

Town of Inlet Police Chief — 4
Ron Johnston — (24 hrs.) 315-866-0974
office 315-357-6699

Town of Inlet Fire Department — 5
Chief — Don Townsend — (24 hrs.) 315-866-0974
office 315-357-5091

Town of Inlet Supervisor — 6
Supervisor — John Frey — office 315-369-2204

Legend:
- **Numbers** above indicate call sequence.

(Color Print to 11 x 17 inch paper, Landscape Orientation, Single Sided, Three Hole Punch on Left Margin, Fold Twice Beginning at Center.)

Notification Flow Chart

Herkimer County Emergency Services
Herkimer County 911 Center (24 hrs.) 315-866-0974
Emergency Dispatcher
Herkimer County Office of Emergency Services Dispatches for the Towns of Webb, Inlet, Old Forge and Eagle Bay

1

Emergency Manager's Conference Call
(Conference telephone line will be established for live updates.)
- **HR-BRRD Staff Assists with Updates**

Town of Webb Police — **2**
Police Chief — Ronald Johnston — (24 hrs.) office — 315-866-0974 / 315-369-6515

Town of Eagle Bay Fire Department — **3**
Dispatcher — (24 hrs.) — 315-866-0974

Town of Webb Fire Department — **4**
Dispatcher — (24 hrs.) — 518-866-0974

Town of Webb — **5**
Supervisor — David Berkstresser — office — 315-369-3121

Herkimer County Sheriff's Office — **6**
Desk Sgt. — (24 hrs.) — 315-867-1167

Town of Webb School — **7**
home 315-369-2147
Admin to Superintendent — office 315-369-3222
Diane Kull

Town of Webb Medical Office — **8**
Office Manager — 315-369-6619

Legend:
- **Numbers** above indicate call sequence.

Part I, Section B

Statement of Purpose

Statement of Purpose

This plan provides procedures designed to identify unusual and unlikely conditions which may endanger the Hudson River - Black River Regulating District (HR-BRRD) facilities, or facilities downstream of the Sixth Lake Dam. Responsibilities of the HR-BRRD and other organizations are defined within the Plan, and include mitigative action and notification of emergency management officials of possible impending or actual failure of the Sixth Lake Dam or associate structures.

This plan may also be used to identify flood areas in the event of possible, impending or actual failure of the dam or structure and includes the current contact information for appropriate personnel in order to maximize the time of emergency response or evacuation.

Part I, Section C

Project Description

&

Location Map

Project Description

Sixth Lake Dam

The Sixth Lake Dam is owned and operated by the Hudson River - Black River Regulating District (HRBRRD), located in Hamilton County New York, just north of New York State Route 28, and approximately 1 mile east of the Town of Inlet. Sixth Lake Reservoir is part of the Fulton Chain of Lakes located on the Middle Branch of Moose River, which is a tributary of the Black River and entirely within the boundaries of New York State's Adirondack Park.

See project location maps Figures 1-1, 1-2 and 1-3, February 2014 at the end of this section for location of Sixth Lake Dam and Reservoir.

Physical Composition

The existing Dam, built in 1920, located at the western end of Sixth Lake Reservoir is made up of an earthen embankment, a spillway, and a concrete outlet structure. See Project Drawings, Part II, Appendix G, Sheets 2 and 3 for details.

Earthen Embankment Dam

The earthen embankment dam is approximately 120 feet long, is 10 feet wide at the top and has a crest elevation of 1,791.0 ft., NGVD 1929. The height of the earthen embankment varies from 0 feet at the south end to approximately 16 feet at the north end and where it abuts a concrete wall which separates the spillway from the embankment dam. The upstream face of the embankment dam is covered with large rip-rap stone. The downstream face consists of a grass surface from top to bottom with rip-rap stone located near the spillway outlet.

Spillway

The spillway is approximately 25 feet long, has a crest elevation of 1786.0 ft., NGVD 1929 and is a concrete filled ambursen – design structure. The south end of the spillway is joined to the concrete abutment wall as mentioned above which also acts as a wing wall to protect the earthen embankment. The north end of the spillway abuts the outlet structure.

Outlet Structure

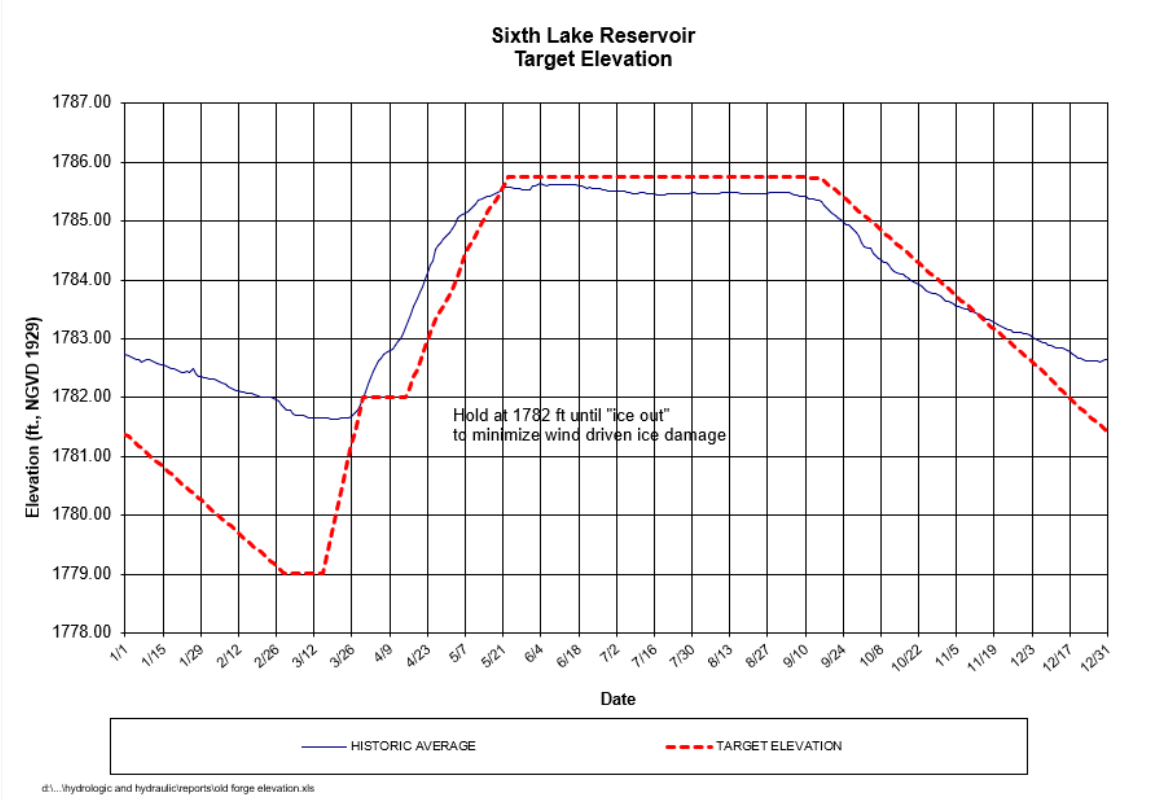
The outlet structure is constructed of reinforced concrete and includes (2) 36- inch wide by 36 inch tall outlet gates/slide gates. The operating floor of the outlet structure is at elevation 1,791.0 ft., NGVD 1929 and supports the gate house. The gate house is constructed of wood and contains the gate controls, data collection & monitoring equipment and telephone.

Sixth Lake Reservoir

A description of Sixth Lake Reservoir is as follows:

Reservoir Storage at 1,790.0 ft., NGVD 1929	0.435 billion cubic feet
Reservoir Storage at 1,786.0 ft., NGVD 1929	0.297 billion cubic feet
Reservoir Storage at 1,774.8 ft., NGVD 1929	0.000 billion cubic feet

Top of Embankment Dam	1,790.3 ft., NGVD 1929
Spillway Elevation	1,786.0 ft., NGVD 1929
Bottom of Gates (Invert Elev.)	1,774.8 ft., NGVD 1929
Normal Reservoir Elev. Summer	1,785.6 ft., NGVD 1929
Normal Reservoir Elev. Winter	1,782.0 ft., NGVD 1929
Average Summer Release	20 c.f.s.
Recent Maximum Release (October 1, 2010)	276 c.f.s. at 1,786.44 ft., NGVD 1929
Maximum Reservoir Depth	40 feet
Reservoir Surface Area (1,786.0 ft. M.S.L.)	732 acres
Approximate Shoreline Length	15 miles
Length of Developed Shoreline	5 miles



Project purpose is for river/reservoir regulation and recreation.

Non Project “Downstream Facilities”

New York State Route 28 Culvert Bridge.

The New York State Route 28 Culvert Bridge and road embankment are located approximately 600 feet downstream of the Sixth Lake Dam and consists of a 10 foot wide by 10 foot tall by 110 foot long concrete culvert under Route 28 to pass outflows from Sixth Lake Reservoir Dam.

The Route 28 Culvert Bridge and roadway are not overtopped during a Sunny Day dam failure of the Sixth Lake Dam and are overtopped during a Stormy Day dam failure of the Sixth Lake Dam.

Outflows from Route 28 Culvert Bridge travel approximately 1800 feet through a narrow steep channel into Fifth Lake Reservoir.

Fifth Lake Reservoir is an approximately 650 feet wide by 750 feet long small lake/reservoir with homes and camps located on its shoreline.

An approximately 1,800 feet long narrow channel extends downstream of Fifth Lake Reservoir navigable by motorized boats and canoes with the South Shore Road Bridge crossing this channel. Homes, camps and a marina are located along this channel.

The South Shore Road Bridge is located in the Town of Inlet, on Hamilton County Road 118 approximately 900 feet downstream of Fifth Lake Reservoir and 900 feet upstream from Fourth Lake.

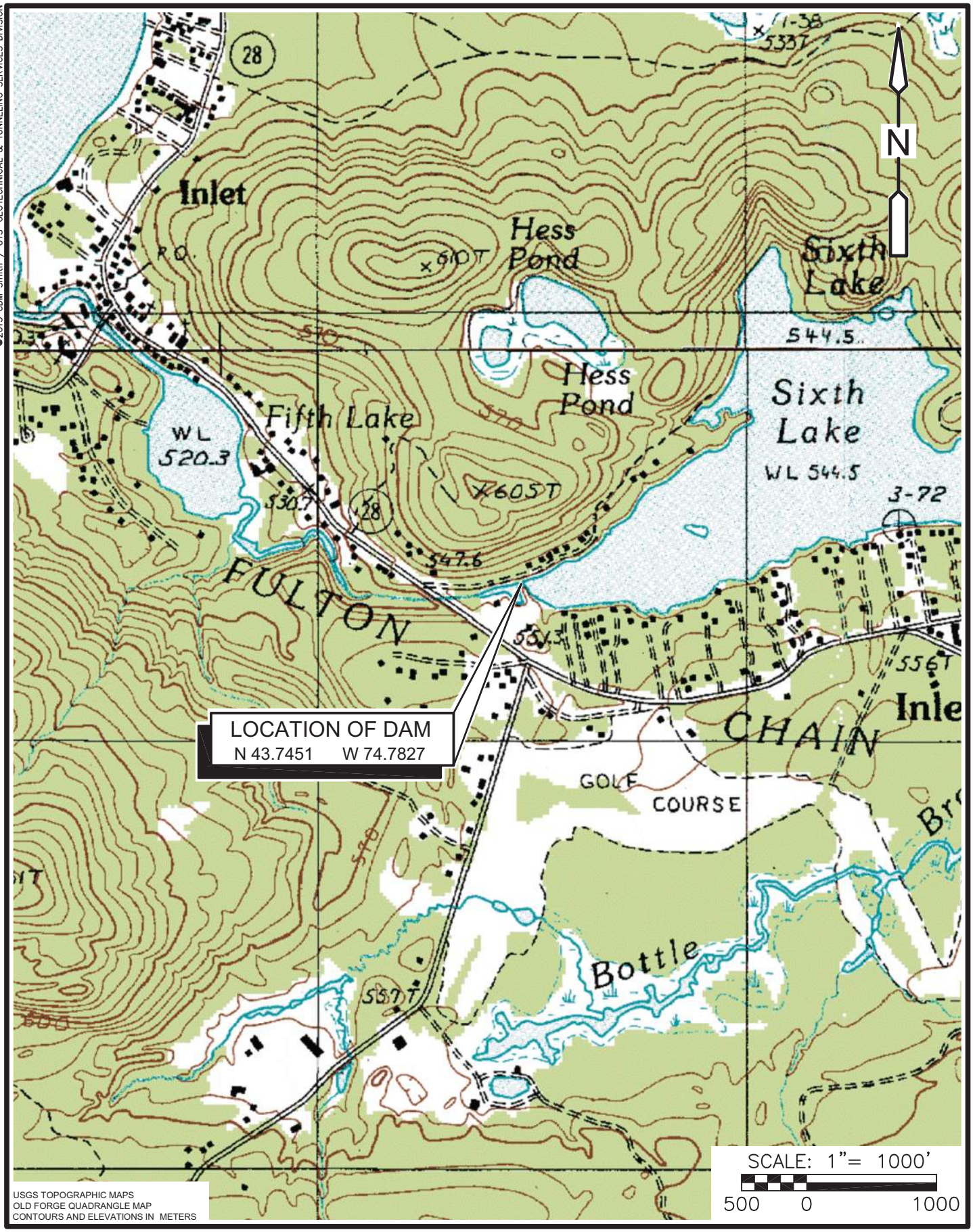
Fourth Lake is the first reservoir in a series of Lakes/Reservoirs extending to Third Lake, Second Lake and First Lake to make up a larger body of water known as the Fulton Chain of Lakes.

The Fulton Chain of Lakes is regulated by HRBRRD with the Old Forge Dam located at the west end of the Fulton Chain of Lakes/Reservoir approximately 8.3 miles downstream of Fifth Lake Reservoir.

Numerous homes and camps along the shorelines of Fifth Lake, the channel between Fifth and Fourth Lake, and the Fulton Chain of Lakes become flooded during a Sunny Day and Storm Day dam failure of the Sixth Lake Dam.

The South Shore Road Bridge also becomes flooded during a Sunny Day and Storm Day dam failure of the Sixth Lake Dam.

See Part I, Section G, **Figure K.7**, Sixth Lake Dam, Emergency Action Plan, Dam Failure Inundation Limits, “Sunny Day” Scenario and **Figure K.8**, Sixth Lake Dam, Emergency Action Plan, Dam Failure Inundation Limits, “Stormy Day” Scenario for approximate limits of inundation during a dam failure of the Sixth Lake Dam.



CDM Smith

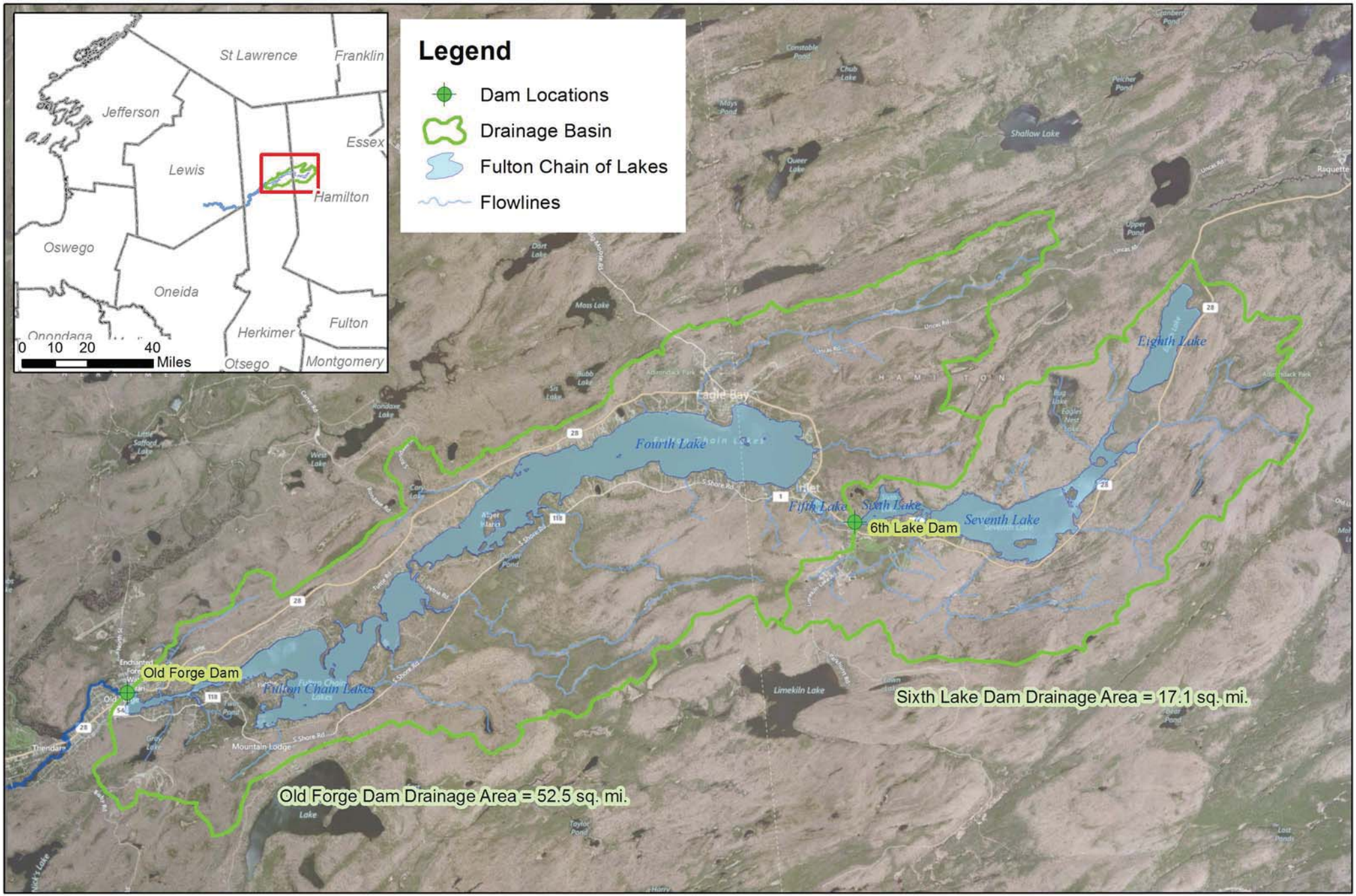
HUDSON RIVER - BLACK RIVER REGULATING DISTRICT
SIXTH LAKE DAM
STATE DAM ID NO.: 140-0860 NID ID NO.: NY00318

LOCUS PLAN
FIGURE 1-1
FEBRUARY 2014

CDM Smith

HUDSON RIVER - BLACK RIVER REGULATING DISTRICT
SIXTH LAKE DAM
STATE DAM ID NO.: 140-0860 NID ID NO.: NY00318

AERIAL MAP
FIGURE 1-2
FEBRUARY 2014



CDM Smith

DRAINAGE AREA

FIGURE 1-3

FEBRUARY 2014

Part I, Section D

EAP Response Process

EAP Response Process

There are generally four steps that are followed when an unusual or emergency incident is detected at a dam. These steps constitute the EAP response process. The steps are:

Step 1: Incident Detection, Evaluation, and Level Classification
Step 2: Notification and Communication
Step 3: Emergency Actions
Step 4: Termination and follow-up

Step 1: Incident Detection, Evaluation, and Level Classification

Incident Detection

Detection of an emergency condition at the Sixth Lake Dam is performed through the following procedures:

Detection made by Regulating District Staff would occur during the visual inspection of the entire dam performed by the Regulating District's Hudson River Area Resident Gate Operator on a daily basis, Monday through Friday and on weekends if required. Unusual conditions at the Sixth Lake Dam would be immediately reported to the Regulating District's Engineering Staff.

Detection can be made by other persons, including recreational users, downstream residents and by other persons not familiar with the EAP.

Detection made from other persons near the dam are able to call the emergency phone numbers posted at the dam and would likely call 911 from their cell phone or a public phone in the town of Inlet located approximately one mile away. A 911 call from Sixth Lake or from downstream of Sixth Lake Dam would be picked up by Hamilton County or Herkimer County 911 Dispatch Centers. These Dispatch Centers contain copies of the Sixth Lake Dam EAP and maintain annual updates for the EAP.

Activation of the EAP is performed by the Chief Engineer as indicated on the Notification Flow Charts located in Part I, Section A of this EAP.

Emergency Conditions Evaluation

Evaluation of an emergency condition at the Sixth Lake Dam is performed as follows:

The Regulating District's Chief Engineer will evaluate and activate the EAP based upon information received and/or further evaluation from any of the personnel listed in the Notification Flow Charts. Based upon information received, the Chief Engineer will classify the emergency as outlined below. The Chief Engineer will also upgrade or downgrade the emergency condition as additional information is received.

Emergency Conditions Classification

After an unusual condition or incident is detected and confirmed, the Regulating District's Chief Engineer will categorize the condition of incident into one of the established emergency levels based on the severity of the initiating condition or triggering events.

The four dam safety emergency levels/categories are as follows:

- **High flow**
- **Non-failure**
- **Potential failure**
- **Imminent failure**

Refer to Part I, Section A for examples of each emergency level/category, a summary of the typical Emergency Situation – Communication and guidance for what can be expected during an **Emergency Condition** at the Sixth Lake Dam.

Step 2: Notification and Communication

After the emergency level at the dam has been determined, notifications are made in accordance with the EAP's Notification Flowchart(s).

EAP Notification Flow Charts are located in Part I, Section A. Separate Notification Flow Charts have been made for Regulating District Staff and Emergency Responders/Managers.

All parties must understand that the formal declaration of public emergency by emergency management authorities can be a very difficult decision. During this step, the Regulating District will provide available information that will assist in that decision by opening a conference call line for emergency management personnel to call in and receive live updates. Early decisions and declarations are critical to maximizing available response time.

When performing notification and communication activities, it is important that people speak in clear, nontechnical terms to ensure that those being notified understand what is happening at the dam.

Step 3: Emergency Actions

After the initial notifications have been made, the Regulating District will act to save the dam and minimize impacts to life, property, and the environment. During this step, there is a continuous process of taking actions, assessing the status of the situation, and keeping others informed through communication channels established during the initial notifications. The EAP may go through multiple emergency levels during Steps 2 and 3 as the situation improves or deteriorates.

During an incident, safety and security measures should be implemented to secure the affected operational areas at the dam from the public and allow operational and emergency management personnel to effectively perform an emergency response.

Step 4: Termination and follow-up

An Emergency Termination Log will be developed and used to document conditions, notifications and responses during the activation of the EAP.

The Regulating District will notify emergency management personnel that the emergency condition at the dam has been stabilized. Emergency managers are responsible for declaring an end to the public emergency response.

Following the termination of an incident, the Regulating District will provide/review an After Action Report (AAR) with emergency management authorities that includes the following topics:

- Events or conditions leading up to, during, and following the activation of the EAP.
- Significant actions taken by each participant and improvements for future emergencies.
- All strengths and deficiencies found in the incident management process, materials, equipment, and staffing levels.
- Corrective actions identified and a planned course of action to implement recommendations.

Part I, Section E

General Responsibilities Under the EAP

General Responsibilities Under the EAP

1. Occurrence of Emergency Condition at the Sixth Lake Dam.

2. Observer notifies Hudson River – Black River Regulating (HR-BRRD) Engineering Staff as listed on posted Notice sign located at Sixth Lake Dam.

HR-BRRD Chief Engineer – **Primary Contact**

1. Receives initial report (or alarm) of situation.

2. Contact HR-BRRD Staff to verify condition at the dam. If HR-BRRD Staff is not readily available, Chief Engineer will request verification from nearest Emergency Agency/Personnel.

3. Based on preliminary notification and verification; determine appropriate **Level** of Implementation as outlined:

    - High Flow Condition
    - Non-Failure Condition
    - Potential Failure Condition
    - Imminent Failure Condition

    Note: Detailed Emergency Conditions Evaluation is provided in Part I, Section A.

4. Using the **Notification Flow Charts** and **Typical Communication Form** provided in Part I, Section A:

    - Perform or instruct all HR-BRRD Staff to make required notifications for given Condition.

    - Ensure that all required HR-BRRD activities are performed.

    - Remain in contact with Emergency Agencies/Personnel as shown on the Emergency Notification Flow Charts. Emergency Agencies/Personnel shall be advised of changing conditions at the dam through-out the actual Emergency.

    - Log information on Emergency Action Summary Forms provided in Part I, Section A as appropriate.

    - As time permits and to aid in expediting the time it takes to perform the required Notifications, a conference line will be opened via telephone and/or internet. An access code or link will be provided to Emergency Responders during the initial Notification.

HR-BRRD Superintendent, Plant Operator, Engineering Assistant and Staff

1. Perform visual inspection/observation and verify emergency condition when requested by Chief Engineer.

2. Perform remedial measures to reduce potential flood/emergency condition such as opening gates, performing maintenance activities, operating heavy equipment and etc. as instructed

by Chief Engineer.

3. Set-up communication systems such as radios, cell phones or phone at dam in order to maintain communications.

4. Mobilize equipment including generator and emergency lighting.

5. Advise Chief Engineer and Area Administrator of status frequently.

6. Limit access to the dam to Emergency Personnel only.

7. Assist with EAP notifications.

HR-BRRD Executive Director

1. Remain in contact with Chief Engineer and HR-BRRD Staff.

2. Communicate with State Agencies.

3. Communicate with media and public as necessary.

HR-BRRD Director of Administrative Services

1. Remain in contact with Chief Engineer and HRBRRD Staff.

2. Activate Communication/Conferencing Systems.

3. Contact NYS Watch Center at NYS OEM for issuing Emergency Condition Notifications through the NY Alert system.

HR-BRRD Operations Engineer

1. Alternate EAP Contact Person.

2. Notify Emergency Contacts shown on Emergency Notification Flow Chart.

3. Assist Chief Engineer and HR-BRRD Staff as required.

4. Designated EAP Coordinator. Responsibilities include the following:

   - Preparing revisions to the EAP
   - Establishing training seminars for Regulating District Staff.
   - Coordination of the EAP exercises

HR-BRRD Area Administrator

1. Notify Operations Personnel and direct them to respond to required location(s).

2. Notify Emergency Contacts shown on Emergency Notification Flow Chart.

3. Assist as necessary and manage HR-BRRD Staff to reduce possible impact of identified Emergency Condition.

4. Update Chief Engineer of status frequently.

Herkimer County - 911 Center

1. When requested by Chief Engineer, the 911 Center shall dispatch an officer to the dam site to verify the reported condition. (Herkimer County dispatches officer to Sixth Lake Dam located in Hamilton County.)

    a. If the Herkimer County 911 Center doesn't have an officer in the immediate area, they shall contact the State Police or other emergency responder to verify condition at the dam.

2. Review information regarding the condition of the Dam with the Regulating District's Chief Engineer.

3. Initiate actions necessary to protect the health and safety of the public including blocking roads and planning evacuation routes.

4. Remain in contact with HR-BRRD Chief Engineer.

Hamilton County Office of Emergency Services

1. Relay information regarding the current Emergency Condition at the dam to all affected municipalities. Refer to Figures K.7 and K.8, Sixth Lake Dam, EAP, Dam Failure Inundation Mapping and if applicable, determine area(s) to be evacuated, based on;

    - Which dam is involved and weather conditions.
    - Time that condition was first noticed.
    - Flood wave travel time.
    - Extent of inundation lines shown and structures effected.

2. Provide assistance to municipalities to help fulfill the emergency responsibilities.

3. Initiate actions necessary to protect the health and safety of the public including blocking roads and planning evacuation routes.

4. Remain in contact with HR-BRRD Chief Engineer.

Herkimer County Office of Emergency Services

1. Relay information regarding the current Emergency Condition at the dam to all affected municipalities. Refer to Figures K.7 and K.8, Sixth Lake Dam, EAP, Dam Failure Inundation Mapping and if applicable, determine area(s) to be evacuated, based on;

    - Which dam is involved and weather conditions.
    - Time that condition was first noticed.
    - Flood wave travel time.
    - Extent of inundation lines shown and structures effected.

2. Provide assistance to municipalities to help fulfill the emergency responsibilities.

3. Initiate actions necessary to protect the health and safety of the public including blocking roads and planning evacuation routes.

4. Remain in contact with HR-BRRD Chief Engineer.

New York State Police

1. When requested by the Herkimer County – 911 Center or the HR-BRRD Chief Engineer, the State Police will travel to the Sixth Lake Dam to verify condition at the dam and review information regarding the condition of the Dam with the Regulating District's Chief Engineer.

2. Close flooded roads or roads which are likely to become flooded.

3. Assist with emergency evacuation.

4. Provide emergency assistance as required.

National Weather Service (NWS)

1. Issue warning using:
   Emergency Alert System (EAS) – NWS EAS.

2. Remain in contact with HR-BRRD Chief Engineer.

New York State Office of Emergency Management, Albany (NYSOEM)

1. The State Office of Emergency Management provides for the overall coordination of State and Federal assistance in support of local government, as appropriate. State assistance is provided when requested and when the emergency is beyond the capabilities of local/county government, or at the direction of the Governor.

2. Provide Emergency Condition Notifications through the NY Alert system as received from HR-BRRD.

Supervisors, Police, and Fire Departments/Emergency Coordinators – Town of Inlet, Eagle Bay & Town of Webb

1. Remain in contact with County Emergency Managers.

2. Initiate actions necessary to protect the health and safety of the public including blocking roads, and planning and assisting with evacuation.

3. Conduct rescue and recovery operations as required.

4. Provide emergency assistance as required.

Town, County & State Highway Departments

1. Assist with emergency repairs to dam if possible.

2. Provide emergency repairs to roads where appropriate.

3. Assist with road closure.

National Grid Control Center

1. De-energies power grid where necessary.

American Red Cross

1. Establish reception centers for evacuated people.

N.Y.S. D.E.C. Dam Safety

1. Remain in contact with HR-BRRD Chief Engineer.

Notes:
1. Sample of typical communications is included in Part II, Section B, “Annual Test Communication”.
2. HR-BRRD chain of command priority of notification listed on Flow Charts, Part I, Section A.
3. HR-BRRD Chief Engineer is Robert Foltan, 54 State Street, Suite 501, Albany, NY 12207. Office Phone: 518-465-3491.

Part I, Section F

Preparedness

Preparedness

A. General Provisions for Surveillance

Physical inspections of the dam and related structures are performed as part of the Hudson River – Black River Regulating District's (HR-BRRD's) Inspection and Maintenance Plan. In addition, the HR-BRRD Plant Operator visits the site each morning Monday through Friday to record reservoir levels, measure precipitation, confirm or makes gate changes and perform routine visual inspection.

During periods of actual or projected high flows, surveillance will be increased as determined by the Chief Engineer.

B. Response During Periods of Darkness

During periods of darkness, any auxiliary illumination required will be provided through use of appropriate portable lighting equipment maintained by HR-BRRD.

200 Watt flood lights are located and maintained at the dam for illumination of the gate house entrance, upstream area/intake area and spillway.

A back-up portable generator is maintained at the Stillwater Field Office for use during periods without power. One larger permanent generator exists at the Stillwater Field Office to maintain the office when necessary.

C. Access to the Site

Access to the Sixth Lake Dam can be obtained along NYS Route 28, from the Town of Inlet New York.

D. Response During Weekends and Holidays

The response during weekends and holidays will be similar to the response during normal working hours. Home phone numbers and cell phone numbers are included with this EAP and shall be used in the event of an emergency.

E. Response During Periods of Adverse Weather

When a flood condition exists, personnel will be at the site to monitor conditions. The use of four wheel drive vehicles should ensure timely response during most weather conditions.

F. Alternative Systems of Communication

Engineering staff and essential operations staff carry cell phones owned and maintained by HR-BRRD. In the event of an emergency, the cell phone system will be utilized both as primary and back-up communications systems. The cell phone numbers are provided in the Notification Flow Charts (Part I, Section A) and in the Emergency Contact and Distribution List (Part II, Appendix D).

NYS Police are connected to radio system capable of providing radio communication throughout the entire Adirondack Park.

G. Warning Systems

Currently no warning sirens exist at the Sixth Lake Dam.

H. Surveillance Systems

Surveillance of the Sixth Lake Dam is currently performed by HR-BRRD as follows:

HR-BRRD's Operations personnel visit the sight each morning Monday through Friday to record reservoir levels, measure precipitation, confirm or makes gate changes and perform routine visual inspection. Visual inspection includes looking for seeps, cracks, deformation, settlement or any unusual activity on the upstream and downstream surfaces of the earthen embankment dam, concrete spillway and outlet structure. Unusual conditions or activity is reported to the Regulating District Engineering Staff.

If unusual conditions or activity is present, surveillance will be increased accordingly.

I. Response Time

The response time for HR-BRRD Staff to report to the Sixth Lake Dam and confirm the conditions is approximately 30 minutes for HR-BRRD Staff who live in Old Forge, NY. One Staff member is on call on a 24 hour 7 days per week basis.

The response time for Town of Inlet Police to report to the Sixth Lake Dam and confirm the condition of the Dam is approximately 20 minutes.

J. Emergency Supplies and Information

1. Emergency supplies and resources to aid evacuees are readily available through local emergency services forces.

2. The use of HR-BRRD equipment for emergency use or repair is coordinated through the Chief Engineer. Some of the equipment includes one 24 hp Ford Backhoe, one 6 yard dump truck, a Kubota utility vehicle, a ¾ ton pick-up truck
and a medium size utility trailer.

   Additional heavy equipment and large dump trucks are available from HR-BRRD's Mayfield Field Office located 2 hours away in Mayfield, N.Y.

K. List of Contractors, Equipment and Material Suppliers

The list of Contractors, Equipment and Material Suppliers that are available during emergency situations are as follows:

Contractors:	Estimated Mobilization & Response Time
D.A. Collins	24 hours

C.D. Perry	24 hours

Equipment Suppliers:

Capital Tractor Inc.	24 hours
Able Tractor	24 hours

Material Suppliers:

Virkler Stone & Gravel	12 hours

Agencies

Inlet DPW	0.1 hours
Old Forge DPW	0.5 hours
NYS DOT Indian Lake	1 hour
Hamilton County DPW	1.5 hours
Herkimer County DPW	2 hours

Part I, Section G

Instruction for Use, Breach Analysis Summary
&
Inundation Maps

Inundation Maps and Dam Break Analysis Summary Forms

Instructions for Use:

The HR-BRRD Chief Engineer will determine the Emergency Level/Category at the Sixth Lake Dam and will estimate flood flows for areas downstream of the dam.

Emergency Responders will use the Inundation Maps (Figures K.7 and K.8) and may use Summary Form 1 to identify the flood stage and timing for roads to close, homes and areas to evacuate and plan evacuation routes using the following steps:

1. Confirm the Emergency Level/Category as follows:

    - **High Flow**
    - **Non-Failure**
    - **Potential Failure**
    - **Imminent Failure**

    See Part I, Section A for a description of Emergency Levels/Categories.

    Emergency Level/Category is _____

2. Confirm the date and time the Emergency Condition at the Dam was first observed (Start Time).

    Emergency Condition Start Date is _____ and Time is _____

3. Confirm estimated flow at the dam as being either.

    - **High Flow** (Summary Form 1, Column C)

    - **Non-Failure** (Summary Form 1, Column C)

    - **Potential or Imminent Failure**
      Sunny Day Dambreak - Sixth Lake level at the **spillway crest**, elevation 1786.5 feet or other elevation.
      (Dambreak Summary Form 1, Column A)

    - **Potential or Imminent Failure**
      Stormy Day Dambreak - Sixth Lake level **above the dam crest**, elevation 1792.2 feet, or other elevation caused by the Spillway Design Flood.
      (Dambreak Summary Form 1, Column B)

    Estimated outflow from the Sixth Lake Dam is _____

    Based upon the estimated outflow/peak discharge from the dam, use the Dam Breach Summary Form 1 to record the Maximum Stage/Elevation and Time to Peak for each Facility/Reach downstream of the Sixth Lake Dam. **(Insert the Emergency Condition Start Date & Time and Fill in the applicable column A, B or C)**

4. Verify actual inundation areas with HR-BRRD Chief Engineer.

South Shore Road
Roadway OVERTOPPED by 1 ft
during "Sunny Day" dam failure flood

Area Upstream of Rte 28 Culvert
Distance from Dam: 500 ft
Initial Flood Wave Arrival: < 1 min
Peak Flood Wave Arrival: 15 min
Peak Flood Elevation: 1785.4 ft
Peak Flood Stage Increase: 14.2
Peak Discharge: 1,480 cfs

Dam Break water surface elevationin Fourth Lake and downstream Chain of Lakes rises slowly to1.5 ft over the course of 7 days as Sixth and Seventh Lakes drain through the dam breach.

Fourth Lake and Downstream Chain of Lakes
Distance from Dam: 1.1 mile
Initial Flood Wave Arrival: 10 min
Peak Elevation Arrival: 6 days 22 hr
Peak Flood Elevation: 1707.7 ft
Peak Flood Stage Increase: 1.5 ft
Peak Discharge: 1,430 cfs

Fifth Lake
Distance from Dam: 0.5 mile
Initial Flood Wave Arrival: 5 min
Peak Flood Wave Arrival: 15 min
Peak Flood Elevation: 1715.5 ft
Peak Flood Stage Increase: 7.8 ft
Peak Discharge: 1,360 cfs

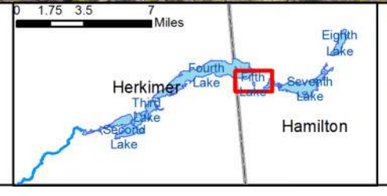
Rte 28 Culvert
Roadway not overtopped
during "Sunny Day" dam failure flood

Sixth Lake Dam

N

Legend

- Floodwave Path
- "Sunny Day" Breach Inundation Extents
- Contours - 10 ft



Note: The inundation areas shown on this map are approximate and should only be used as a guideline for establishing evacuation zones. Actual flooding conditions may differ from those depicted on the map.
Basemap: USGS Apr 2009 0.6 m Orthoimagery
Coordinate System: NAD 1983 SP NY East Feet
Topography: USGS Digital Elevation Map
Vertical Datumn: M.S.L. Feet
NYS Dam ID.: 140B - 0860 NY

CDM Smith

0 250 500 1,000 1,500 Feet

Figure K.7
Sixth Lake Dam
Emergency Action Plan
Dam Failure Inundation Limits
"Sunny Day" Scenario

etkinds B:\Projects\HRBRRD_dams\GIS\Figure K7 EAP_6th_Sunny.mxd 12/31/2014

The peak water surface elevation associated with the spillway design flood event (SDF) in the Fourth Lake and downstream Chain of Lakes is el. 1713.0 ft. A coincident failure of the Sixth Lake Dam causes an incremental rise of 0.3 ft.

Fourth Lake and Downstream Chain of Lakes
Distance from Dam: 1.1 mile
Peak Flood Wave Arrival: 2 hr
Peak Elevation Arrival: 16 hr
Peak Flood Elevation: 1713.3 ft
Peak Flood Stage Increase: 7.1 ft
Incremental Dam Break Rise: 0.3 ft

Fifth Lake
Distance from Dam: 0.5 mile
Peak Flood Wave Arrival: 1 hr 55 min
Peak Flood Elevation: 1718.0 ft
Peak Flood Stage Increase: 10.3 ft
Incremental Dam Break Rise: 0.9 ft
Peak Discharge: 3,785 cfs

South Shore Road
Roadway OVERTOPPED by 3.0 ft
during "Stormy Day" dam failure flood
Roadway overtopped by 2.1 ft
during Spillway Design Flood (SDF)
before the dam break

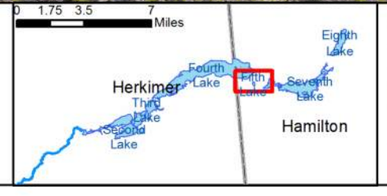
Area Upstream of Rte 28 Culvert
Distance from Dam: 500 ft
Initial Flood Wave Arrival: < 1 min
Peak Flood Wave Arrival: 1 hr 30 min
Peak Flood Elevation: 1792.2 ft
Peak Flood Stage Increase: 20.8 ft
Incremental Dam Break Rise: 1.3 ft
Peak Discharge: 3,790 cfs

Rte 28 Culvert
Roadway OVERTOPPED by 4.6 ft
during "Stormy Day" dam failure flood
Roadway overtopped by 3.3 ft
during Spillway Design Flood (SDF)
before the dam break.

Sixth Lake Dam

N

Legend
- Floodwave Path
- "Stormy Day" Breach Inundation Extents
- Contours - 10 ft



Note: The inundation areas shown on this map are approximate and should only be used as a guideline for establishing evacuation zones. Actual flooding conditions may differ from those depicted on the map.
Basemap: USGS Apr 2009 0.6 m Orthoimagery
Coordinate System: NAD 1983 SP NY East Feet
Topography: USGS Digital Elevation Map
Vertical Datumn: M.S.L. Feet
NYS Dam ID.: 140B - 0860 NY

CDM Smith

0 250 500 1,000 1,500 Feet

Figure K.8
Sixth Lake Dam
Emergency Action Plan
Dam Failure Inundation Limits
"Stormy Day" Scenario

etkinds B:\Projects\HRBRRD_dams\GIS\Figure K8 EAP_6th_Stormy.mxd 12/31/2014

Sixth Lake Dam EAP — Part I, Section G

NYS Dam Id. No. 140B - 0860 NY — Data Compiled from information shown on Sixth Lake Dam EAP Mapping (Figures K.7 & K.8), by CDM Smith, 12/31/14. — **Summary Form 1**

Hudson River - Black River Regulating District (HR-BRRD)

SIXTH LAKE DAM AND FULTON CHAIN OF LAKES

CDM Smith, Dam Breach Study, January 2015

HEC - RAS Dam Break Model

Sixth Lake Drainage Area: 17 (sq. mi.)

Typical Base Flow = 2 cfs/sq.mi.

(Date:)

Insert Emergency Condtion Start Date:

(hrs:min)

Start Time:

	Hydrologic Condition:		**Sunny Day Dam Failure Inundation, Figure K.7**					**Stormy Day Dam Failure Inundation, Figure K.8**					**High Flow Condtion or Non-Failure Condition**			
	Sixth Lake Dam Break Elevation:		1786.5 ft. M.S.L.					1792.2 ft. M.S.L.					1786.0 ft. M.S.L.			
	Inflow to S.L. Reservoir:		34 c.f.s.					8,500 (cfs)					Estimated Inflow (cfs):		**(Information from Summary Form 2)**	
				Peak		Time to Peak	**Column A**	Reservoir	Peak		Time to Peak	**Column B**		Peak	Time to Peak	**Column C**
	Distance from Dam	Normal Pool	Max	Discharge	Initial Flow	Elev. or Discharge	**Actual Time**	Elev. @ Location	Discharge	Initial Flow	Elev. or Discharge	**Actual Time**	Max	Discharge	Elev. or Discharge	**Actual Time**
Location	(miles)	Elev. (ft. M.S.L.)	Elev. (ft. M.S.L.)	(c.f.s.)	(hrs:min)	(hrs:min)	(hrs:min)	(ft. M.S.L.)	(c.f.s.)	(hrs:min)	(hrs:min)	(hrs:min)	Elev. (ft. M.S.L.)	(c.f.s.)	(hrs.)	(hrs:min)
Sixth Lake	0	1786.0	1786.5	1,480	0:00	0:00		1792.2	3,790	0:00	0:00					
Route 28	0.1	1774.3	1785.4	1,360	0:01	0:15		1792.2	3,785	0:01	1:30					
Fifth Lake	0.5	1706.7	1715.5	1,430	0:05	0:15		1718.0	3,785	0:05	1:55					
Fourth Lake	1.1	1706.7	1707.7	1,430	0:10	6 days + 22 hrs		1713.3	3,785	0:10	16:00					
Old Forge Dam	9.0	1706.7	1707.7					1713.3								
				Releases made from O.F. Dam will affect flood levels and timing.					Releases made from O.F. Dam will affect flood levels and timing.							

Sixth Lake Dam EAP | **Flow Estimation Sheet for Dam & Rt 28 Culvert** | Part I, Section G

NYS Dam Id. No. 140B - 0860 NY | Example Data/Information for Sixth Lake Dam and Rt. 28 Culver by HR-BRRD. | **Summary Form 2**

Hudson River - Black River Regulating District (HR-BRRD)

Sixth Lake and Route 28 Outflow Calcs.

Normal Pool Failure Example:
Failure of South Embankment Dam

South Embankment Dam

Crest Elevation:	1791.0	(ft MSL)
Minimum Base Elevation:	1774.8	(ft MSL)
Length:	120.0	(ft)
Height:	16.2	(ft)

Concrete Gravity Spillway

Concrete Spillway Crest Elevation:	1786.0	(ft MSL)
Base Elevation:	1774.8	(ft MSL)
Length:	24.6	(ft)
Height:	11.2	(ft)

Gate House

Top of Gate House Floor:	1791.0	(ft MSL)
Gate Invert:	1774.0	(ft MSL)
Length of Gate House:	15.0	(ft)
Gates (2)	H = 3, W = 3	(ft)

North Embankment Dam

Crest Elevation:	1791.0	(ft MSL)
Base Elevation:	1780.4	(ft MSL)
Length:	30.0	(ft)
Height:	10.6	(ft)

Breach Flow Calculator: (use if breach occurs)

Insert Res. Elev.:	1786.05	ft
c=	2.5	
L=	0	ft
Bottom of Breach	1774.80	ft
H=	11.3	ft
Q=cLH^(3/2)=	0	(cfs)

c= Coeficient
L= Length = Bottom width of breach
H= Height

1978 Core of Engineer's Phase 1 Report

Peak Inflow:	10,992	(cfs)
Peak Outlflow:	2,600	(cfs)

@ 3 feet overtop of earthen embankment

Downstream Rt. 28 Bridge Culvert

Est. Road Elevation:	1796.3	(ft MSL)	eq. 19.105 Ignores friction loss in culvert.
Est. Top of Culvert:	1778.6	(ft MSL)	
U.S. Inv./Channel Elevaton:	1768.6	(ft MSL)	
D.S. Inv./Channel Elevation:	1766.5	(ft MSL)	
Height of Culvert:	10.0	(ft)	
Width of Culvert:	10.0	(ft)	
Length of Culvert:	170.0	(ft)	Cd = Discharge Coeficient: Range from 0.60 to 1.00

Open Channel Flow Through Bridge Culvert:

Insert Head at Bridge:	1776.5	(ft MSL)	Insert Head at Bridge when full: 1785.4 (ft MSL)
Top of Culvert:	open		h1 (upstream head) 16.8 (ft)
Mannings n	0.035		h3 (barrel height) 10.0 (ft)
			h4 (downstream head) 10.0 (ft)
Q = (1.486/**n**)(**A**)(**R**)^2/3(**S**)^1/2			Cd = Discharge Coeficient: 0.64 Table 19.10
			Ao = Cross Sectional Area 100.0
1.486/**n**	42.46		eq. 19.105 Q=(**Cd**)(Ao)[(2g)(h1-h4)]^1/2 for simplicity
A	78.60	(s.f.)	(**Cd**)(Ao) 64.00
R	25.72		(2g) 64.4
(**R**)^2/3	8.71		(h1-h4) 6.8
S	0.013	(ft/ft)	(2g)(h1-h4) 435.3
(**S**)^1/2	0.114		[(2g)(h1-h4)]^1/2 20.865
Q	3,300	(cfs)	**Q** 1,335 (cfs)

Sixth Lake Dam: **Estimated Out-Flow (Q) above spillway without breach**

	(full open)					Left				Right					Total
	(2) Gates	**Spillway**			Q=cLH^(3/2)	**Embankment**			Q=cLH^(3/2)	**Embankment**	Total		Q=cLH^(3/2)		**Outflow**
Reservoir Elevation	Q	c	L	H	Q	c	L	H	Q	c	L	H	Q	Elevation	Q
(ft)	(cfs)	(Coef.)	(ft)	(ft)	(cfs)	(Coef.)	(ft)	(ft)	(cfs)	(Coef.)	(ft)	(ft)	(cfs)	(ft)	(cfs)
1784	220	3.1	25		0									1784	220
1785	240	3.1	25		0									1785	240
1786	256	3.1	25	0	0									1786	256
1786.5	256	3.1	25	0.5	27									1786.5	283
1787	256	3.1	25	1	78									1787	334
1788	256	3.1	25	2	219									1788	475
1789	256	3.1	25	3	403									1789	659
1790	256	3.1	25	4	620									1790	876
1791	256	3.1	25	5	866	2.5	120	0	0	2.5	30	0	0	1791	1122
1792	256	3.1	25	6	1139	2.5	120	1	300	2.5	30	1	75	1792	1770
1793	256	3.1	25	7	1435	2.5	120	2	849	2.5	30	2	212	1793	2752
1794	256	3.1	25	8	1754	2.5	120	3	1559	2.5	30	3	390	1794	3958

Part II, Section A

Dam Breach Study

Appendix K

Dam Breach Study

In accordance with NYS ECL Part 673, a dam failure analysis was performed for Sixth Lake Dam (ID#140B – 0860 NY) in Hamilton County. This analysis is limited to the following tasks:

- Task 1: Review Existing Data
- Task 2: Development of appropriate dam breach parameters
- Task 3: Development of flood wave routing model using HEC-HMS and HEC-RAS
- Task 4: Performance of dam failure analysis under two regulatory scenarios: (1) "sunny day" and (2) "stormy day" spillway design flow (SDF) conditions.
- Task 5: Preparation of flood inundation maps

Task 1 – Data Review

Data was collected from the Hudson River Black River Regulating District (HRBRRD), U.S. Natural Resources Conservation Service (NRCS), and U. S. Geological Survey (USGS) in support of this analysis.

Dam and spillway dimensions, and the stage-storage relationship for the reservoir below the normal pool elevation (Sixth and Seventh Lakes) were provided by HRBRRD. They are summarized in Section 3 of this EAP.

Shoreline elevation data for the reservoir and channel cross sections were obtained from the USGS national elevation dataset (1/3 arc-second resolution).

On November 15, 2013, field survey of the Sixth Lake Dam and Route 28 culvert was conducted by HRBRRD. The culvert is 550 feet downstream of the Sixth Lake Dam spillway. Four cross sections of the channel were taken upstream and downstream of the culvert. The culvert was measured as 10 feet by 10 feet with 3 foot high wing walls. These dimensions were the basis of the modeling of the tailwater impact of the culvert on the spillway hydraulics.

Basin runoff hydrology for Sixth Lake is based on a unit hydrograph and Probable Maximum Storm (PMS) developed by HRBRRD in 2011 for a Probable Maximum Flood (PMF) analysis.

Geospatial soils data for the watershed was downloaded from the Soil Survey Geographic (SSURGO) database maintained by NRCS.

Task 2 – Dam Breach Parameters

The dam breach size of opening and rate of failure were estimated from methods published by USACE (1997), and other empirical studies collected by the US Bureau of Reclamation Dam Safety Office (Wahl, 1998). These empirical studies provide guidelines based on the height of the dam face (Approximately 15.9 feet from downstream toe to dam top) and the volume of stored water in the

Sixth Lake Dam reservoir (approximately 10,600 acre-feet). It is assumed that Sixth Lake and Seventh Lake are one continuous hydraulic storage area.

Table K.1 summarizes the empirical guidelines of the characteristics of a Sixth Lake Dam failure described in by the Dam Safety Office literature review including one from the USACE (USACE, 1997; FERC 1987; Singh and Snorrason, 1982; Von Thun and Gillette, 1990, and MacDonald and Langridge-Monopolis, 1984).

Table K.1 Empirically-Based Estimates of Dam Breach Characteristics

Empirical Study	Final Breach Average Width	Full Formation Time
USACE (1997)	16 – 32 ft	0.1 to 4.0 hours
FERC (1987)	32 – 64 ft	0.1 to 1.0 hours
Singh and Snorrason (1982)	32 – 80 ft	0.25 to 1.0 hours
Von Thun and Gillette (1990)	60 ft	0.35 hours
MacDonald and Langridge-Monopolis (1984)	N/A	0.73 hours

There is a dam breach routine in HEC-HMS that creates a progressively widening outlet to a storage reservoir object at a specified rate. **Table K.2** summarizes the input parameters used in the HEC-RAS simulation for a failure of the Sixth Lake Dam.

Table K.2 Dam Breach HEC-RAS Input Parameters

Parameter	Value	Source
Final Bottom Width	50 ft	Empirical studies and channel restriction
Final Bottom Elevation	1775 ft M.S.L.	Local topography
Left Side Slope	2.0	Limits of local topography
Right Side Slope	2.0	Limits of local topography
Breach Weir Coefficient	2.6	Assumption
Full Formation Time	0.25 hour	Approximate average empirical studies
Failure Mode	Overtopping	Assumption

The initial pool elevation in each dam failure simulation is a function of the associated initial flow conditions and the rating curve developed for the dam. The “Sunny Day” breach has an initial water surface elevation equal to the normal pool (el. 1786.5 feet M.S.L). The “Stormy Day” breach occurs when the water surface elevation is equal to the peak spillway design flood (SDF) pool (el. 1792.2 feet M.S.L.). Task 4 describes a sensitivity analysis in which the “stormy day” breach occurs just as the reservoir pool is exceeding the dam top (el. 1790.9 feet M.S.L.) although this scenario was not mapped.

Task 3 – Flood Routing Model

To determine the peak inundation extents resulting from a Sixth Lake Dam failure, a HEC-HMS model of the Fulton Chain of Lakes basins was adapted to simulate the spillway design flood (SDF) and the two dam failure modes: "Sunny Day" failure and "Stormy Day" failure. The results of this modeling are presented in Task 4. **Attachment K.1** includes the HEC-HMS model input.

Model Extents

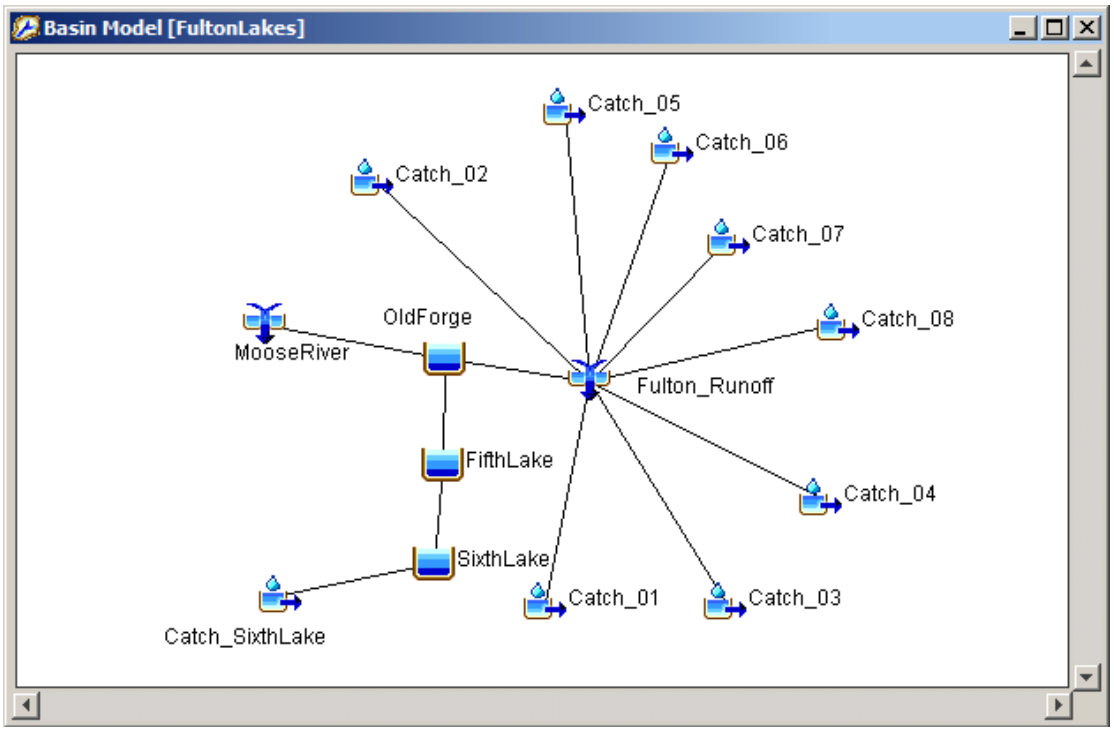
A HEC-HMS model was built to represent the Fulton Chain of Lakes and the contributing runoff catchments. The model includes three reservoirs shown in **Table K.3** each with their own stage-storage-discharge relationship: (1) Sixth Lake Dam reservoir including Seventh Lake, (2) Fifth Lake, and (3) First through Fourth Lakes all modeled as a hydraulically continuous.

Table K.3 HEC-HMS Modeled Reservoirs

Reservoir	D/S Control	Normal Pool
Sixth Lake and Seventh Lake	Sixth Lake Dam	1786.5 feet M.S.L.
Fifth Lake	None	1707.7 feet M.S.L.
First through Fourth Lakes	Old Forge Dam	1706.2 feet M.S.L.

The downstream extent of the model is the Old Forge Dam at the outlet of First Lake. **Figure K.1** shows a schematic of the HEC-HMS model catchments and reservoirs.

Figure K.1 – Schematic of HEC-HMS Model



Basin Runoff Parameters

The Fulton Chain of Lakes watershed was delineated into eight catchments between 2.3 to 6.6 square miles in area each, with a ninth catchment representing the Sixth Lake watershed (17.1 square miles). The Sixth Lake watershed runoff parameters including a unit hydrograph were obtained from a 2011 analysis prepared by HRBRRD. The ArcHydro extension for ArcGIS 10.1 was used to delineate the other eight catchments using the USGS national elevation dataset (1/3 arc-second resolution). **Figure K.2** shows the nine model catchments.

Rainfall losses for the eight new catchments were calculated using the NRCS runoff curve number (CN) methodology (USDA, 2004). The CN of an area is a function of the property of the soils and the land use. Geospatial soils data for the watershed was downloaded from the Soil Survey Geographic (SSURGO) database maintained by NRCS. Land use data was classified to the cover type categories in the curve number tables in TR-55 (USDA, 1986). Spatially averaged curve numbers were calculated for each sub-basin from the geospatial union of the soils and land use data. Rainfall losses for the Sixth Lake catchment are based on the calibrated deficit and constant loss parameters calculated in the 2011 study.

The basin lag and time of concentration were calculated for each of the new eight catchments using the velocity method as described by the NRCS (USDA, 2010). The total Time of Concentration for each sub-basin is the sum of the travel times associated with sheet flow and shallow concentrated flow. The ArcHydro GIS extension was used to determine the longest path of flow for each catchment. The Lag Time used to define the unit hydrograph response for each catchment was assumed to be 60% of the Time of Concentration based on Equation 15-3 in the National Engineering Handbook (USDA, 2010). The Lag Time for each catchment was input to the HEC-HMS model.

Runoff transform for the Sixth Lake catchment was based on a unit hydrograph developed during the 2011 hydrologic and hydraulic study. The runoff characteristics and rainfall losses used in the model are listed in **Table K.4**.

Table K.4 – Basin Runoff Characteristics

Drainage Catchment	Area (mi^2)	Runoff (CN)	Basin Lag (min)
Catch_01	3.8	84.0	124.8
Catch_02	2.3	84.0	81.7
Catch_03	3.7	84.0	80.5
Catch_04	5.0	84.0	142.4
Catch_05	2.8	84.0	163.2
Catch_06	6.2	84.0	44.3
Catch_07	6.6	84.8	718.7
Catch_08	4.9	87.5	66.7
Sixth Lake[1]	17.1	N/A	N/A

1 Basin runoff uses unit hydrograph methodology from 2011 HRBRRD H&H study

A baseflow of 2 cfs per square mile of drainage area was assumed for each catchment.

Reservoir Storage Parameters

The stage-storage-discharge relationship for each of the three reservoirs in the HEC-HMS model was calculated from the best available data.

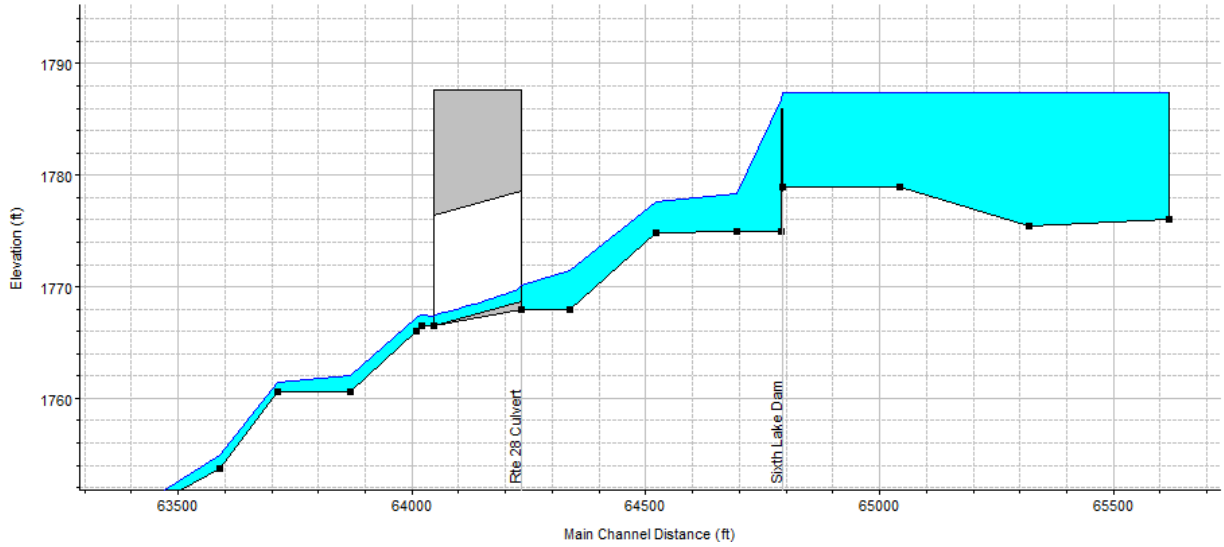
The stage-storage relationships for above the normal pool of all three modeled reservoirs were calculated using shoreline elevation data obtained from the USGS national elevation dataset (1/3 arc-second resolution). The stage-storage relationship for the Sixth Lake Dam reservoir below the normal pool was obtained from HRBRRD.

Outlet Rating Curve Parameters

The stage-discharge relationship for each of the three reservoirs in the HEC-HMS model was calculated from the best available data.

For the development of the Sixth Lake rating curve (stage-discharge relationship), a detailed steady-stage hydraulic model was prepared in HEC-RAS representing the dam, spillway, gates, and channel downstream including the box culvert under Route 28. Cross sections were obtained using HEC-GeoRAS with the spatially available USGS national elevation dataset (1/3 arc-second resolution) for the banks, and the November 2013 survey for the thalwag. **Figure K.3** shows a profile of the model in the vicinity of the spillway and culvert.

Figure K.3 – Profile of HEC-RAS model of Sixth Lake Dam and d/s Channel including Route 28 Culvert



A uniform main channel Manning's coefficient of n = 0.01 was selected based on the physical characteristics of the channel identified in photographs taken in the field (Chow, 1959). **Attachment K.2** includes the HEC-RAS model input.

The channel downstream of the Sixth Lake Dam including the Route 28 culvert constrict the flow passing through the spillway and create a significant tailwater under extreme flow conditions. The rating curve of the channel immediately downstream of the dam was input as the tailwater condition for the outlet structures used to define the reservoir discharge in HEC-HMS. This rating curve was obtained from the HEC-RAS model. The capacity of the Route 28 culvert before it overtops the minimum roadway elevation (el. 1787.6 feet M.S.L.) is 1,720 cfs.

The HEC-HMS outlet structure used to define the discharge from Fifth Lake is a cross section cut from the USGS national elevation dataset.

The rating curve used to define the discharge from First through Fourth Lakes was obtained from detailed HEC-RAS modeling developed in support of the dam failure analysis for Old Forge Dam.

Task 4 – Dam Failure Simulations

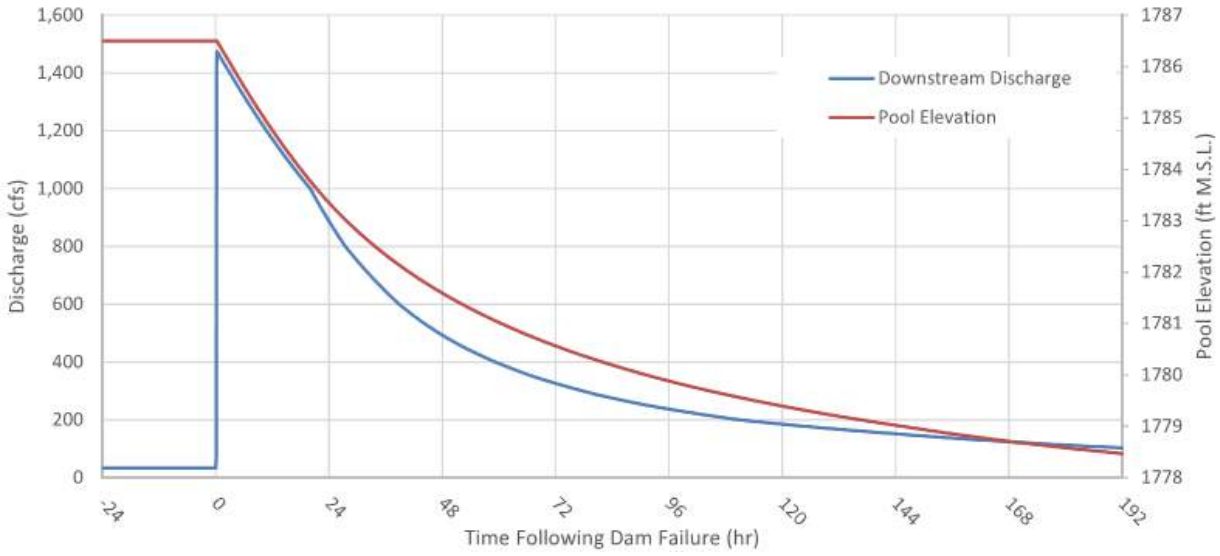
There are two dam failure scenarios required for inundation mapping by NYSDEC: (1) "sunny day", and (2) "stormy day". The "sunny day" scenario occurs spontaneously with a normal pool and normal baseflow condition. The "Stormy Day" scenario occurs at the peak of the SDF pool and coinciding with the peak SDF discharge. The dam breach defined under Task 2 was simulated using the HEC-HMS model described in Task 3 under both the "Sunny Day" and "Stormy Day" conditions. **Table K.5** summarizes the progression of the dam failure floodwave between the Sixth Lake Dam and Fourth Lake.

Results – "Sunny Day"

The "sunny day" scenario is a dam failure that occurs spontaneously with the reservoir filled to the normal pool elevation (el. 1786.5 feet M.S.L.) during normal condition baseflow in over the spillway and in the downstream reaches.

At the Sixth Lake Dam, the "sunny day" failure produces a peak discharge of 1,475 cfs within 15 minutes of the start of the failure. Following this peak, the discharge recedes as the Sixth Lake and Seventh Lake pools drain through the breach opening, a process that takes a day and a half to reduce the discharge by half, and four days for the reservoir to drop by just 6.0 feet. **Figure K.4** shows the dam breach hydrograph at the site of the failed dam and the corresponding reservoir pool elevation.

Figure K.4 – "Sunny Day" Dam Failure Hydrograph and Pool Elevation at Sixth Lake Dam Site



The main channel and Route 28 culvert downstream of the Sixth Lake Dam severely restrict the passage of flow for extreme discharges. However, the culvert at Route 28 does have the capacity to pass the peak "sunny day" dam failure floodwave without over topping the roadway. The floodwave

arrives at the upstream face of the culvert within a minute of the initial dam failure, with the water surface rising by 14.2 feet within 15 minutes of the dam failure.

Downstream of the culvert, Fifth Lake is impacted by the dam failure floodwave within 5 minutes of the initial breach, rising by 7.8 feet within 15 minutes of the dam failure. The rise is due in part to the constricted outlet channel which has a roadway crossing (South Shore Road). This roadway is overtopped by approximately half a foot for no less than 12 hours following the dam failure. The peak discharge leaving Fifth Lake, slightly attenuated by the storage in the Lake, is 1,360 cfs.

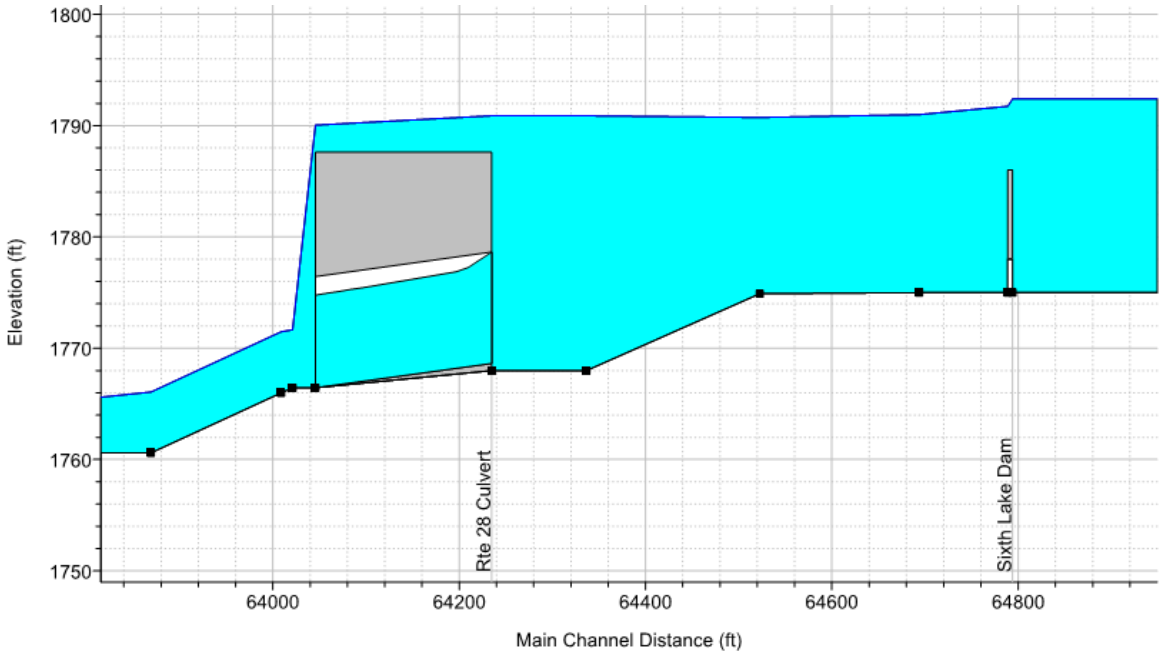
The floodwave arrives at Fourth Lake within 10 minutes of the dam failure upstream. Including the estimated baseflow from the Fourth through First Lake drainage area (35.3 square miles), the peak discharge is 1,430 cfs. As Sixth Lake and Seventh Lake drain through the dam breach, the floodwave causes a 1.5 foot rise above the normal pool over the course of nearly 7 days before slowly subsiding.

Results – "Stormy Day"

The "Stormy Day" scenario is a dam failure that occurs at the peak of the spillway design flood (SDF) conditions for the Sixth Lake Dam. For the Sixth lake Dam, the SDF is associated with the half Probable Maximum Flood (PMF) condition. The peak SDF pool elevation is el. 1792.5 feet M.S.L. corresponding to a peak discharge of 2,740 cfs. The peak pool elevation occurs 2 hours after the peak runoff from the half PMF, and more than 18 hours after the peak rainfall from the associated half Probable Maximum Storm (PMS).

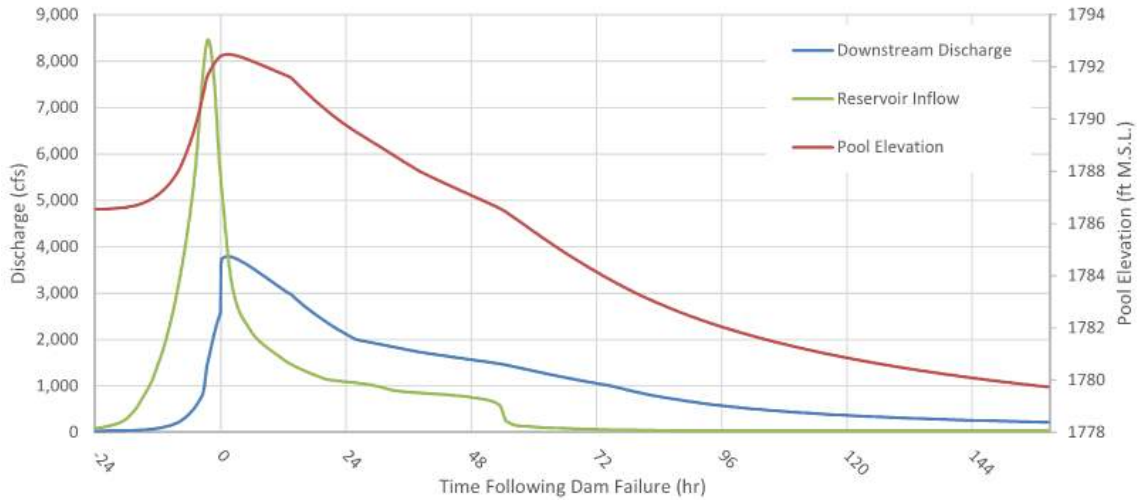
The main channel and Route 28 culvert downstream of the Sixth Lake Dam severely restrict the passage of flow for extreme discharges. During the SDF, the Route 28 culvert cannot pass the peak discharge without overtopping. This creates a significant tailwater on the discharge over the dam and spillway as shown in HEC-RAS output for the flood profile associated with the peak SDF discharge shown in **Figure K.5**.

Figure K.5 – Flood Profile for Peak SDF Discharge (Q = 2,740 cfs)



The dam failure occurs when the water surface elevation reaches the peak SDF pool elevation. The peak SDF pool elevation occurs when the spillway (el. 1786.0 ft M.S.L.) and top of dam (el. 1790.9 feet M.S.L.) have already been overtopped and face a significant downstream tailwater created in part by the overtopping of the Route 28 culvert. As the dam breach widens, the resulting downstream flood wave is constrained by the tailwater. **Figure K.6** shows the hydrograph of inflow to the Sixth Lake Dam reservoir, the pool elevation, and the hydrograph of the dam discharge which includes the dam breach.

Figure K.6 – Stormy Day Dam Failure Hydrograph, SDF Inflow Hydrograph and Pool Elevation at Sixth Lake Dam site



At the Route 28 Culvert, the "stormy day" dam failure creates an incremental increase in the peak water surface elevation of 1.3 feet above what it would otherwise be during a SDF without a dam failure.

Immediately prior to the dam failure, the water surface elevation in Fifth Lake has already risen by 9.4 feet from the runoff discharges associated with the half PMF. The dam failure creates an incremental rise of an additional 0.9 feet. The arrival of the peak water surface elevation from the dam failure occurs 1 hour and 55 minutes after the initial failure. The South Shore Road crossing the outlet of Fifth Lake is overtopped prior to the dam failure from the half PMF scenario.

The arrival of the dam failure floodwave in Fourth Lake makes an incremental rise of 0.3 feet above the peak pool associated with the half PMF. The peak inflow from the catchments contributing directly to Fourth through First Lakes is 54,230 cfs and occurs 18 hours before the "stormy day" Sixth Lake Dam failure. The peak WSEL occurs 16 hours after the dam failure, but is primarily driven by runoff unassociated with the Sixth Lake drainage area.

A sensitivity analysis was conducted to determine whether a "stormy day" failure that occurs when the reservoir pool reaches the top of dam (el. 1790.9 feet M.S.L.), which is 1.6 feet lower than the peak SDF pool (el. 1792.5 ft M.S.L.) , resulted in significantly lower downstream hazards. Modeling shows that the peak discharge immediately downstream of the dam discharge is only 5% lower (3,580 cfs) and still exceeds the capacity of the Route 28 culvert. The results presented in the inundation mapping conducted in Task 5 represent the "stormy day" failure with a peak SDF pool.

Task 5 – Flood Inundation Maps

Post-processing of the HEC-HMS peak reservoir pool elevations was performed using the GIS extension Spatial Analyst. A geospatial peak water surface for both condition was intersected with the available topography to determine the peak extent of flooding.

Figure K7 show the peak extent of inundation for the "sunny day" dam failure scenario starting immediately downstream of the Sixth Lake Dam and extending to the eastern corner of Fourth Lake. The water surface rise in Fourth Lake associated with the "sunny day" dam failure is less than 2 feet and occurs gradually over 7 days. It was not considered a significant enough hazard to map.

Figure K.8 shows the peak extent of inundation for the "stormy day" dam failure scenario starting immediately downstream of the Sixth Lake Dam and extending to the eastern corner of Fourth Lake. The incremental water surface rise in Fourth Lake associated with the "stormy day" dam failure is less than 0.3 feet. It was not considered a significant enough hazard to map.

References

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Part II, Section B

Internal Review, Training, Updates, Testing & Distributing the EAP

INTERNAL CORRESPONDENCE

SUBJECT: Sample EAP Outline;
Internal Review/Training/Testing/Updates/Distribution

---

1. Annual internal review/training for the EAP was conducted

   on_____ at _____.
   (date) (location)

2. The following were in attendance: (See Sign-In Sheet)

3. Suggested topics to review and discuss are as follows:

   A. EAP Review

   - EAP Contacts are verified annually. Additionally, contacts are changed on master contact list when notified by EAP Plan Holders.
   - Changes in Upstream or Downstream Occurrence.
   - Verification of Plan Locations.
   - Verification of Posted Notice Locations.
   - Annual Test Date (after Internal Review/Training, and before the end of the year if possible.

   B. Training

   - Chain of Command (Day/Night of Non-Business Hours)
   - Notification Flow Charts & Procedures
   - General Responsibilities
   - Inundation Maps

   C. Critique Items – The following items are provided as suggestions for discussion with Internal Review/Training attendees. No written response is required to these items at this time.

   - What type of emergency scenario to choose for “Call-Out Drill”?
   - Any concerns regarding telephone contacts.
   - How to shorten EAP implementation time
   - Additional revisions EAP (if any) as a result of the Internal Review/Training.

D. Other review topics:

4. After reviewing the EAP, revisions/updates are made annually and sent to all EAP Plan Holders.

INTERNAL CORRESPONDENCE

DATE:
TO: File,_____

SUBJECT: Emergency Action Plan Adequacy Review
Project Name:_____

The current status of this plan is as follows:

1. The EAP is reviewed annually for its content and adequacy.

2. Further checks include the following items:

   A. _____ No revision is required, other than the phone lists.
   B. _____ Revision(s) may be required because of possible flood plain hazard due to:

   _____ Road Construction
   _____ Residential Construction
   _____ Commercial Construction
   _____ New Public Recreation
   _____ New Private Recreation
   _____ New Water Impounding Structure
   _____ New Water Diversion Structure
   _____ New Water-Related Facilities
   _____ Other _____
   _____

3. A copy of the current EAP for this project is in a prominent location and readily accessible to Regulating District personnel at the following locations:
   _____
   _____
   _____

   Also, posted notices instructing observer to call the Engineering Staff are located at the following locations:
   _____
   _____
   _____

   Name,
   _____

   Title,
   _____

Emergency Situation – Annual Test Communication

1. This is _____, _____with the Hudson River
(Name) (Title)
Black River Regulating District (Regulating District).

For Annual Test Only

We are conducting our annual test of the Sixth Lake Dam Emergency Action Plan.

This is only a test. If it were not a test, I would advise you of the following information:

2. The emergency situation would be identified and confirmed by visual inspection at the time of the incident at Sixth Lake Dam, upstream of Fifth Lake, Hamilton County as being either a **High Flow, Non-Failure, Potential Failure or Imminent Failure** Condition. After the identification of the Emergency Condition, the specific information of the Condition would be outlined by the following items:

3. **High Flow** condition is developing due to _____
_____
_____
_____
(Briefly describe situation)

Or

Non-Failure Condition is being investigated by the Regulating District.
Failure has not occurred however, the Regulating District has made the following changes to the release from the Sixth Lake Dam in order to mitigate failure. The changes are as follows,_____
_____
_____
_____
_____
(Briefly describe situation)

Or

Potential-Failure Condition is being investigated by the District.

Failure has not occurred however, the Regulating District has made the following changes to the release from the Sixth Lake Dam in order to mitigate failure. The changes are as follows,_____
_____
_____
_____
_____
(Briefly describe situation)

Or

Imminent-Failure Condition has been identified by the Regulating District.

Failure (has occurred/is imminent) due to _____
_____
_____
_____
(Briefly describe situation)

Emergency Situation – Annual Test Communication (Continued)

4. The emergency situation was identified at about _____.
(hours)

5. We expect flooding of the flood-prone areas in the vicinity of the (river/creek).
_____
_____
_____
_____

5a. If conditions worsen, flooding may occur.
_____
_____
_____
_____

6. Current Emergency flow is _____, estimated at the Sixth Lake Dam.
(c.f.s.)

7. The estimated time of peak flood at the Sixth Lake Dam will be at _____on_____.
(hours) (date)

8. The estimated peak flood at the Sixth Lake Dam will be _____.
(c.f.s.)

9. When the Emergency condition becomes upgraded or downgraded, you will be notified by Regulating District Engineering Staff.

For Annual Test Only

I REPEAT, THERE IS NO FAILURE AT THIS TIME. THIS IS ONLY A TEST.

THANK YOU FOR YOUR COOPERATION.

(Extra Info. - Optional)

You are encouraged to test your own internal plans/procedures including notifications to key decision makers in your organization. However, please use caution when transmitting this information so as not to cause alarm to the general public or businesses in the area (Hospitals, Schools, Businesses, etc.). If you receive any media inquiries regarding this exercise, please refer them to me (Name - Title -Phone No.).

Part II, Section C

Notification Posted Notice

NOTICE

If:

Dam(1) Failure is observed in progress or through inspection is deemed imminent,

Then, Immediately Notify:

Hudson River – Black River Regulating District Staff

Robert Foltan **(Chief Engineer)**	**518-465-3491 (Albany Office)** **518-461-6927 (Cell)**
(Administrator)	**518-661-5535 (Sacandaga Field Office)** **315-788-5440 (Watertown Office)**
Michael Mosher **(Operations Engineer)**	**518-465-3491 (Albany Office)** **518-366-8959 (Cell)**

Control Center:

Hudson River - Black River Regulating District
54 State Street, Suite 501
Albany, NY 12207

(1) The Term "Dam" Includes Earth Embankment, Masonry/Concrete Structures, Spillway, and Gates

Part II, Section D

EAP Contacts & Distribution List

Sixth Lake Dam EAP
Hudson River - Black River Regulating District
NYS Dam ID No. 140 - 0860

CONTACT - DISTRIBUTION LIST

Edit Date:	Call Sequence No.	Alternates Identified	EAP Binder No.	Organization/Agency	Dam Facility	Title	Name	Emergency Phone	Office Phone	Mobile Phone	Fax / Alternate	Other Phone	2nd Line	3rd Line	E-Mail
07/07/20			2	HR-BRRD	Sixth Lake Dam	Chief Engineer	Robert Foltan, P.E.		518-465-3491	518-461-6927		518-439-3486	54 State Street, Suite 501	Albany, NY 12207	rfoltan@hrbrrd.ny.gov
				Conference Call with HR-BRRD Staff. (Review Outline for Emergency Notification) - HR-BRRD Staff Assists with Notifications											
11/06/19	1		11	Hamilton County Sheriff's Office		Sheriff	Karl Abrams	518-548-6111	518-548-3113				102 County View Drive, P.O. Box 210	Lake Pleasant, NY 12108	Sheriff@HamiltonCountyNY.gov
08/13/24			10	Hamilton County Office of Emergency Services		Emergency Services Manager	Timothy P. O'Neill		518-548-6223	518-332-3554			102 County View Drive, P.O. Box 44	Lake Pleasant, NY 12108	toneill@hamiltoncountyny.gov
02/11/14				NY State police		Desk Trooper	Desk Trooper	518-897-2000 24 hrs.	518-897-2083		518-891-5587		1097 RT. 86 P.O. Box 100	Ray Brook, NY 12977-0100	
06/18/18		Alternate	6	NY State Police - Troop "B" Headquarters		Sergeant, Troop "B" EMNCO	Scott Barrett	518-897-2000 24 hrs.	518-897-2083	518-925-0198 (Cell/Text)	518-891-5587		1097 RT. 86 P.O. Box 100	Ray Brook, NY 12977-0100	scott.barrett@troopers.ny.gov
716/2021		Alternate	29	NY State Police		Station Commander	Randy McKeever	518-897-2083	518-648-5833		518-648-0312		6192 Route 28	Indian Lake, NY 12842	randy.mckeever@troopers.ny.gov
10/17/19			13	Inlet Police Department		Police Chief	Ron Johnston	315-866-0974	315-357-6699		315-357-6266		160 Route 28, P.O. Box 707	Inlet, NY 13360	police@inletny.com
12/12/23			14	Town of Inlet Fire Department		Fire Chief	Don Townsend	315-866-0974	315-357-5091	315-334-3951			1 Limekiln Lake Road, P.O. Box 512	Inlet, NY 13360-0300	dallas0765@gmail.com
10/17/19			12	Town of Inlet		Supervisor	John Frey		315-369-2204				P.O. Box 179	Inlet, NY 13360	supervisor@inletny.com
06/28/11	2			Herkimer County Emergency Services		Emergency Dispatcher		315-866-0974					71 Reservoir Road	Herkimer, NY 13350	
03/06/20		Alternate	24	Herkimer County Emergency Management Office		Emergency Manager	John Raymond	315-866-0974	315-867-1212	315-868-5501	315-867-5873	315-794-3525	71 Reservoir Road	Herkimer, NY 13350	jraymond@herkimercounty.org
08/13/24			16	Town of Webb Police Department		Police Chief	Interim Police Chief Sgt. Riolo	315-866-0974	315-369-6515 Dispatch				P.O. Box 157	Old Forge, NY 13420	triolo@townofwebbpd.com
08/07/15			19	Town of Eagle Bay Fire Department		Fire Chief	Shane Beach	315-866-0974	315-357-3414				5516 State Rt. 28	Eagle Bay, NY 13331	
11/22/16			18	Town of Webb Fire Department		Fire Chief	Charlie Bogradus		315-369-3424				P.O. Box 1170, 116 Fulton St.	Old Forge, NY 13420	oldforgefd@frontiernet.net
04/19/22			15	Town of Webb		Supervisor	Bonnie Baker		315-369-3121	315-360-5480			P.O. Box 157	Old Forge, NY 13420	towsupv@frontiernet.net
07/29/20			17	Herkimer County Sheriff		Sheriff	Scott F. Scherer	315-867-1252	315-867-1167		315-867-1354	315-823-0820	320 North Main Street	Herkimer, NY 13350	sscherer@herkimercounty.org
12/08/22			23	Town of Webb UFSD		Superintendent's Secretary	Mary Kate Russell		315-369-3222 ext. 2102	315-369-5234		315-369-2147	3002 NYS Rt. 28, P.O. Box 38	Old Forge, NY 13420	mrussell@towschool.org
11/14/22			25	Webb Professional Office Bldg		Office Manager	Carletta Darling		315-369-6619	315-404-1333	315-369-6533		114 South Shore Road	Old Forge, NY 13420	cdarlin1@mvhealthsystem.org
10/01/21	3		8	National Weather Service - Forecast Office		Sr. Service Hydrologist	Britt Westergard	518-626-7572 24 hrs.					1400 Washington Avenue	Albany, NY 12222	britt.westergard@noaa.gov; alb.stormreport@no
11/27/19			28	National Weather Service - Forecast Office		Kirk Apffel	Hydrology Program Manager	716-565-9404	716-565-0013				587 Aero Drive	Buffalo, NY 14225	kirk.apffel@noaa.gov
06/26/12	4			**Conference Call with County Emergency Manager's**											
06/01/17			1	HR-BRRD	Sixth Lake Dam	Operations Engineer	Michael Mosher, P.E.		518-465-3491	518-366-8959 (Cell/Text)			54 State Street, Suite 501	Albany, NY 12207	mmosher@hrbrrd.ny.gov
10/13/23	1		33	New York State Office of Emergency Management (NYSOEM)/Planning Section		State Watch Center - S.W.C. (24/7)		24-hour Watch Center 518-292-2200	518-292-2200				1220 Washington Ave. Building 22	Albany, NY 12226-2251	nysoem.planning@dhses.ny.gov
02/27/23		Alternate	7	New York State Office of Emergency Management (NYSOEM)		Region III- Regional Director	Mike Nardolillo	24-hour Watch Center 518-292-2200	518-292-2360	518-701-0669			20 Elm St, Suite 105	Glens Falls, NY 12801	mike.nardolillo@dhses.ny.gov

Sixth Lake Dam EAP
Hudson River - Black River Regulating District
NYS Dam ID No. 140 - 0860

CONTACT - DISTRIBUTION LIST

Part II, Section D

Edit Date:	Call Sequence No.	Alternates Identified	EAP Binder No.	Organization/Agency	Dam Facility	Title	Name	Emergency Phone	Office Phone	Mobile Phone	Fax / Alternate	Other Phone	2nd Line	3rd Line	E-Mail
12/20/18		Alternate	32	New York State Office of Emergency Management (NYSOEM)		Regional Director - Region IV	Gerald Pedersen		315-438-8907	315-663-4191	315-438-3350		10 Alder Drive Suite 103	East Syracuse, NY 13057-1219	gerald.pedersen@dhses.ny.gov
11/10/16	2			National Grid Call Center		Shift Supervisor		315-460-2110 315-460-2130							
10/13/23	3		22 (.pdf)	American Red Cross		Disaster Program Manager	Cortney Shatraw	315-405-6112	315-782-4410	315-405-6112	315-782-4438		203 N Hamilton Street	Watertown, NY 13601	cortney.shatraw@redcross.org
11/02/22	4		9	NYSDEC, Dam Safety		Section Chief	Donald Canestrari	24-hr/emergency 518-486-4326	Office: 518-402-8185	cell: 518-852-0415		Backup Office: 518-402-8138	625 Broadway, 4th Floor	Albany, NY 12233-3504	donald.canestrari@dec.ny.gov; courtney.white@dec.ny.gov
07/14/21			4	HR-BRRD	Sixth Lake Dam	HR-BR Area Administrator			518-661-5535				737 Bunker Hill Road	Mayfield, NY 12117	
07/20/20	1		30	HR-BRRD		Black River Area Superintendent	Michael Dicob		315-376-6672	315-778-9883	315-376-8835		116 Necessary Dam Road	Lowville, NY 13367	mdicob@hrbrrd.ny.gov
11/02/22	1		31	HR-BRRD		Black River Area Plant Operator	Josh Rice		315-376-6672	315-286-7350	315-376-8835		116 Necessary Dam Road	Lowville, NY 13367	jrice@hrbrrd.ny.gov
12/19/18	1		26	HR-BRRD		Engineering Assistant	Thomas Baker		518-661-5535	315-842-0438	518-661-5720		737 Bunker Hill Road	Mayfield, NY 12117	tbaker@hrbrrd.ny.gov
10/25/19	1			HR-BRRD		Conklingville Dam, Principal Plant Operator	Eric Johnson		518-696-3215	518-848-2651	518-696-3215	518-654-7706	233 Co. Rt. 8	Hadley, NY 12835	ejohnson@hrbrrd.ny.gov
10/17/19	1		20	HR-BRRD		Office Binder - HRAO/Albany	Albany Office Copy		518-465-3491				54 State Street, Suite 501	Albany, NY 12207	hrao@hrbrrd.ny.gov
10/17/19			27	HR-BRRD		Executive Director	John Callaghan		518-465-3491	518-590-4785			54 State Street, Suite 501	Albany, NY 12207	jcallaghan@hrbrrd.ny.gov
11/01/22			26	HR-BRRD		Director of Administrative Services	Stephanie Ruzycky		518-661-5535	518-848-4262	518-661-5720	518-883-6238	737 Bunker Hill Road	Mayfield, NY 12117	sruzycky@hrbrrd.ny.gov
12/08/17			3	HR-BRRD		Office Binder - BRFO	Watertown Office Copy, Attn.: Megan Cole/Kimberly Scott		315-376-6672	315-778-9883	315-376-8835		116 Necessary Dam Road	Lowville, NY 13367	mcole@hrbrrd.ny.gov
03/04/20			26	HR-BRRD		Office Binder - SFO	Mayfield Office Copy, Attn.: Stephanie Porter		518-661-5535		518-661-5720		737 Bunker Hill Road	Mayfield, NY 12117	sacfo@hrbrrd.ny.gov
04/28/11			21	HR-BRRD		Office Binder - BRAO	Watertown Office Copy, Attn.: Megan Cole/Kimberly Scott		315-788-5440		315-779-1794		317 Washington Sreet, Room 614	Watertown, NY 13601	brao@hrbrrd.ny.gov
08/13/24	← Latest Revision		33												

Part II, Section E

Site Specific Concerns

Extreme Event Operation Plan & Notification Procedure

Site Specific Concerns

The NYS Route 28 Bridge/Culvert should be monitored for washout due to high flows from Sixth Lake Dam.

The **Extreme Event Operation Plan and Notification Procedures** (**Plan** and **Procedures**) for the Sixth Lake Dam, EAP, has been developed to provide a description of the current operations plan during high flow events and to improve coordination with emergency management agencies and adjacent communities.

The intent of the **Plan** is to improve the current system [of notification] for affected upstream and downstream inhabitants and property owners, when there is a warning of an impending high flow event...

The **Procedures** incorporate both reservoir elevation and flow when considering the appropriate emergency level classification, response and notification of upstream and downstream inhabitants during **High Flow** emergency conditions.

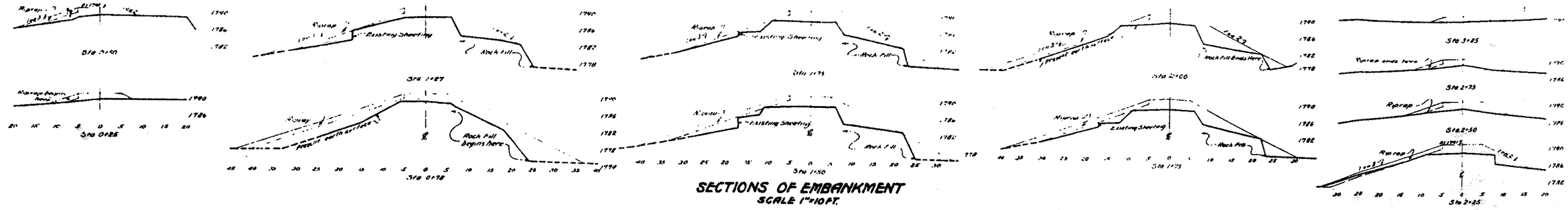
Elevation (ft) / Outflow (cfs)	Operation Procedures	Probable Impacts	Action taken
WSEL < 1786.0 = Spillway Crest			
Q > 0	Follow general operating plan and procedures. Discharge through outlet gates to target daily elevation.	None	None
WSEL > 1786.0			
Q = 0 - 250	Maximize discharge through gates to increase discharge as needed to lower WSEL < 1786.0.	None	None
Q = 250 - 500	Maximize discharge through gates to increase discharge as needed to lower WSEL < 1786.0. Field staff monitor 8 am – 4 pm, daily (Monday -Friday).	Minor flooding of land around Sixth & Seventh Lakes.	Issue notification through NYALERT notification system.
Q > 500	Maximize discharge through gates to increase discharge as needed to lower WSEL < 1786.0. Field staff monitor 8 am – 4 pm, daily (Monday -Friday) and weekends as directed by Chief Engineer.	Flooding of houses/garages around Sixth & Seventh Lakes.	Activate EAP High Flow Condition.

Part II, Section F

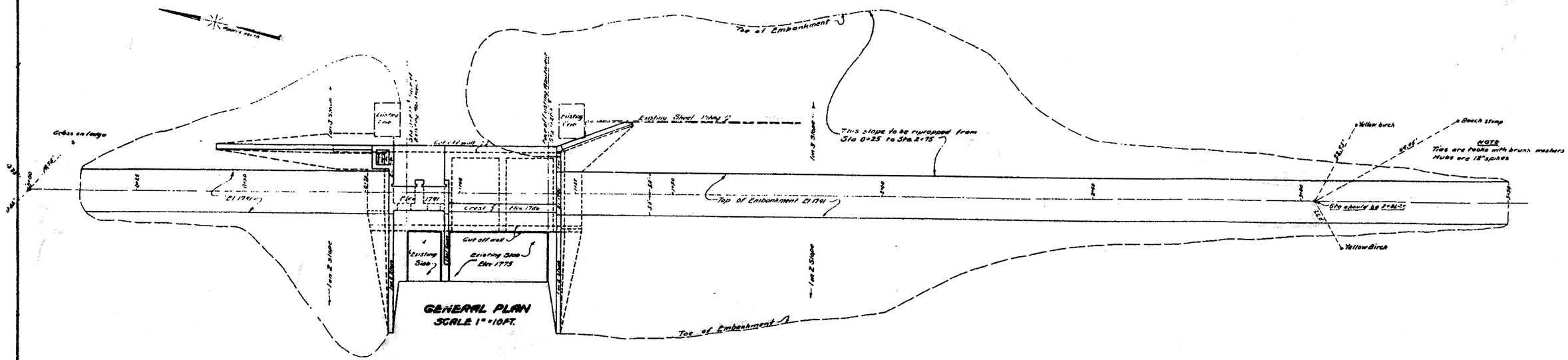
EAP Signatures

Part II, Section G

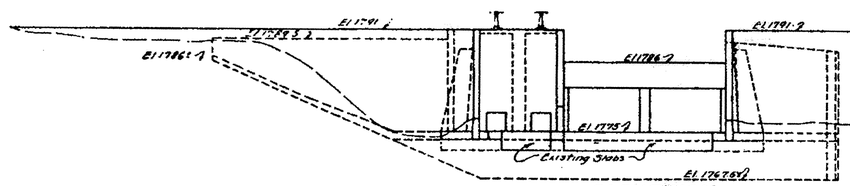
Project Drawings



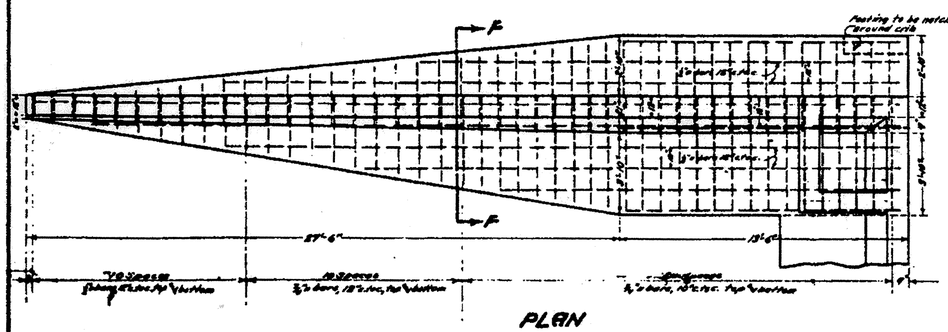
SECTIONS OF EMBANKMENT
SCALE 1"=10FT.

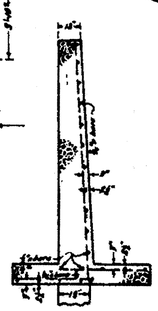


GENERAL PLAN
SCALE 1"=10FT.



ELEVATION
SCALE 1"=10FT.





PLAN, ELEVATION and SECTION OF UPSTREAM NORTH WING WALL
SCALE 1"=3FT.

CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PHASE 1 - NATIONAL DAM SAFETY PROGRAM
SIXTH LAKE DAM
PLATE III AUGUST 1978

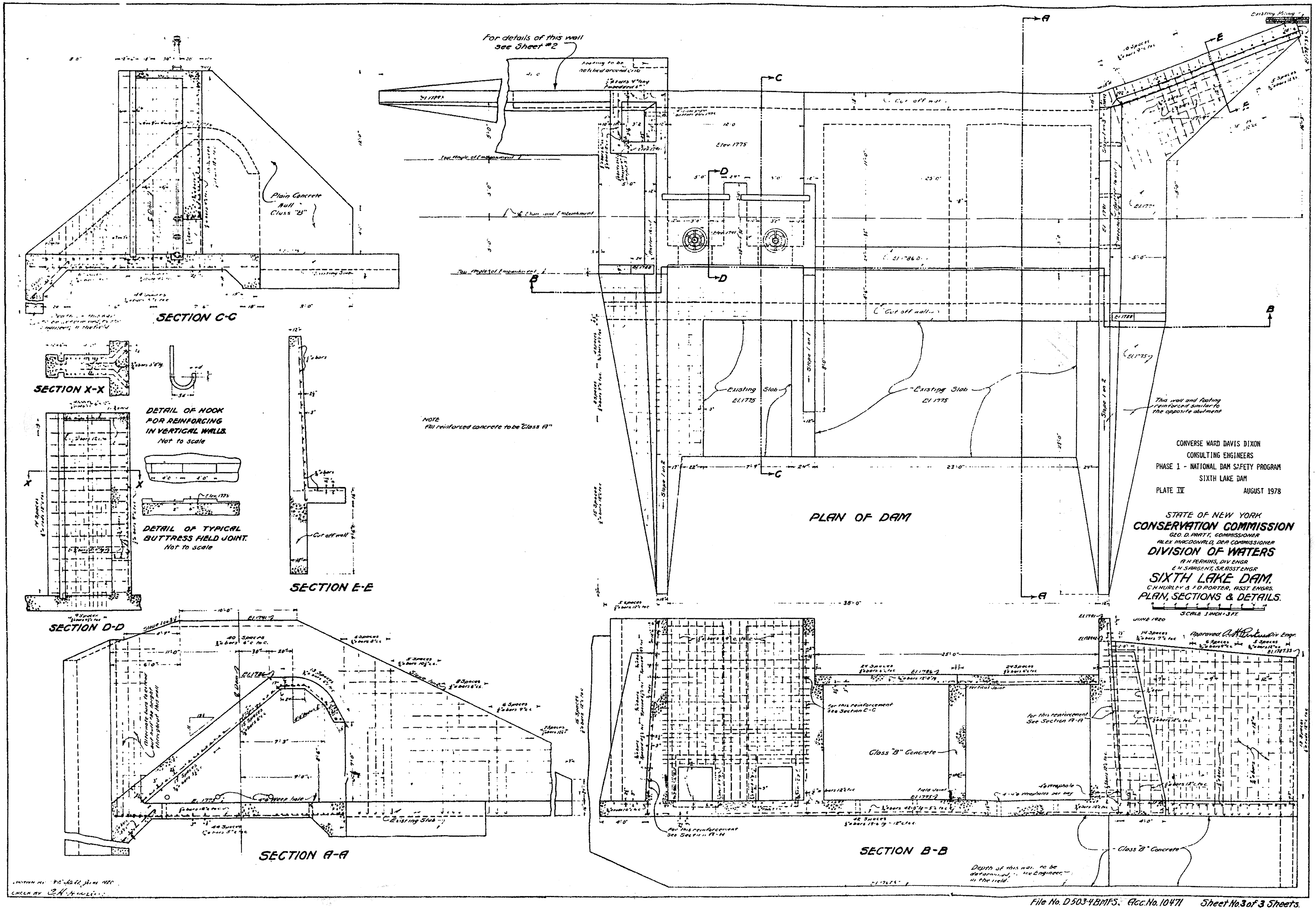
STATE OF NEW YORK
CONSERVATION COMMISSION
GEO. D. PRATT, COMMISSIONER
ALEX MACDONALD, DEP. COMMISSIONER
DIVISION OF WATERS
R.K. PARSONS, DIV. ENGR.
E.M. SARGENT, JR. ASST. ENGR.
SIXTH LAKE DAM
C.H. HURLEY & F.D. PORTER, ASST. ENGRS.
GENERAL LAYOUT AND DETAILS
SCALES AS INDICATED

June 1930

Approved: A.K. Parsons Div. Engr.

Drawn by ... W.S. Hall Jan. 1930.
Check by ... C.H. Hurley ...

File No. D 503-4 EMFS, Acc. No. 10470 Sheet No. 2 of 3 Sheets.


SECTION C-C
SECTION X-X
DETAIL OF HOOK FOR REINFORCING IN VERTICAL WALLS. Not to scale
DETAIL OF TYPICAL BUTTRESS FIELD JOINT. Not to scale
SECTION E-E
SECTION D-D
SECTION A-A
SECTION B-B
PLAN OF DAM
For details of this wall see Sheet #2
Plain Concrete Bull Class "B"
NOTE All reinforced concrete to be Class "A"
Existing Slab El.1775
Cut off wall
Class "B" Concrete
This wall and footing reinforced similar to the opposite abutment
Depth of this wall to be determined by the Engineer in the field.
CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PHASE I - NATIONAL DAM SAFETY PROGRAM
SIXTH LAKE DAM
PLATE IV
AUGUST 1978
STATE OF NEW YORK
CONSERVATION COMMISSION
GEO. D. PRATT, COMMISSIONER
ALEX MACDONALD, DEP. COMMISSIONER
DIVISION OF WATERS
A.H. PERKINS, DIV. ENGR.
E.H. SARGENT, SR. ASST. ENGR.
SIXTH LAKE DAM.
C.H. HURLEY & F.D. PORTER, ASST. ENGRS.
PLAN, SECTIONS & DETAILS.
SCALE 1 INCH = 3 FT.
JUNE 1920
Approved Div. Engr.
File No. D503-4BMFS. Acc. No. 10471 Sheet No. 3 of 3 Sheets.

NOTICE

If:

Dam(1) Failure is observed in progress or through inspection is deemed imminent,

Then, Immediately Notify:

Hudson River – Black River Regulating District Staff

Robert Foltan **(Chief Engineer)**	**518-465-3491 (Albany Office)** **518-461-6927 (Cell)**
(Administrator)	**518-661-5535 (Sacandaga Field Office)** **315-788-5440 (Watertown Office)**
Michael Mosher **(Operations Engineer)**	**518-465-3491 (Albany Office)** **518-366-8959 (Cell)**

Control Center:

Hudson River - Black River Regulating District
54 State Street, Suite 501
Albany, NY 12207

(1) The Term "Dam" Includes Earth Embankment, Masonry/Concrete Structures, Spillway, and Gates