United States Department of Agriculture

WELCOME

Public Information Meeting

Review of Rehabilitation Alternatives

Middle Creek Watershed

PA-637 (Walker Lake Dam)

Snyder County Conservation District

10541 Route 522

Middleburg, Pennsylvania

Wednesday, January 21th, 2026

6:00 to 8:00 pm ET

Natural Resources Conservation Service

nrcs.usda.gov/

Meeting Logistics

- Instructions to Online Attendees
- Chat Function
- Online Attendees Muted and Unable to Speak
- Meeting Handouts/Sign In Sheet

Welcome & Introductions

- **Jason Winey,** Snyder County Conservation District
- **Ruth Hocker,** PA Fish and Boat Commission
- **Mark Buckwalter,** NRCS Watershed Programs

- **North Wind Resource Partnership**
  - **Tony Ruhlman,** Project Manager
  - **Joe Troxell,** Dams Engineer Lead
  - **Michael Robertson**, Technical Lead

pennsylvania
FISH & BOAT COMMISSION

USDA

North Wind
Resource Partnership

Natural
Resources
Conservation
Service

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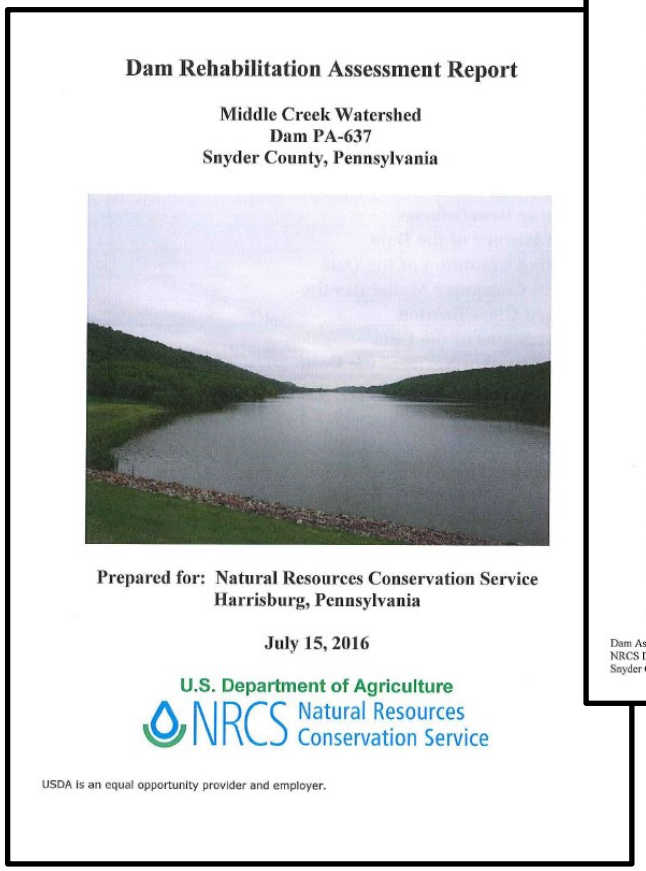
Meeting Agenda

- Background / Purpose & Need
- NRCS Rehabilitation Process
- Investigations & Analyses Performed to Date
- Dam Deficiencies
- Alternatives Formulation Process
- Alternatives
- Preferred Alternative
- Collect Public Input



Dam Rehabilitation Assessment Report

Middle Creek Watershed
Dam PA-637
Snyder County, Pennsylvania

Prepared for: Natural Resources Conservation Service
Harrisburg, Pennsylvania

July 15, 2016

U.S. Department of Agriculture
NRCS Natural Resources Conservation Service

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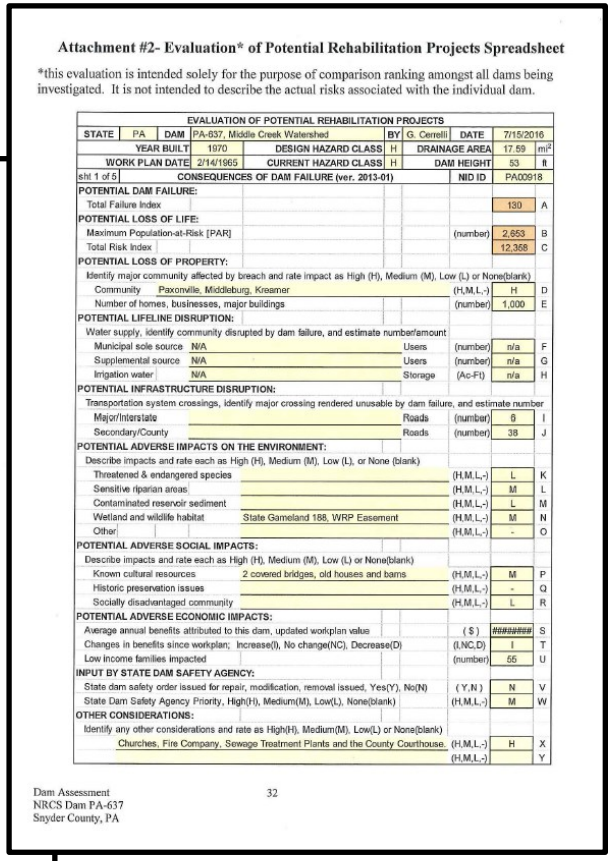

Attachment #2- Evaluation* of Potential Rehabilitation Projects Spreadsheet

*this evaluation is intended solely for the purpose of comparison ranking amongst all dams being investigated. It is not intended to describe the actual risks associated with the individual dam.

EVALUATION OF POTENTIAL REHABILITATION PROJECTS

STATE	PA	DAM	PA-637, Middle Creek Watershed	BY	G. Cerrelli	DATE	7/15/2016		
YEAR BUILT		1970	DESIGN HAZARD CLASS	H	DRAINAGE AREA		17.59	mi^2	
WORK PLAN DATE		2/14/1965	CURRENT HAZARD CLASS	H	DAM HEIGHT		53	ft	
sht 1 of 5	CONSEQUENCES OF DAM FAILURE (ver. 2013-01)					NID ID	PA00918		
POTENTIAL DAM FAILURE:									
Total Failure Index							130		A
POTENTIAL LOSS OF LIFE:									
Maximum Population-at-Risk [PAR]						(number)	2,653		B
Total Risk Index							12,368		C
POTENTIAL LOSS OF PROPERTY:									
Identify major community affected by breach and rate impact as High (H), Medium (M), Low (L) or None(blank)									
Community	Paxonville, Middleburg, Kreamer					(H,M,L,-)	H		D
Number of homes, businesses, major buildings						(number)	1,000		E
POTENTIAL LIFELINE DISRUPTION:									
Water supply, identify community disrupted by dam failure, and estimate number/amount									
Municipal sole source	N/A				Users	(number)	n/a		F
Supplemental source	N/A				Users	(number)	n/a		G
Irrigation water	N/A				Storage	(Ac-Ft)	n/a		H
POTENTIAL INFRASTRUCTURE DISRUPTION:									
Transportation system crossings, identify major crossing rendered unusable by dam failure, and estimate number									
Major/Interstate					Roads	(number)	9		I
Secondary/County					Roads	(number)	38		J
POTENTIAL ADVERSE IMPACTS ON THE ENVIRONMENT:									
Describe impacts and rate each as High (H), Medium (M), Low (L), or None (blank)									
Threatened & endangered species						(H,M,L,-)	L		K
Sensitive riparian areas						(H,M,L,-)	M		L
Contaminated reservoir sediment						(H,M,L,-)	L		M
Wetland and wildlife habitat	State Gameland 188, WRP Easement					(H,M,L,-)	M		N
Other						(H,M,L,-)	-		O
POTENTIAL ADVERSE SOCIAL IMPACTS:									
Describe impacts and rate each as High (H), Medium (M), Low (L) or None(blank)									
Known cultural resources	2 covered bridges, old houses and barns					(H,M,L,-)	M		P
Historic preservation issues						(H,M,L,-)	-		Q
Socially disadvantaged community						(H,M,L,-)	L		R
POTENTIAL ADVERSE ECONOMIC IMPACTS:									
Average annual benefits attributed to this dam, updated workplan value						($)	########		S
Changes in benefits since workplan; Increase(I), No change(NC), Decrease(D)						(I,NC,D)	I		T
Low income families impacted						(number)	55		U
INPUT BY STATE DAM SAFETY AGENCY:									
State dam safety order issued for repair, modification, removal issued, Yes(Y), No(N)						(Y,N)	N		V
State Dam Safety Agency Priority, High(H), Medium(M), Low(L), None(blank)						(H,M,L,-)	M		W
OTHER CONSIDERATIONS:									
Identify any other considerations and rate as High(H), Medium(M), Low(L) or None(blank)									
	Churches, Fire Company, Sewage Treatment Plants and the County Courthouse.					(H,M,L,-)	H		X
						(H,M,L,-)			Y

Dam Assessment
NRCS Dam PA-637
Snyder County, PA

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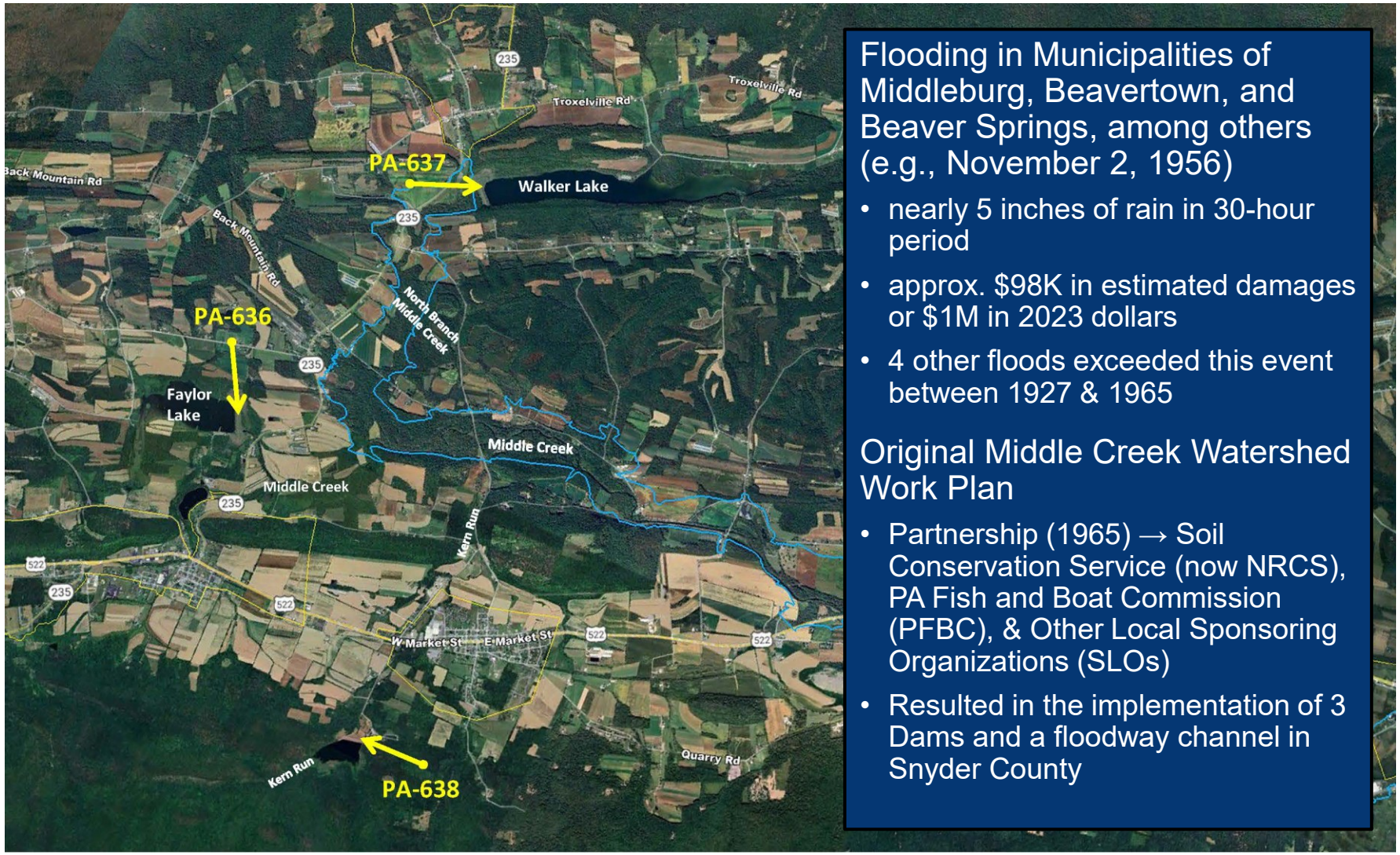
Dam Location & Background

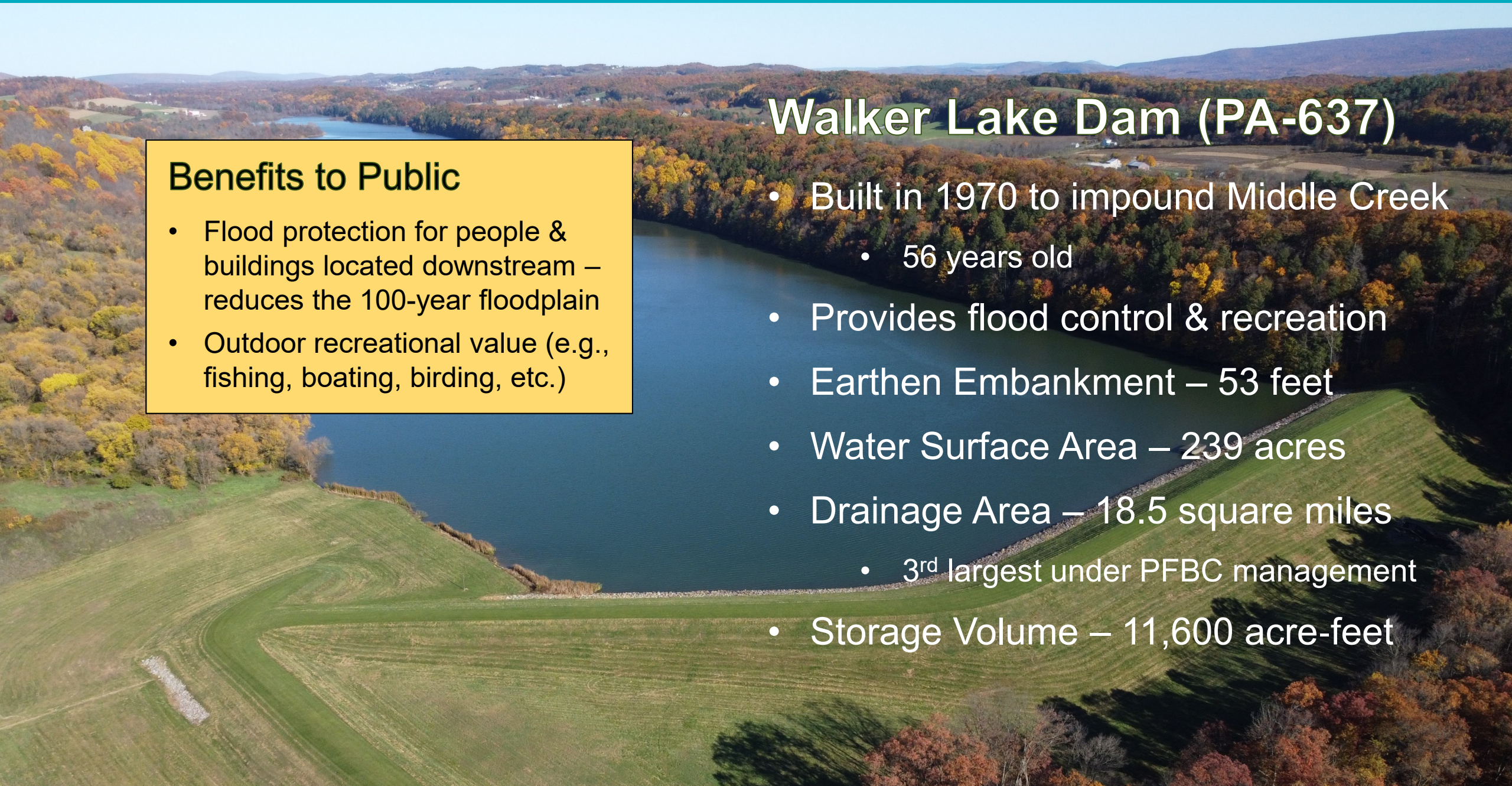


Flooding in Municipalities of Middleburg, Beavertown, and Beaver Springs, among others (e.g., November 2, 1956)

- nearly 5 inches of rain in 30-hour period
- approx. $98K in estimated damages or $1M in 2023 dollars
- 4 other floods exceeded this event between 1927 & 1965

Original Middle Creek Watershed Work Plan

- Partnership (1965) → Soil Conservation Service (now NRCS), PA Fish and Boat Commission (PFBC), & Other Local Sponsoring Organizations (SLOs)
- Resulted in the implementation of 3 Dams and a floodway channel in Snyder County



Walker Lake Dam (PA-637)

- Built in 1970 to impound Middle Creek
  - 56 years old
- Provides flood control & recreation
- Earthen Embankment – 53 feet
- Water Surface Area – 239 acres
- Drainage Area – 18.5 square miles
  - 3rd largest under PFBC management
- Storage Volume – 11,600 acre-feet

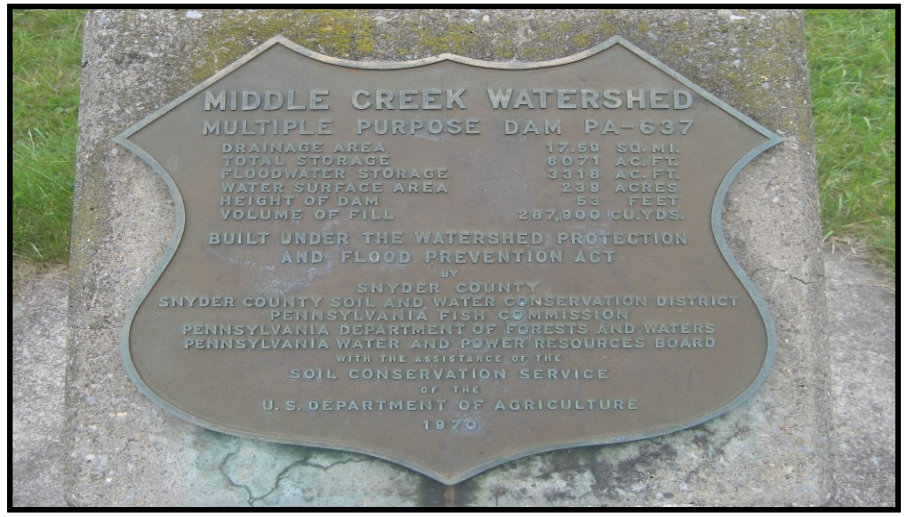
Benefits to Public

- Flood protection for people & buildings located downstream – reduces the 100-year floodplain
- Outdoor recreational value (e.g., fishing, boating, birding, etc.)

Purpose and Need

Purpose

- Continue to provide flood protection to the watershed and support public recreation for the next 100 years while minimizing environmental, economic, and social impacts.



Need

- The existing dam structures do not meet current safety and performance standards.

The dam is *not* less safe than the day it was built.

- Inspected quarterly by PFBC and annually by PADEP-Dam Safety
- No imminent dam safety hazards identified.
- The dam is generally aging gracefully

PFBC is taking a *proactive* approach by pursuing rehabilitation of the dam.

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Walker Lake Dam (PA-637)

AS BUILT

MIDDLE CREEK WATERSHED PROJECT

SNYDER, MIFFLIN, and UNION COUNTIES, PENNSYLVANIA

MULTIPLE PURPOSE DAM PA-637

RECREATION and FLOOD PREVENTION

DRAINAGE AREA	17.59	Sq. Mi.
TOTAL STORAGE	6071	Ac. Ft.
FLOODWATER RETARDING STORAGE (TO EMERGENCY SPILLWAY CREST)	3318	Ac. Ft.
SEDIMENT and RECREATION STORAGE	2753	Ac. Ft.
WATER SURFACE AREA (AT PERMANENT POOL (RECREATION POOL)	239	Acres
HEIGHT of DAM	53	Feet
VOLUME of FILL	286,100	Cu. Yds.

BUILT UNDER THE WATERSHED PROTECTION & FLOOD PREVENTION ACT

by

SNYDER COUNTY SOIL and WATER CONSERVATION DISTRICT
PENNSYLVANIA FISH COMMISSION
PENNSYLVANIA DEPARTMENT of FORESTS and WATERS
PENNSYLVANIA WATER and POWER RESOURCES BOARD

with the assistance of the

SOIL CONSERVATION SERVICE
of the
U. S. DEPARTMENT of AGRICULTURE
1967

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The Watershed Rehabilitation Process

Initial Evaluation

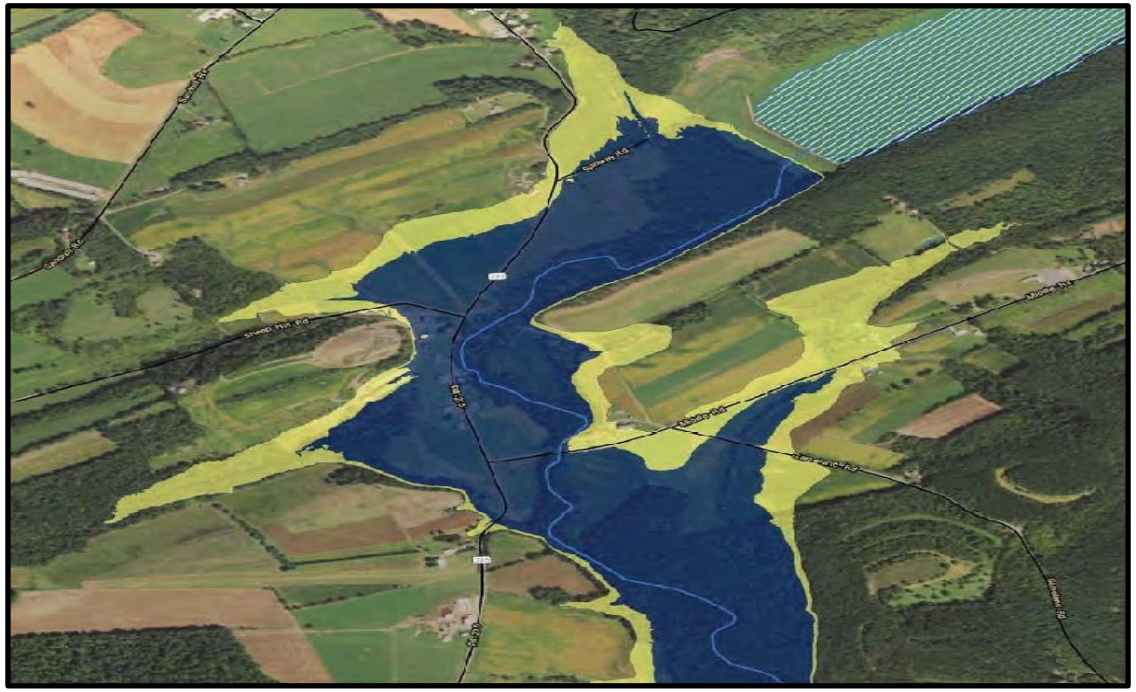
Planning
- ~ 2 Years

Design
- ~ 2 Years

Construction
- ~ 2 Years

Watershed Rehabilitation Planning

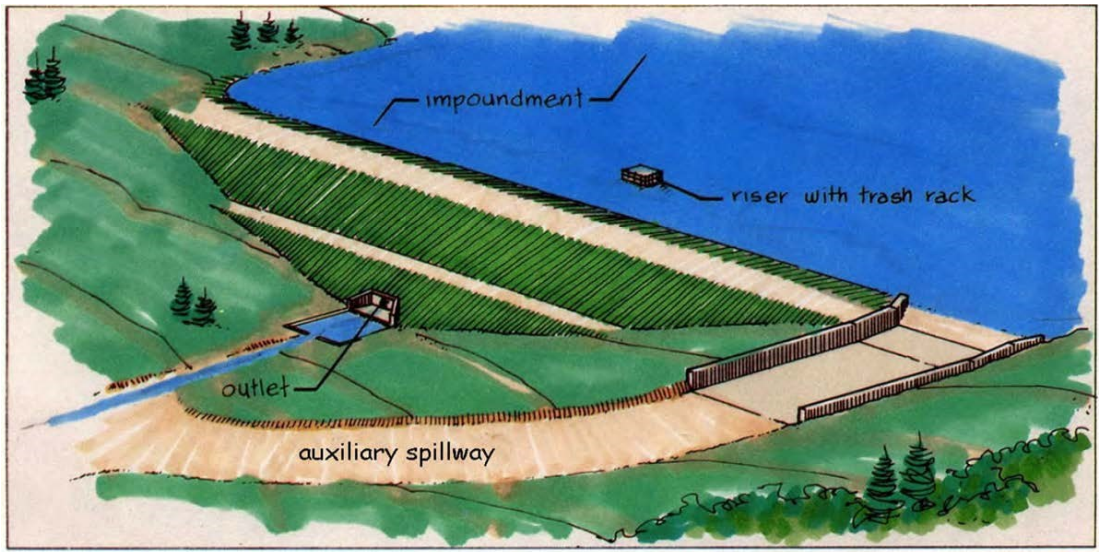
- ***Funding*** mechanism in place
  - *Small Watershed Rehabilitation Amendments of 2000* - NRCS can assist communities with rehabilitation of their aging dams
- ***Proactive*** effort to reduce potential effects on life and property
  - *Assess* baseline conditions
  - *Develop* and *Evaluate* alternative plans
  - *Select* an appropriate course of action or remedy



Watershed Rehabilitation Planning

- PFBC worked with NRCS to evaluate how the dam was designed compared to current criteria and best practices.
- Considers all possible alternatives to address deficiencies.
- Evaluates alternatives against environmental and public concern.
- Determines if rehabilitation (or another alternative) should be funded with tax dollars.

Typical Earth Dam

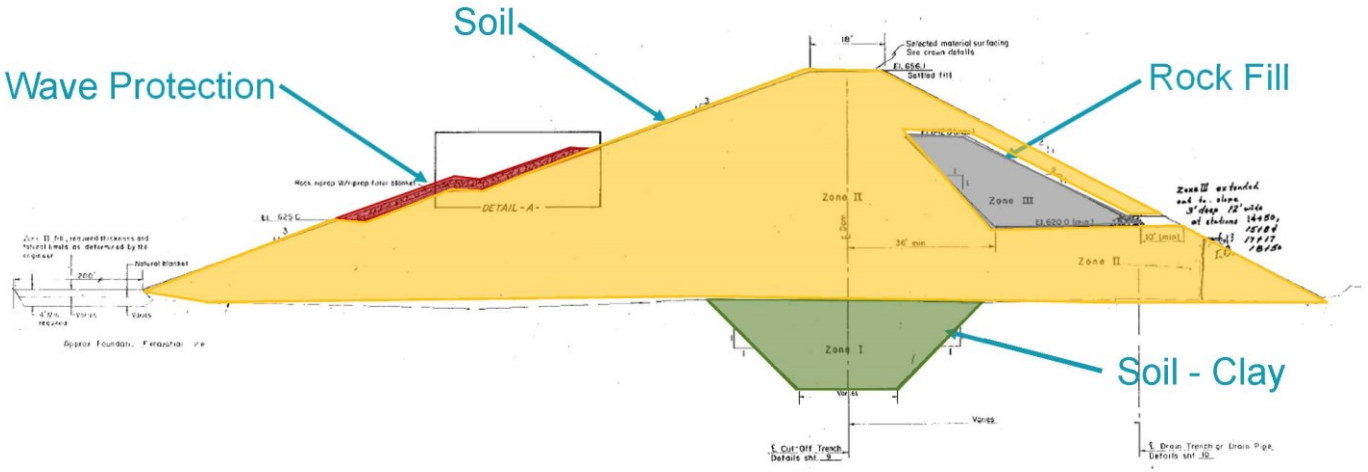


Main Features

- Earth Embankment
- Principal Spillway: Concrete Intake Structure
- Auxiliary Spillway: Vegetated Channel

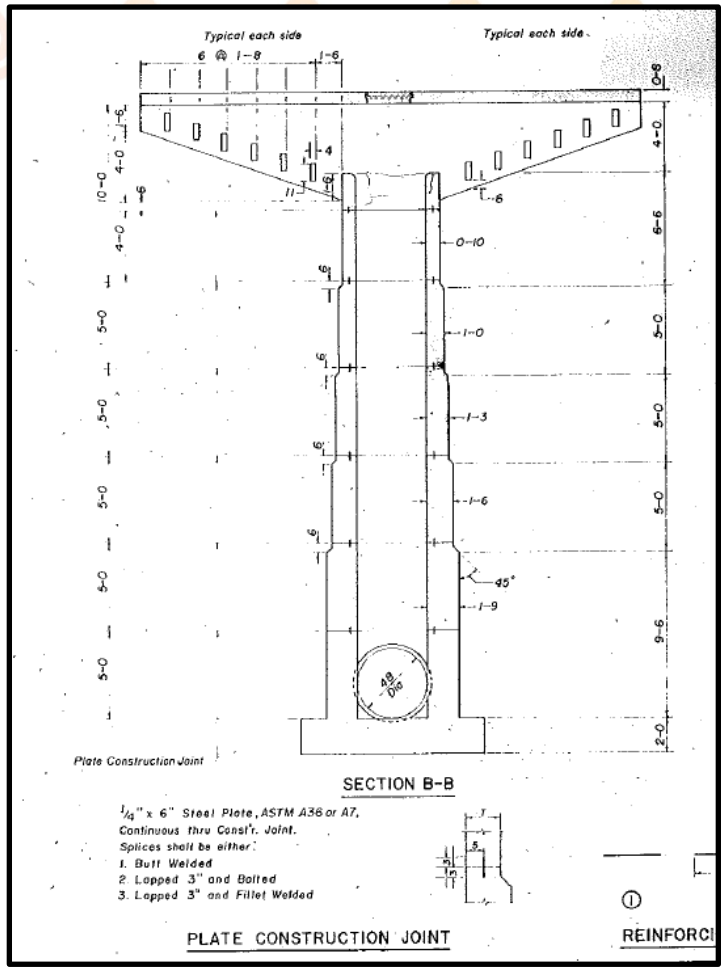
Earthen Embankment

- 53 feet in height
- 1,300 feet in length
- 18 feet in top width
- 3:1 slope (upstream face)
- 2:1 slope (downstream face)



Principal Spillway (PSW) Infrastructure

- Concrete Riser Structure with Trash Rack
- Reinforced Concrete Pipe (i.e., outlet pipe)
- Concrete Impact Basin

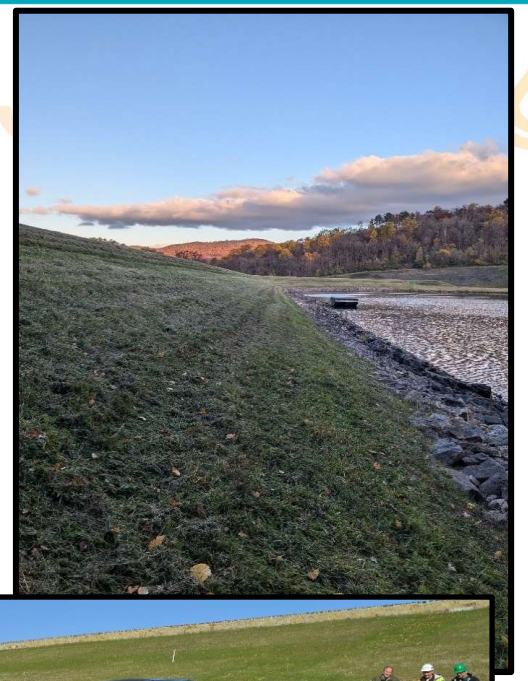


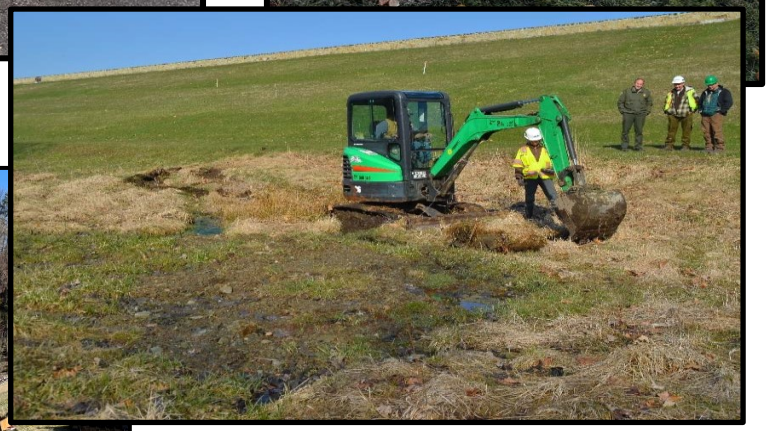
Auxiliary Spillway (ASW)

- Founded on shale
- Vegetated with concrete sill or ridge
- 170 feet in width
- 12.5 feet in height
- 680 feet in length

Analyses & Investigations

- Inspections of Structural & Earthen Components
- Internal Pipe Inspection
- Geotechnical Investigation
- Detailed Surveys including Topographic
- Bathymetry & Sediment
- Hydrology & Hydraulic Analyses
- Structural & Geotechnical Analyses
- Environmental & Cultural Resources Investigation





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Analyses & Investigations (cont'd)

- Inspections of Structural & Earthen Components
- CCTV Inspection of Internal Pipes

Cold Water Release

48" Conduit Pipe

PSW Riser & Pond Drain

Impact Basin

Analyses & Investigations (cont'd)

Geotechnical Investigation

- 10 borings completed

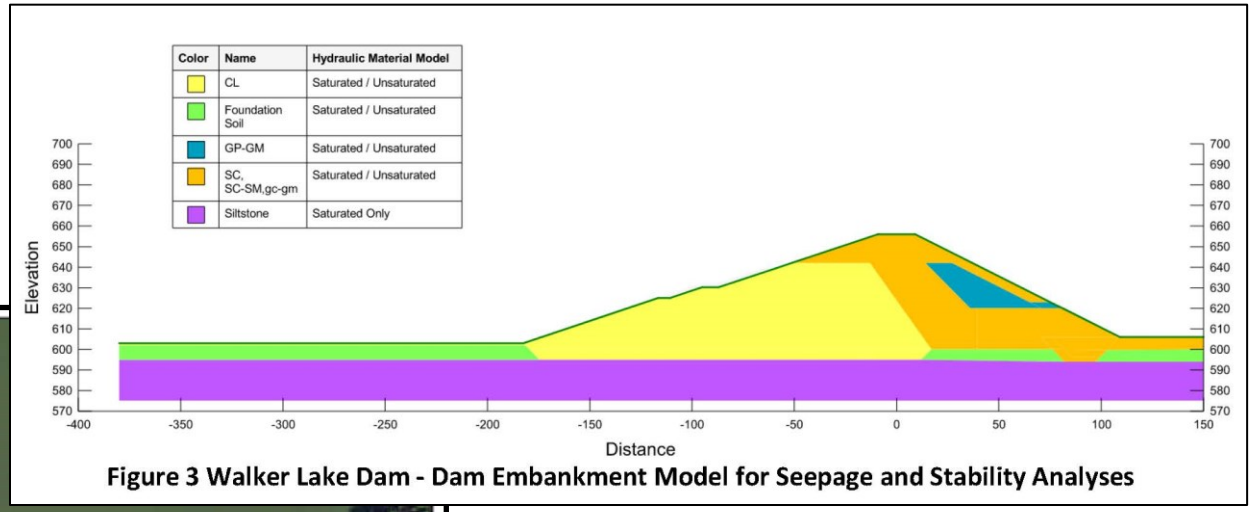
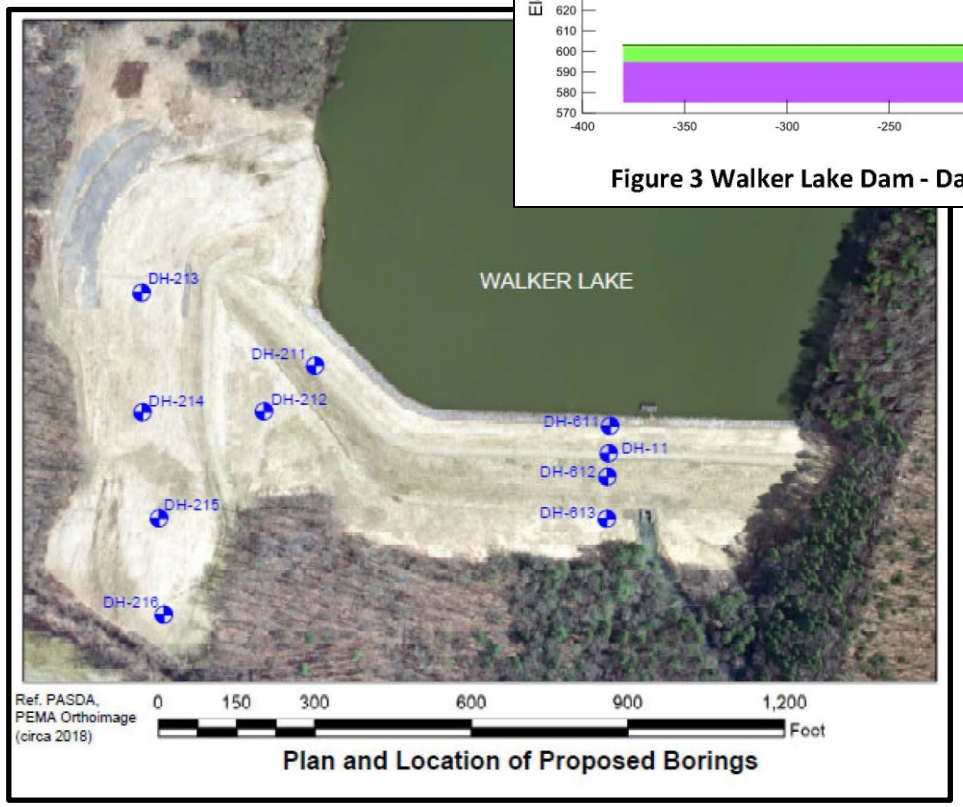


Figure 3 Walker Lake Dam - Dam Embankment Model for Seepage and Stability Analyses



Plan and Location of Proposed Borings

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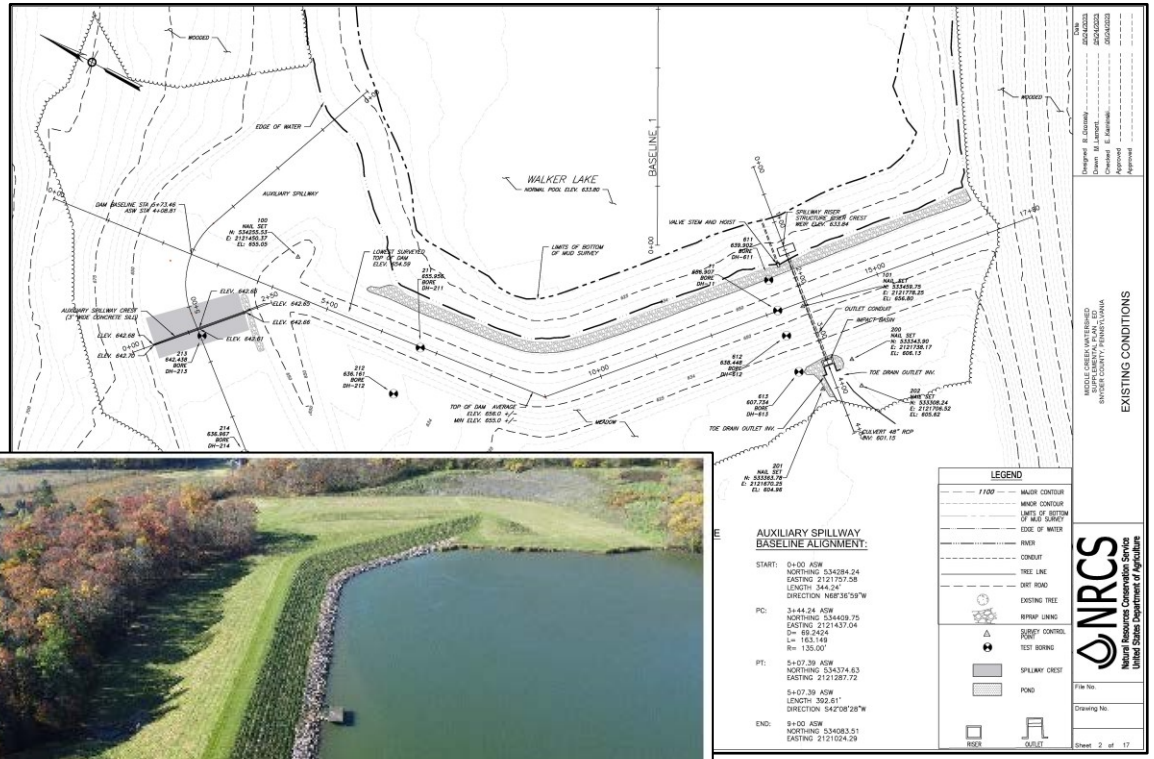
Analyses & Investigations (cont'd)

Topographic & Sediment Surveys

Table 3: Datum Equality

Dam Structure	Historic Drawing Elevation	2023 Topographic Survey Elevation	Elevation Difference (ft) (Historic Drawing – Topographic Survey)
Auxiliary Spillway Weir	643.6	642.7	0.9
Principal Spillway Crest	634.9	633.8	1.1
Outlet Invert	602.5	601.2	1.3
Top of Riser (Average)	639.6	638.6	1.0
Average Datum Conversion (As-built – Survey)			**1.1**

Figure 1. Topographic Survey Limits



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Analyses & Investigations (cont'd)

Topographic & Sediment Surveys

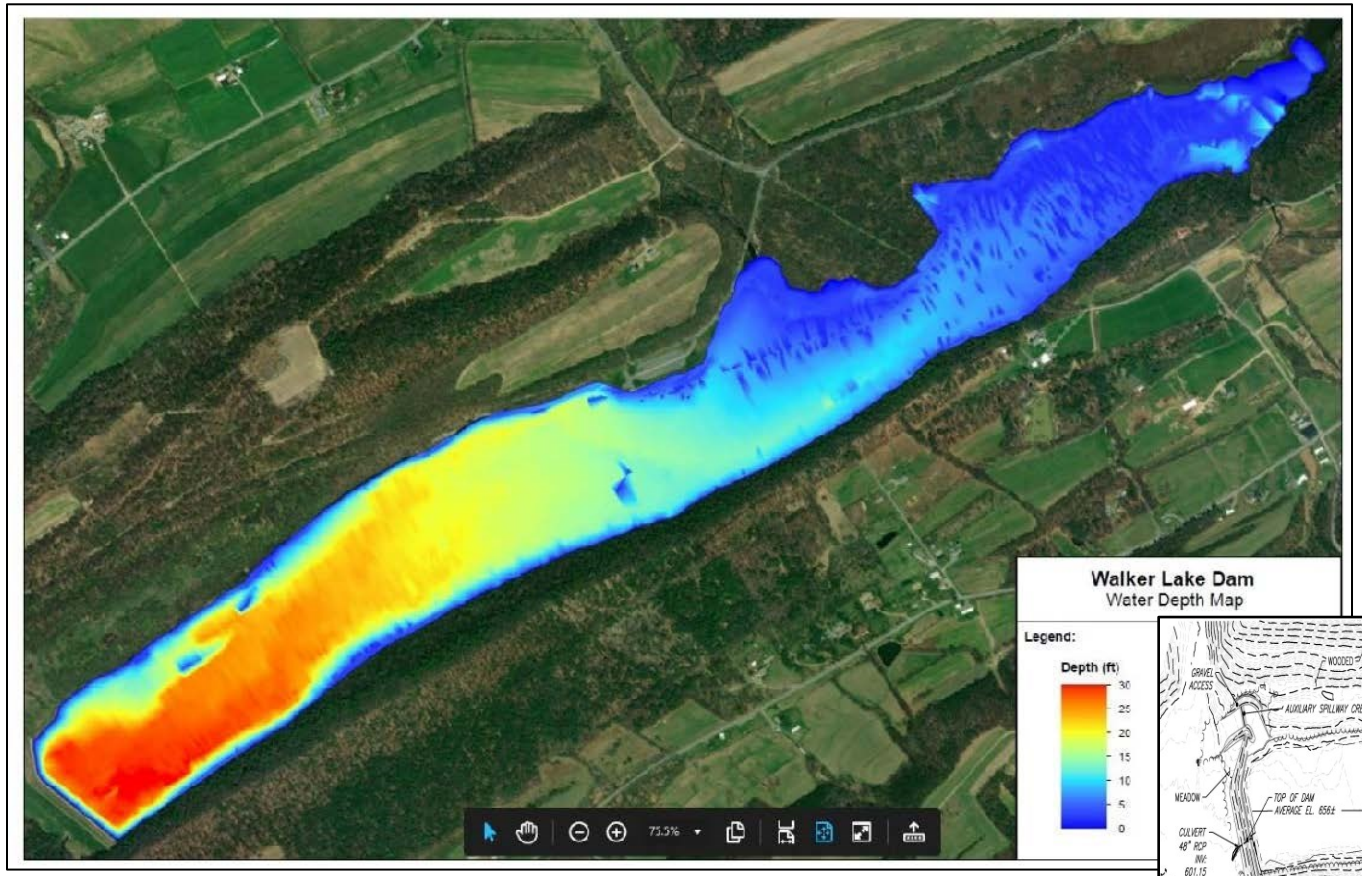
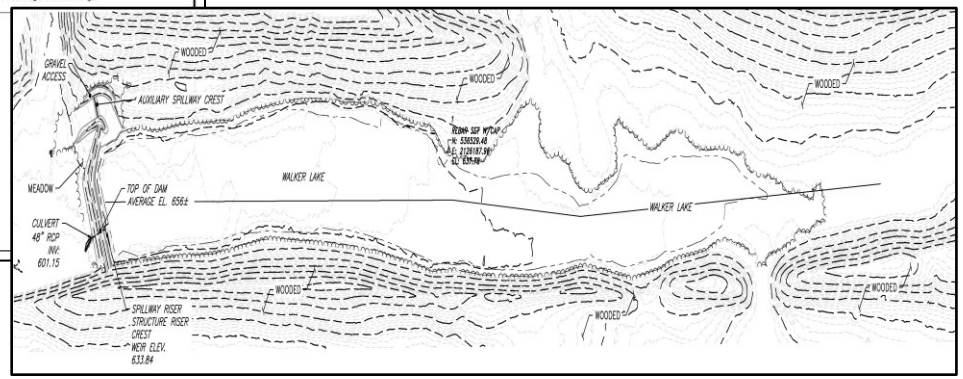


Table 2: Comparison of Physical Sounding and Bathymetric Sonar Data			
Point ID	**Probe Elevation (ft)**	**Sonar Elevation (ft)**	**Variance (ft)**
40000	622.12	621.61	0.51
40001	625.54	625.31	0.23
40002	626.18	625.95	0.23
40003	625.67	626.41	-0.74
40004	626.83	627.14	-0.31
40005	627.43	627.90	-0.47
40006	628.08	626.41	1.67
		Average Variance:	***0.16***



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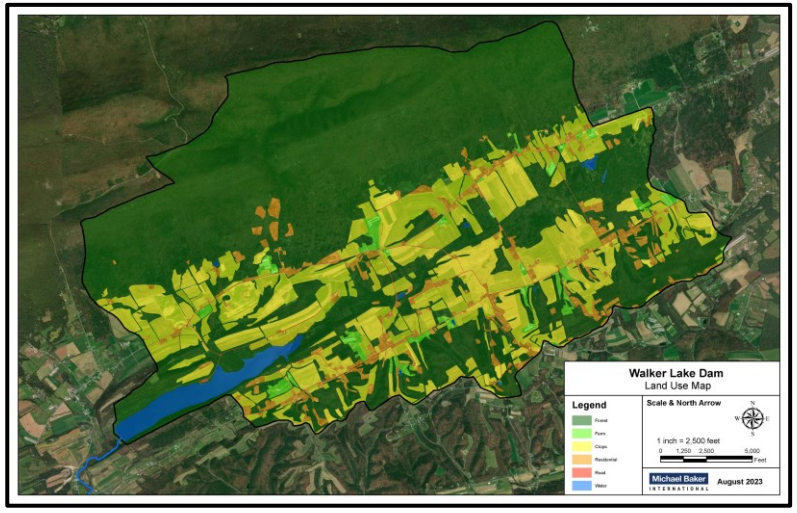
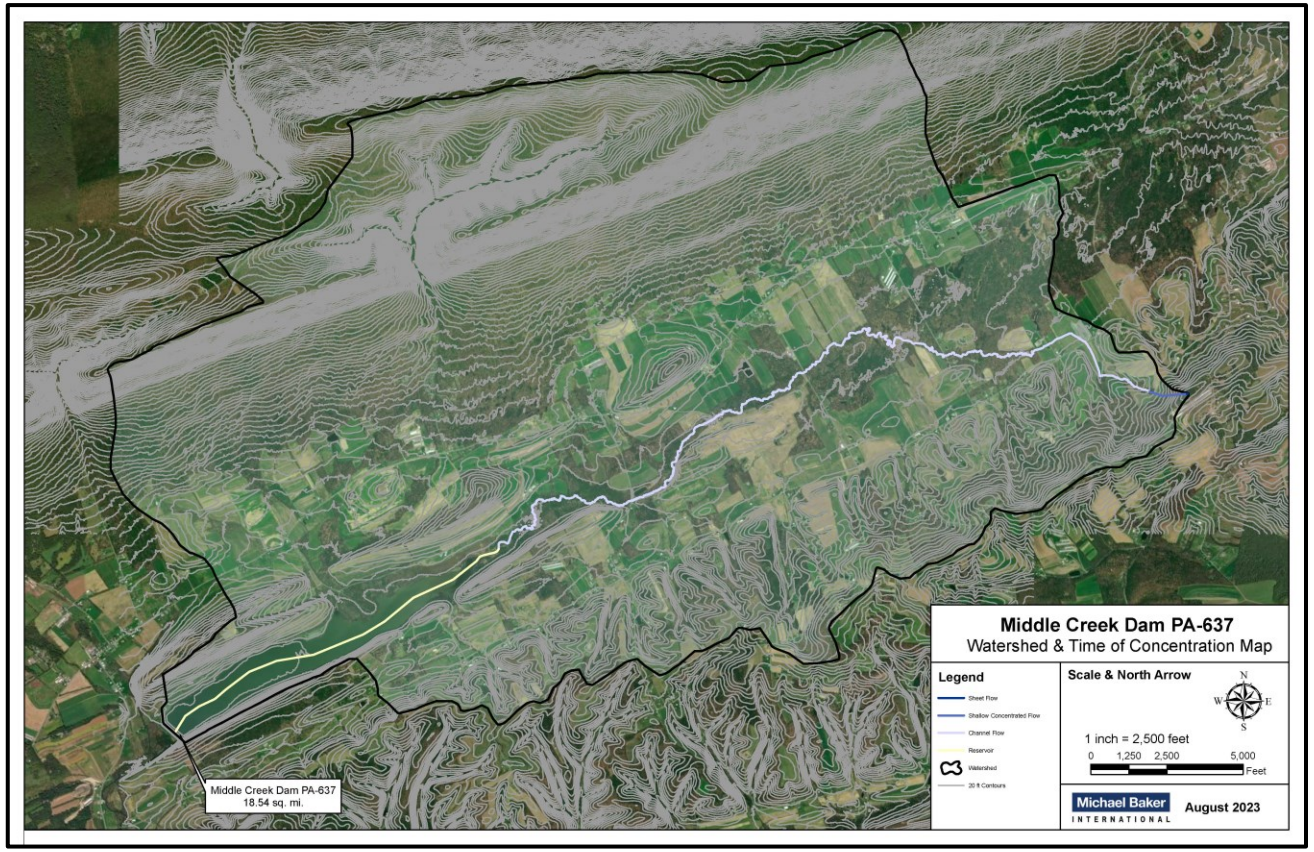
Analyses & Investigations (cont'd)

Hydrology & Hydraulic Analyses

- Characterize watershed
- Evaluate impacts from upstream dams
- Flood routings of existing conditions
- Breach analyses & inundation mapping
- Analysis of proposed alternatives





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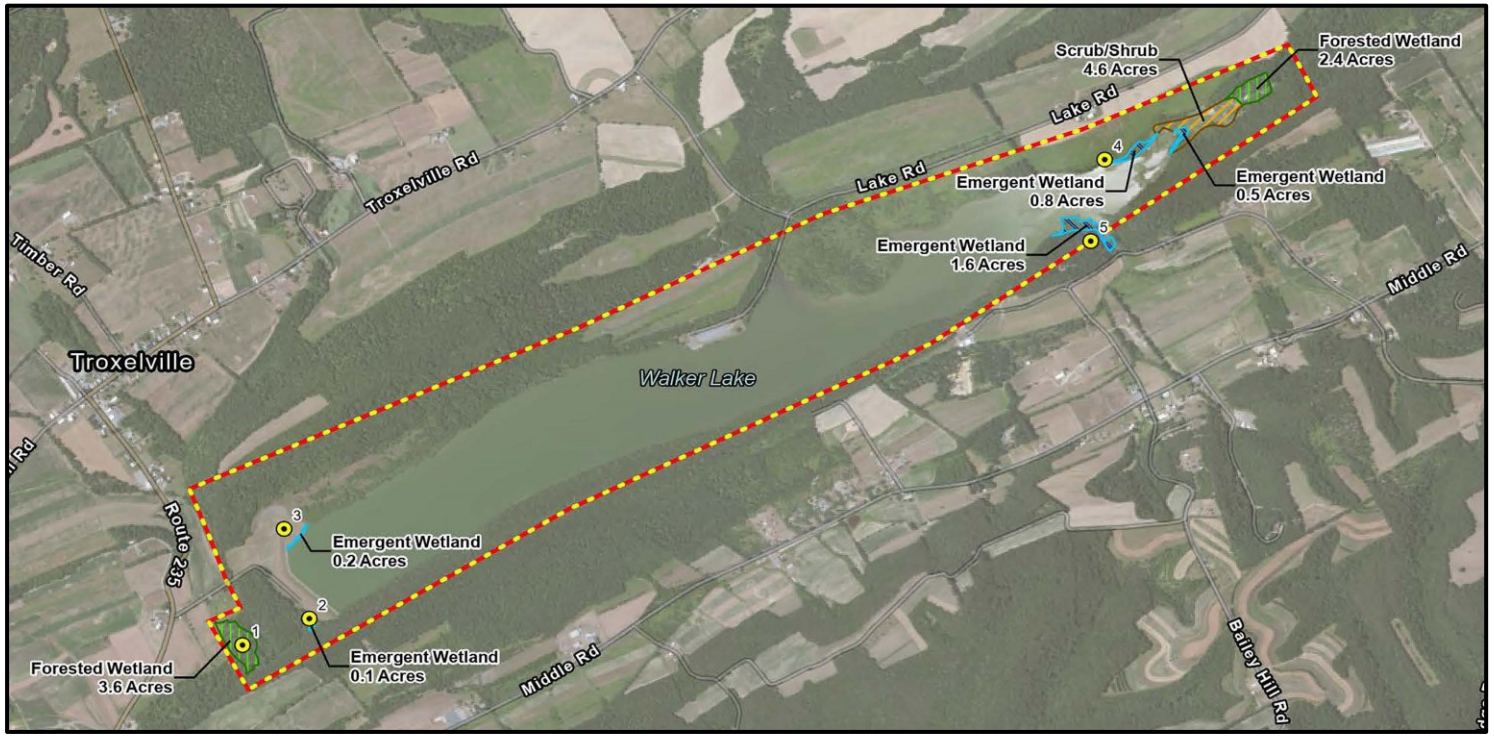
Analyses & Investigations (cont'd)



Environmental Investigation

- Wetlands Field Determination
- Land Cover & Soils Mapping
- Water Quality Assessment
- PNDI Inquiry
  - T&E Species
  - Special Concern Resources

Table 1 Walker Lake Dam - Evaluation of Water Quality

	pH	Specific Conductance (umho/cm)	Chloride (mg/L)	Sulfate (mg/L)
Test Results	5.6	142	5.2	6.1
Criteria for Corrosive Environment (PennDOT DM-4 Section D10.7.5.6P)	< 5.5	---	> 1000	> 150
Is Water Corrosive?	No	No	No	No

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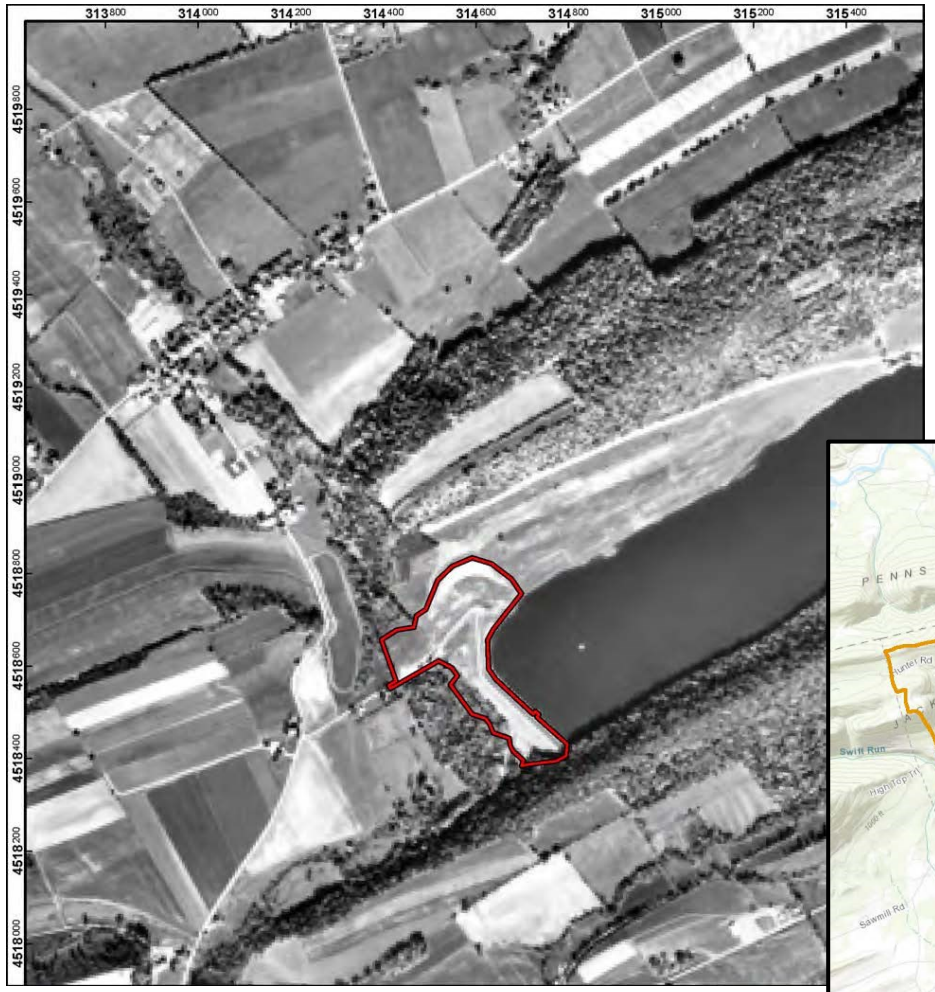
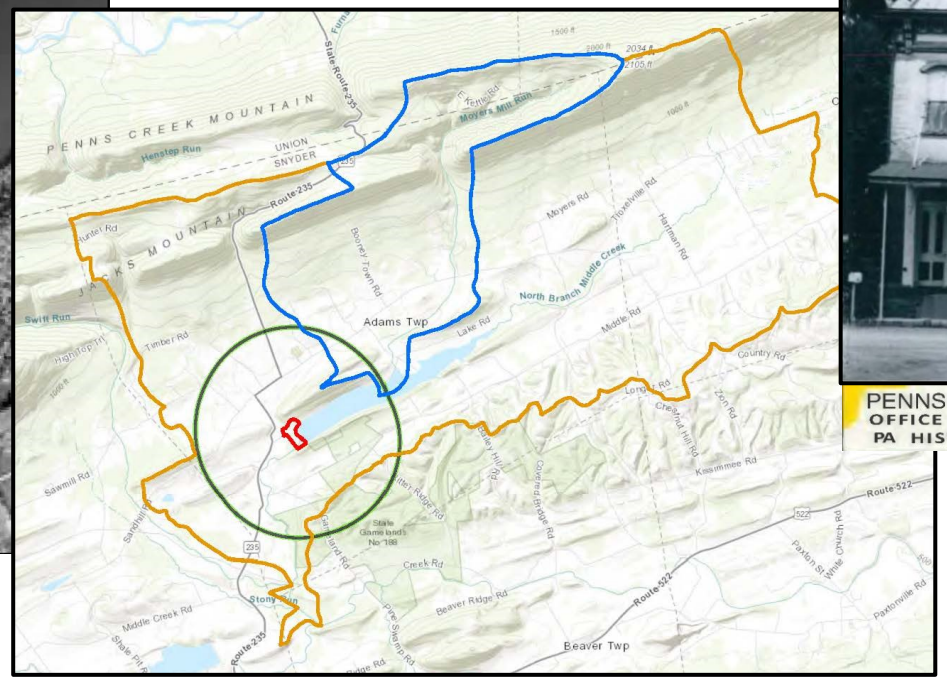
Analyses & Investigations (cont'd)



Cultural Resources Assessment

- Delineated Area of Potential Effects (APE)
- Identified & evaluated below- and above-ground cultural resources
  - Pre-historic & historic archaeological sites
  - Historic buildings / structures / districts



PENNSYLVANIA HISTORIC RESOURCE SURVEY FORM
OFFICE OF HISTORIC PRESERVATION Box 1026
PA HISTORICAL & MUSEUM COMMISSION Harrisburg, PA 17120

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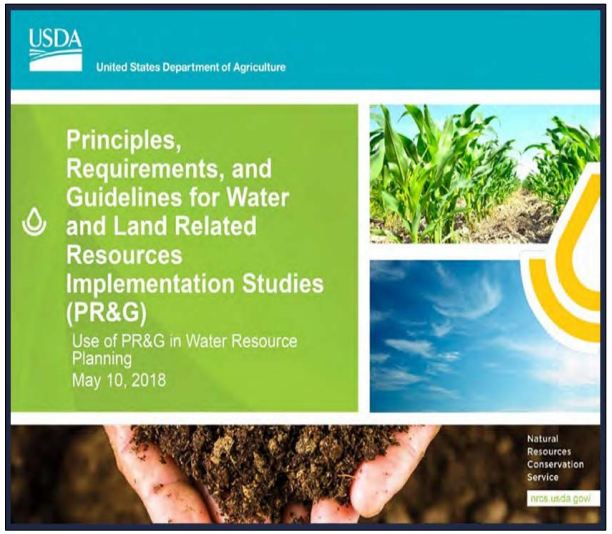
Identified Deficiencies for Walker Lake Dam

- The auxiliary (emergency) spillway receives flow from storms less than the 100-year, 24- hour event (7.5”)
- The dam over tops during the probable maximum flood (23” in 24 hours) because the auxiliary (emergency) spillway is not big enough
- The auxiliary (emergency) spillway erodes and breaches the dam during the probable maximum flood
- Some concrete surfaces in poor condition.
- Wet areas below the dam.

Alternatives Formulation Process

Alternative Formulation & Evaluation under PR&G

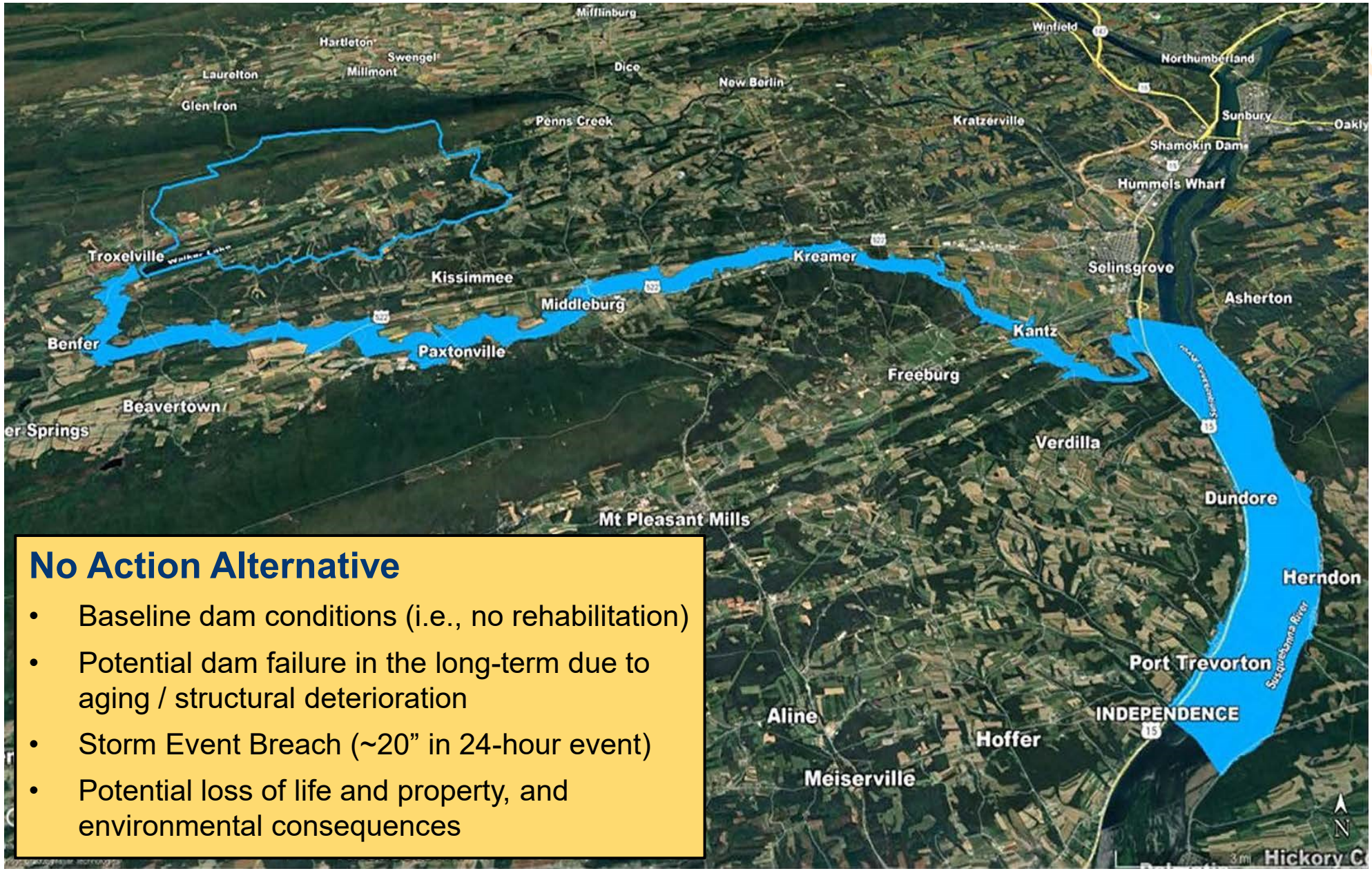
- Public benefits of alternative are compared to costs
- Performance against guiding principles
- Performance against formulation criteria
- Must evaluate ecosystem services (i.e., resource concerns)



Programmatic Alternatives

(<u>required</u> under PR&G and NEPA)

- No Action
- Decommissioning the Dam (Dam Removal) with Non-structural Measures Downstream (elevate, relocate, zoning, etc.)
- Structural Rehabilitation to PA Dam Safety & Design Criteria
- Locally Preferred (Sponsor's) Alternative
- National Economic Efficiency



No Action Alternative

- Baseline dam conditions (i.e., no rehabilitation)
- Potential dam failure in the long-term due to aging / structural deterioration
- Storm Event Breach (~20” in 24-hour event)
- Potential loss of life and property, and environmental consequences

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No Action Alternative

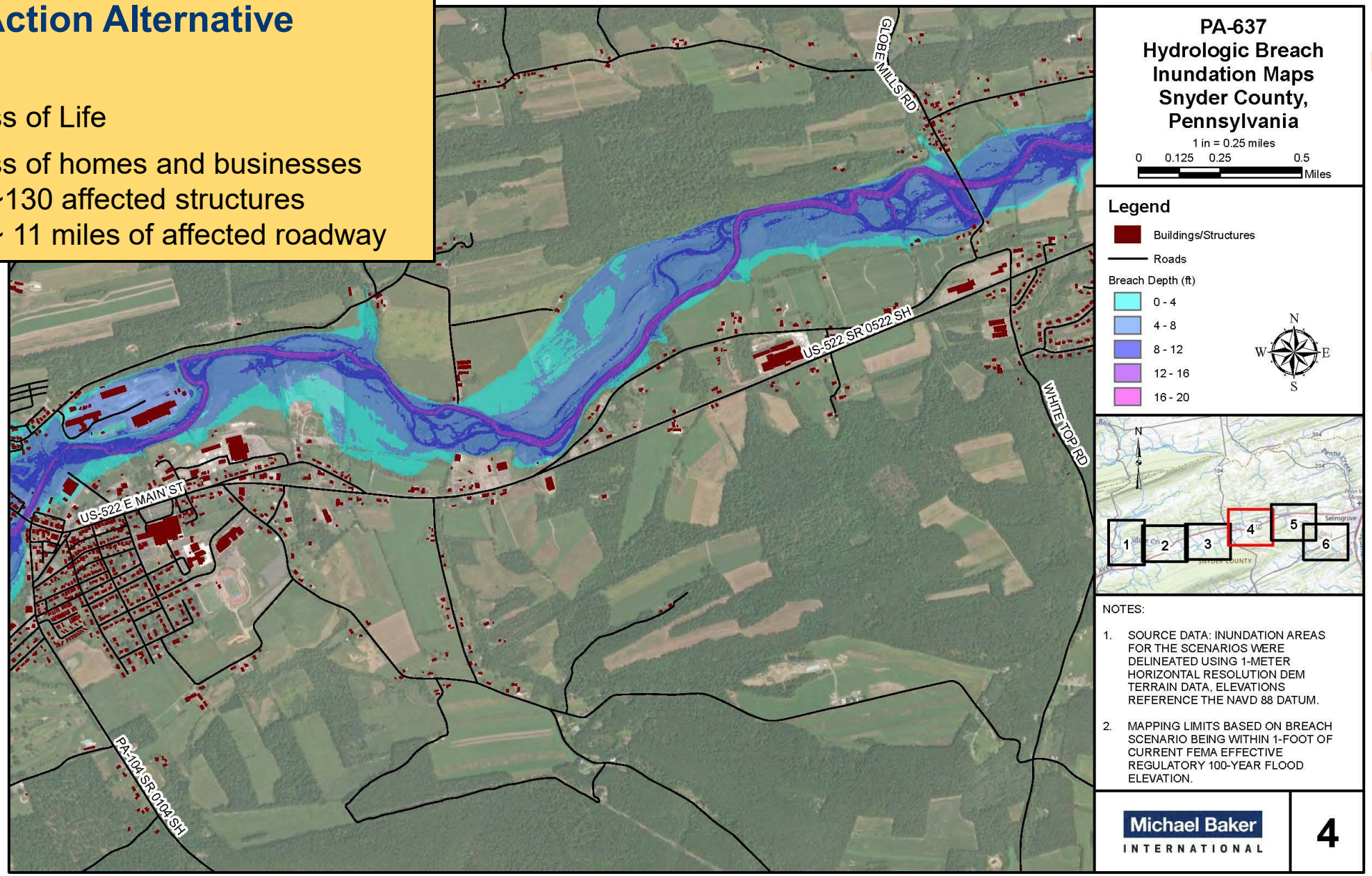
Risks

-Loss of Life

-Loss of homes and businesses

~130 affected structures

~ 11 miles of affected roadway



PA-637
Hydrologic Breach Inundation Maps
Snyder County, Pennsylvania

1 in = 0.25 miles

0 0.125 0.25 0.5 Miles

Legend

- Buildings/Structures
- Roads

Breach Depth (ft)

- 0 - 4
- 4 - 8
- 8 - 12
- 12 - 16
- 16 - 20

NOTES:

1. SOURCE DATA: INUNDATION AREAS FOR THE SCENARIOS WERE DELINEATED USING 1-METER HORIZONTAL RESOLUTION DEM TERRAIN DATA, ELEVATIONS REFERENCE THE NAVD 88 DATUM.
2. MAPPING LIMITS BASED ON BREACH SCENARIO BEING WITHIN 1-FOOT OF CURRENT FEMA EFFECTIVE REGULATORY 100-YEAR FLOOD ELEVATION.

Michael Baker INTERNATIONAL

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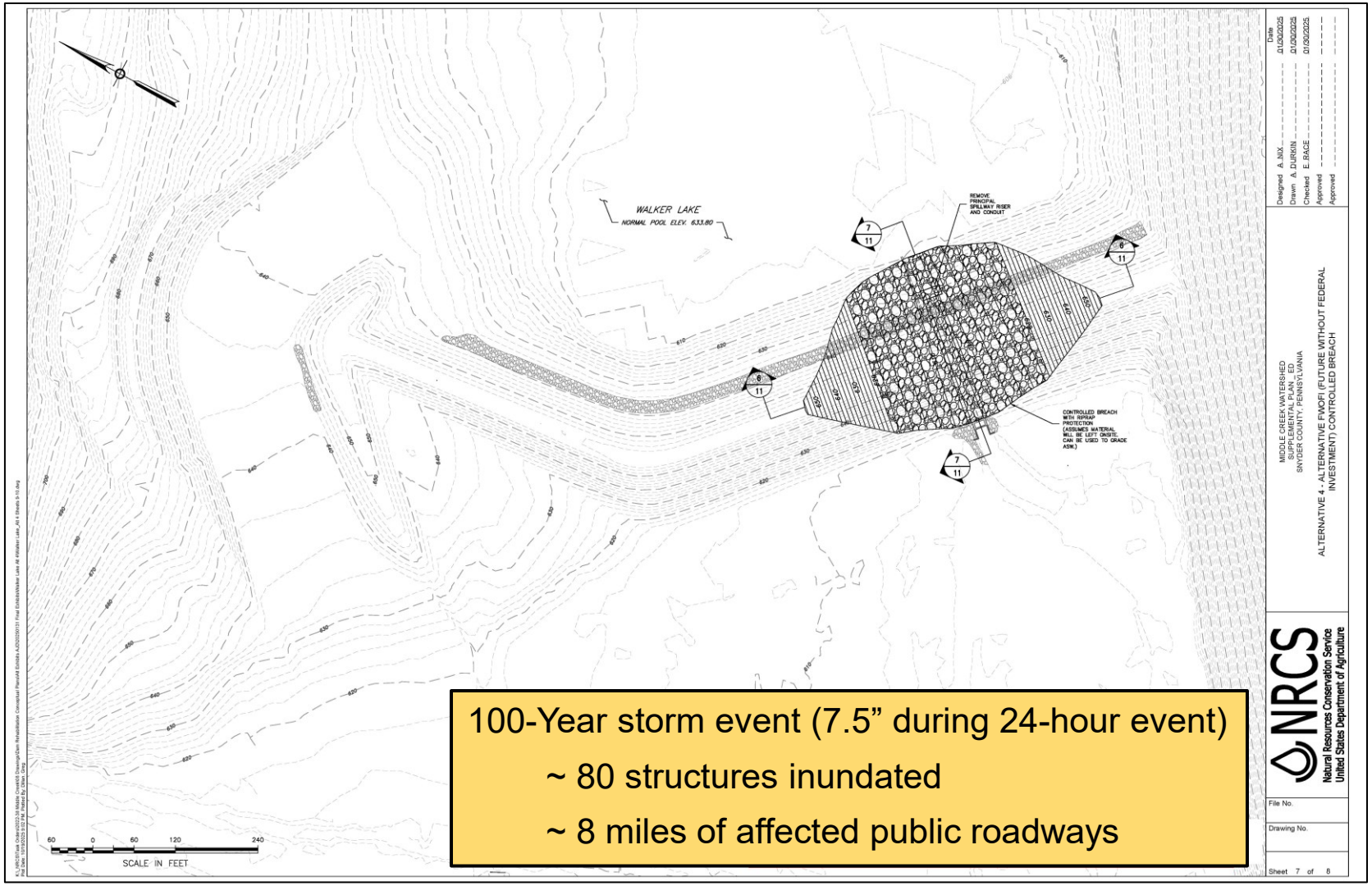
Dam Decommissioning Alternative
- Includes Downstream Flood Protection & Alternative Recreation



100-Year storm event (7.5” during 24-hour event)

~ 80 structures inundated

~ 8 miles of affected public roadways

- Remove dam
- Remove riser, conduit, and outlet works
- Restore/stabilize pre-existing streambed
- Provide alternative downstream flood protection (non-structural)
- Provide downstream recreation.
- **Decommissioning Cost Estimate– $ 6,055,000**

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Non-Structural Measures

- Flood Protection to structures/infrastructure downstream
  - Flood-proof buildings
  - Acquire structures or land rights
  - Relocate/remove structures
  - Upgrade infrastructure
  - Amend zoning regulations to address future floodplain development

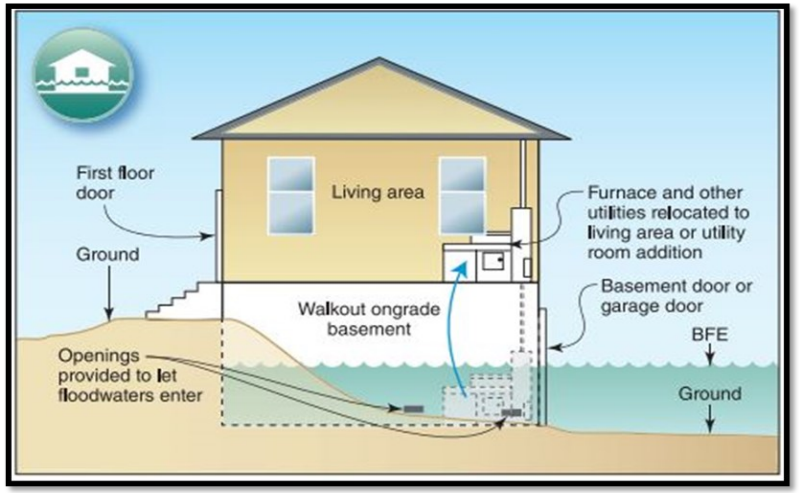

Photo courtesy of FEMA P-312: Homeowner's Guide to Retrofitting

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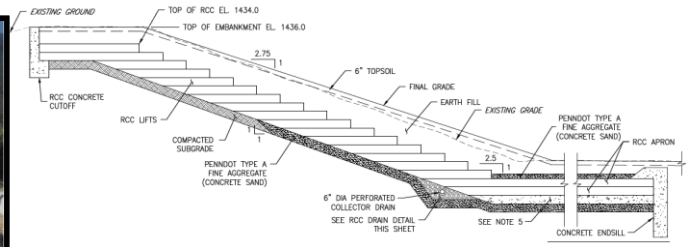
Structural Alternatives

- Correct deficiencies that do not meet NRCS and PA Dam Safety Standards and Criteria
- In other words, safely pass the required storm flood flow without overtopping the dam



Potential Solutions

- Widen the ASW
- Raise the crest of Dam
- Provide Embankment Overtopping Protection
- Seepage Collection System (e.g., toe drain)
- Slope flattening / buttressing (for embankment stability)

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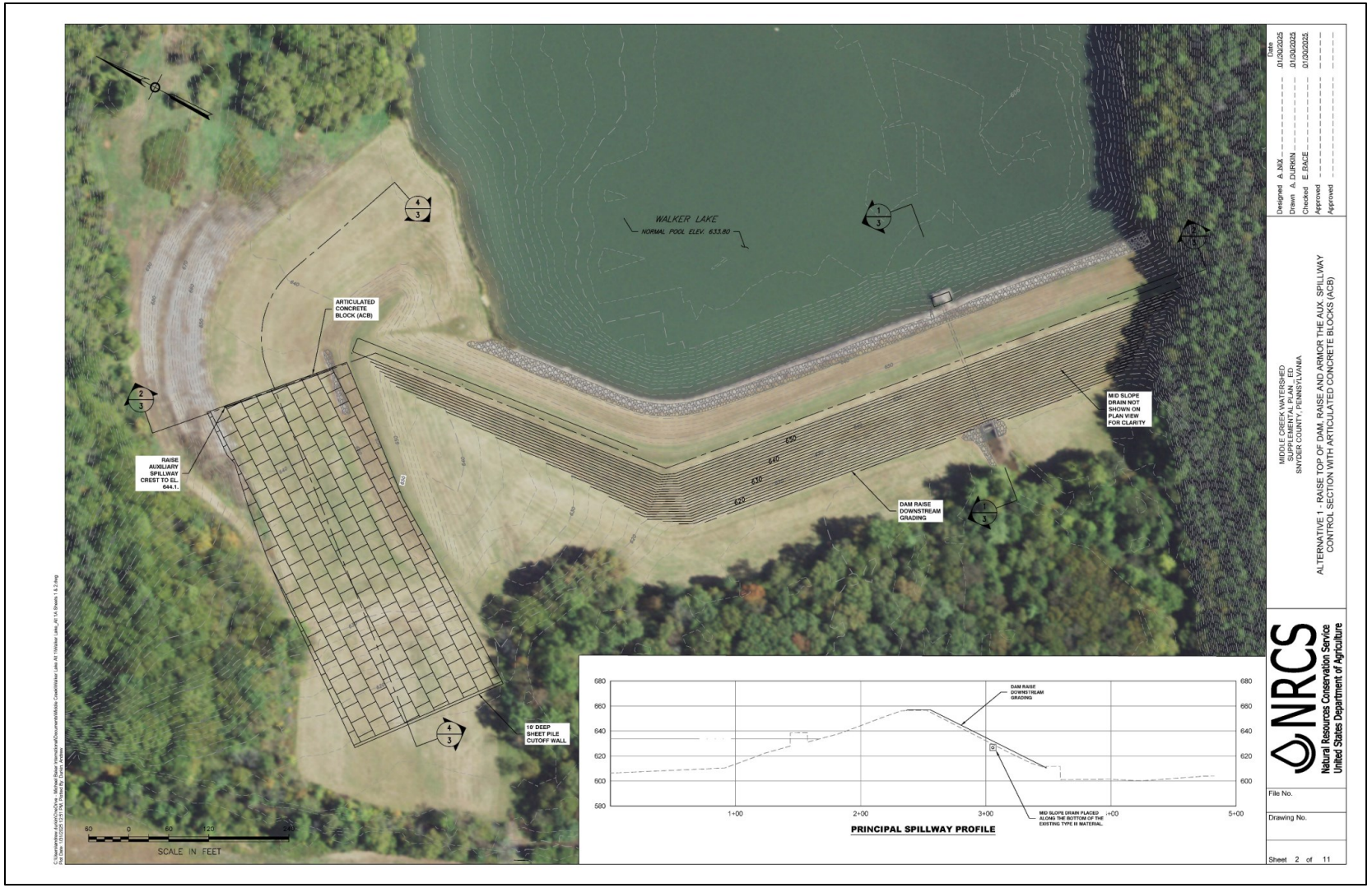
DESIGN OPTION 1 – RAISE TOP OF DAM, RAISE AND ARMOR THE AUXILIARY SPILLWAY CONTROL SECTION WITH ARTICULATED CONCRETE BLOCKS (ACB)



- Raise top of dam by average of 1.1 feet
- Raise auxiliary (emergency) spillway by 1.4 feet, widening it from 170 to 222 feet; armor with ACBs
- Flatten the downstream slope of embankment
- Add mid-slope seepage collection with graded filters
- Extend conduit 60 feet and replace outlet works
- Concrete repairs in select areas
- **Estimated Cost – $ 8,295,000**

Natural Resources Conservation Service

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DESIGN OPTION 2 – ARMOR THE EMBANKMENT WITH ROLLER COMPACTED CONCRETE (RCC), RAISE AND ARMOR THE AUXILIARY SPILLWAY CONTROL SECTION WITH ACBs

- Armor the existing embankment with RCC
- Raise auxiliary (emergency) spillway and armor with ACBs (same as Design Option 1)
- Seepage collection addressed with filter under RCC
- Concrete repairs in select areas
- **Estimated Cost – $ 16,311,000**

Natural Resources Conservation Service

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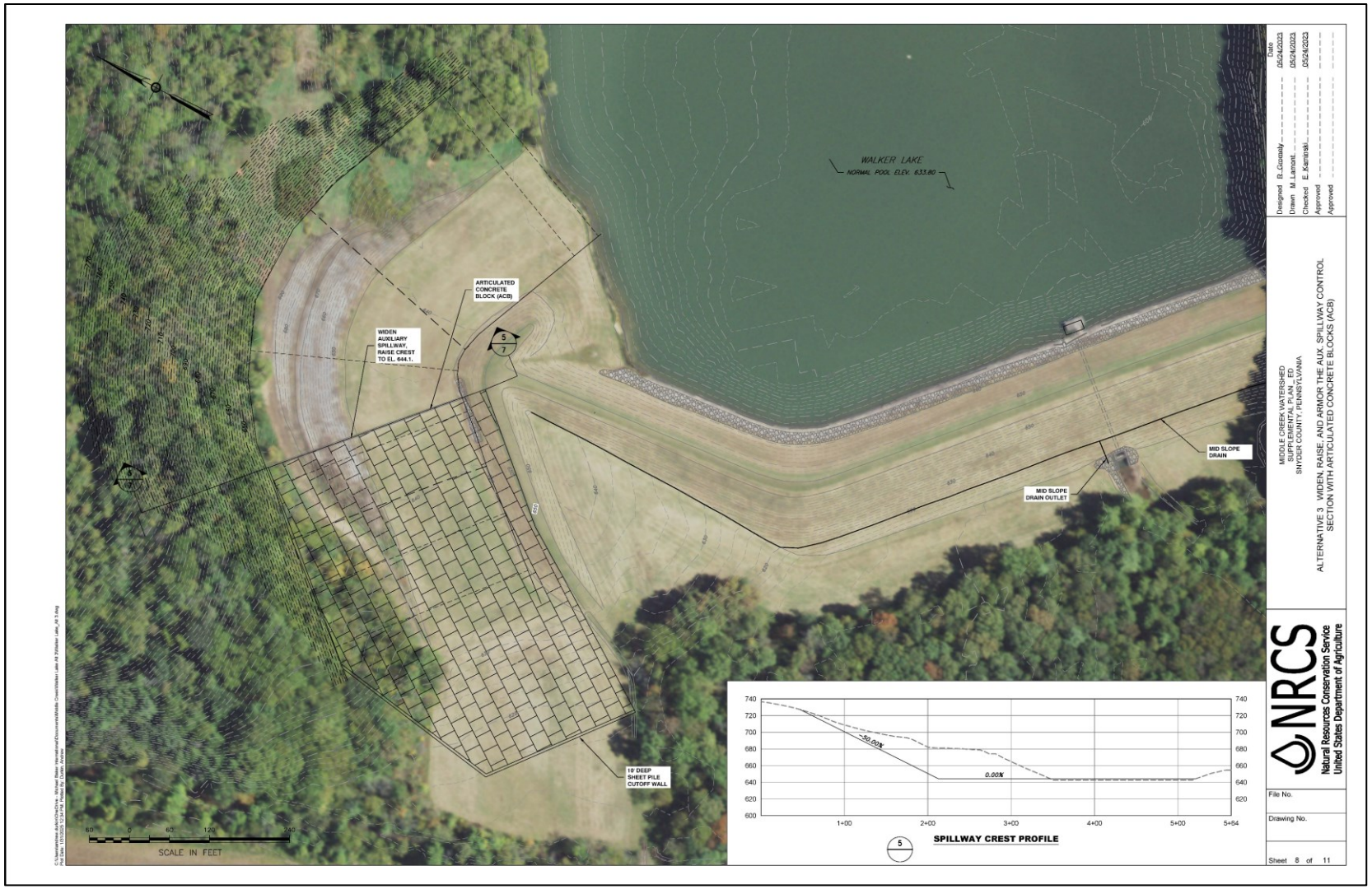
DESIGN OPTION 3 – WIDEN, RAISE, AND ARMOR THE AUXILIARY SPILLWAY CONTROL SECTION WITH ACBs



- Raise top of dam by average of 0.1 feet in select areas; area between ESW and embankment may require raising up to 0.6 feet
- Raise auxiliary (emergency) spillway by 1.4 feet, widening it from 222 to 305 feet; armor with ACBs
- Flatten the downstream slope of embankment
- Add mid-slope seepage collection with graded filters
- Extend conduit 60 feet and replace outlet works
- Concrete repairs in select areas
- **Estimated Cost – $ 21,947,000**

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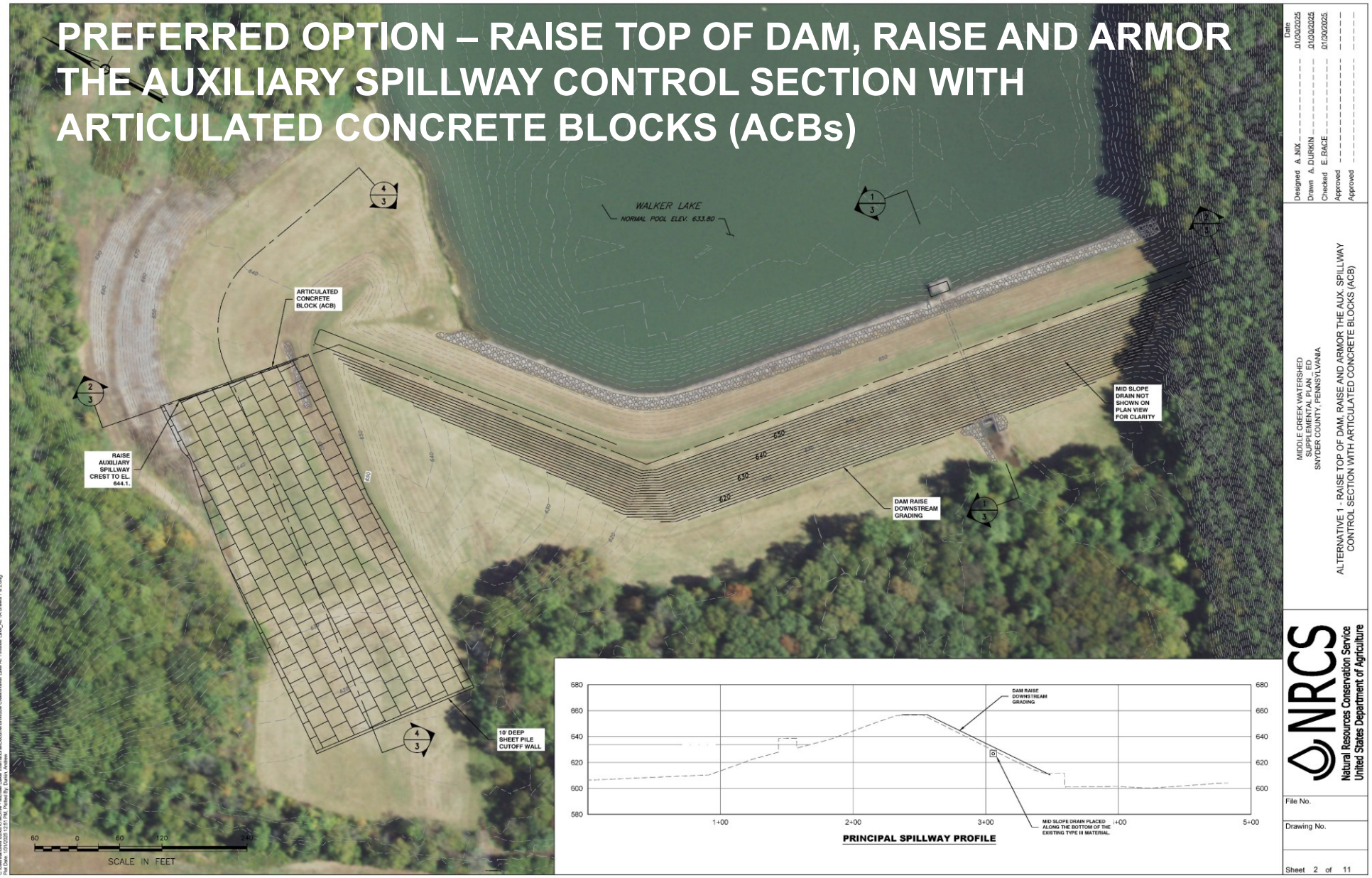
PREFERRED OPTION – RAISE TOP OF DAM, RAISE AND ARMOR THE AUXILIARY SPILLWAY CONTROL SECTION WITH ARTICULATED CONCRETE BLOCKS (ACBs)



Date
Designed A. NIX 01/30/2025
Drawn A. DURKIN 01/30/2025
Checked E. RACE 01/30/2025
Approved
Approved

MIDDLE CREEK WATERSHED
SUPPLEMENTAL PLAN - ED
SNYDER COUNTY, PENNSYLVANIA

ALTERNATIVE 1 - RAISE TOP OF DAM, RAISE AND ARMOR THE AUX. SPILLWAY CONTROL SECTION WITH ARTICULATED CONCRETE BLOCKS (ACB)

NRCS Natural Resources Conservation Service
United States Department of Agriculture

File No.
Drawing No.
Sheet 2 of 11

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Engineer's Preferred Alternative

Project Costs * preliminary estimates, subject to change	
Total Project Costs:	**$ 8,295,000**
Annual Project Benefits:	$ 79,448
Annual Project Costs:	$ 82,950
Benefit-to-Cost Ratio:	0.96
Project Life:	100 years

Federal / Local Cost-Share

NRCS Cost-Share

- 100% of planning costs
- 100% of design costs
- 100% of construction engineering & quality assurance
- 65% of construction costs

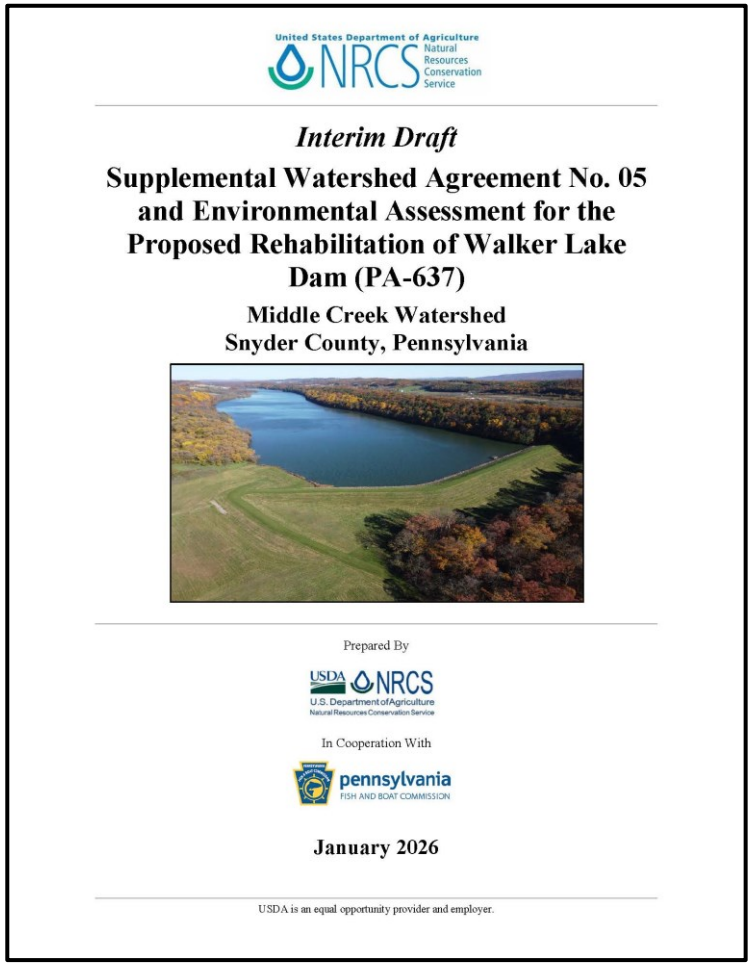
Local Sponsor Cost-Share

- 35% of construction costs (cash or in-kind credit)
- 100% of permit costs
- 100% of land / easement acquisition costs

No Federal Action

- 0% Federal
- 100% Local

Plan-ED Project Schedule



United States Department of Agriculture
NRCS Natural Resources Conservation Service

Interim Draft

Supplemental Watershed Agreement No. 05 and Environmental Assessment for the Proposed Rehabilitation of Walker Lake Dam (PA-637)

Middle Creek Watershed
Snyder County, Pennsylvania

January 2026

USDA is an equal opportunity provider and employer.

Collection and Analysis of Data – 2022-2023

First Public Meeting – February 2023

Formulation & Evaluation of Alternatives – December 2025

Second Public Meeting – January 2026

Preferred Alternative Selected – March 2026

Draft Plan-ED completed – May 2026

Final Plan-ED completed – August 2026

Public Discussion and Questions

Summary Of Alternatives	
No Action	No Rehabilitation and Eventual Dam Failure
Decommissioning	Remove Dam to Pre-existing Conditions and Provide Flood Protection to Structures Downstream
Non-structural Alternatives	Provide Flood Protection to Downstream Structures and Infrastructures
Structural Rehabilitation	Correct the Deficiencies and Safely Pass the Required Storm Event

Closing Remarks

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Natural Resources Conservation Service
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Thanks for your attention, participation, & input.