City of PIQUA

Stantec

Piqua Hydraulic Canal and Dam Safety Design Project

City of Piqua Public Meeting

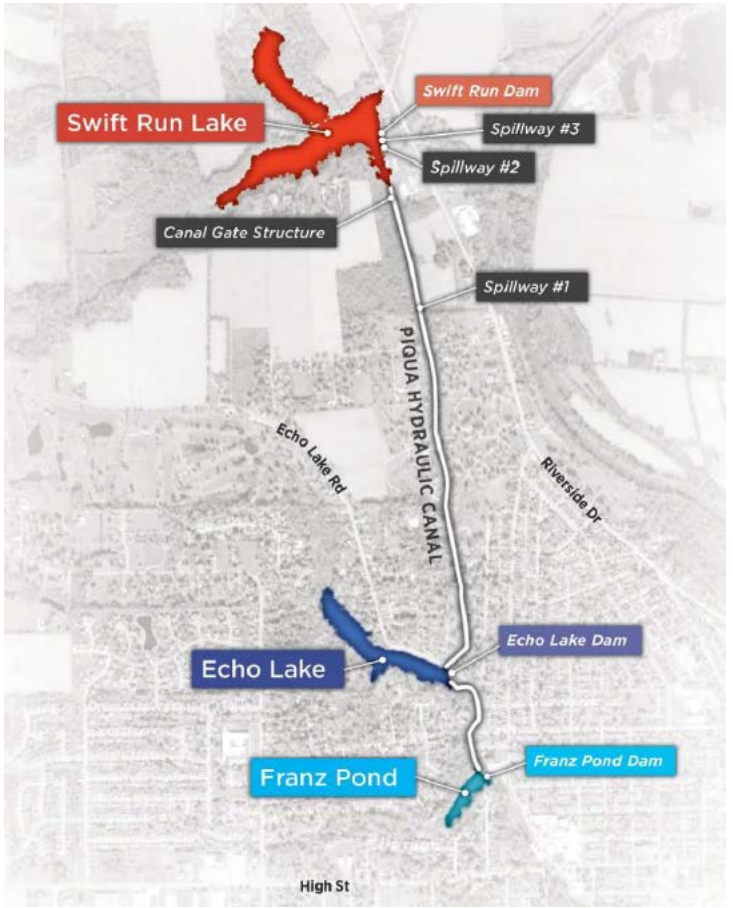
4/25/25

Technical Overview – Work Completed in Past Year

- Site-Specific PMP Study by Applied Weather Associates
- Updating of Hydrology and Hydraulics Modeling
- Geotechnical Evaluation – previous work concentrated on Swift Run, recent work on Canal, Echo Lake, Franz Pond Dams

ODNR Dam Safety Rating Overview

- Safety classifications based on dam height, storage, and hazard:
    - Class I (High Hazard) – designed to accommodate 100% PMF (Probable Maximum Flood)
    - Class II (Medium Hazard) – 50% PMF
    - Class III (Low Hazard) – 25% PMF
    - Class IV (Exempt)
- ODNR evaluations performed every 5 years, most recently late last year
- Piqua Dams – Swift Run (Class II), Echo and Franz (Class I)
    - Compliance issues include:
        - Insufficient spillway capacity to pass design storm
        - Ongoing maintenance of dams and hydraulic canal, spillway conditions

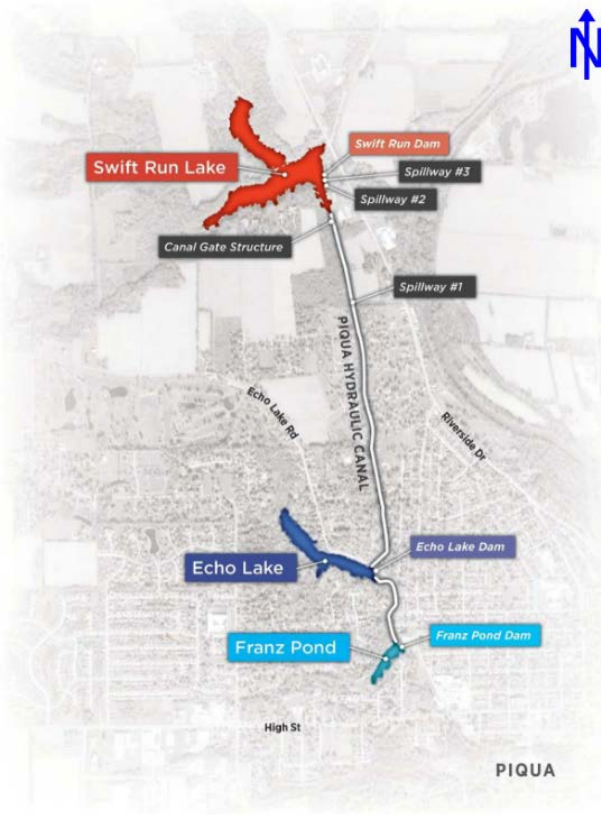


Site-Specific PMP Study

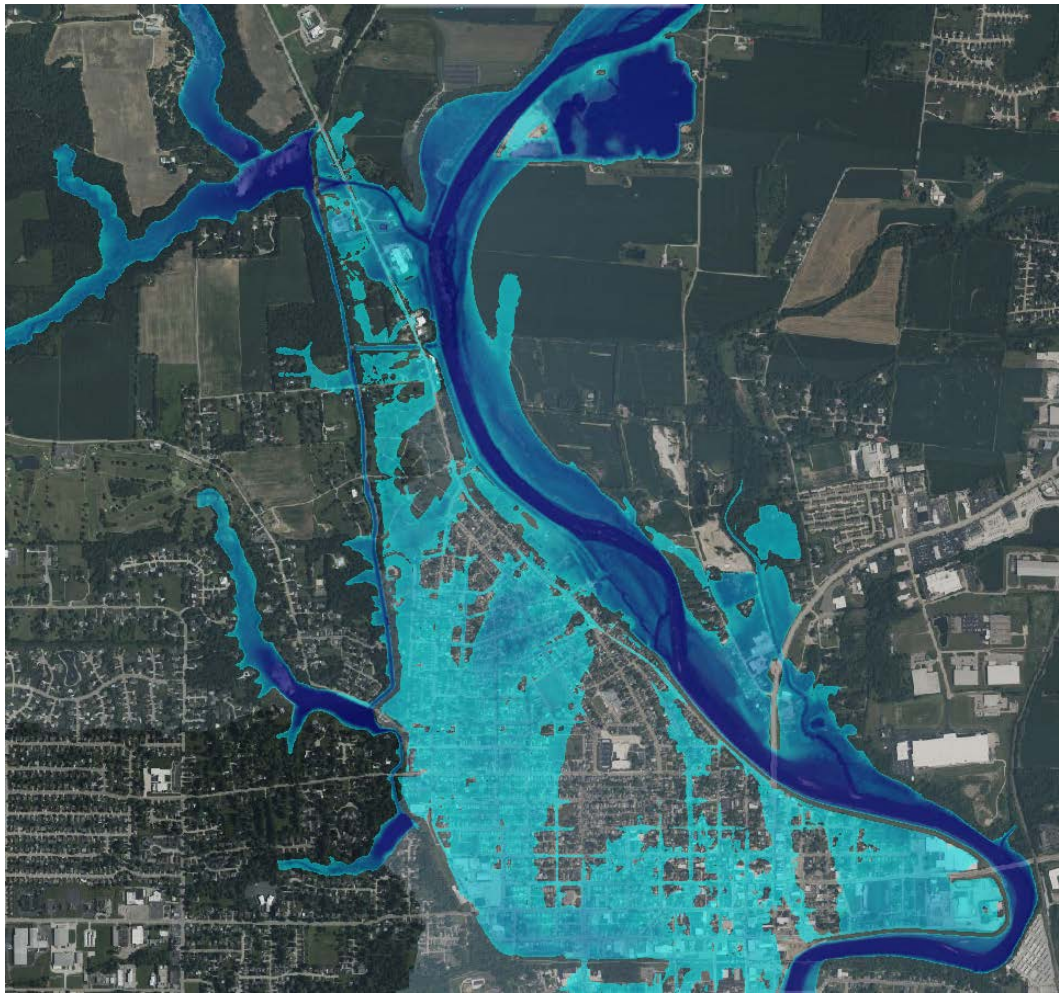
- PMP – Probable Maximum Precipitation which is used to generate the PMF
- Greatest depth of precipitation possible
- Previous modeling developed using Ohio Statewide PMP developed by AWA in 2013
- AWA recently completed a local PMP study for Piqua using additional data and updated methodology.
- Local PMP study resulted in 6-hr PMP depths being reduced by between 17-20% and 24-hr PMP depths reduced by 1-11% (however 24-hr PMP controls for design)

		Ohio Statewide PMP (2013)		Piqua Site-Specific PMP (Local Storm)		Percent Change	
Sub basin	Area (mi^2)	6 hr	24 hr	6 hr	24 hr	6 hr	24 hr
n/a	1	19.8"	27.7"	15.8"	25.8"	-20%	-7%
n/a	10	18.5"	24.1"	15.4"	20.4"	-17%	-15%
Swift Run Lake	7.42	18.67"	24.57"	15.45"	21.92"	-17%	-11%
Echo Lake	1.95	19.42"	26.66"	15.60"	25.19"	-20%	-5%
Canal-side	0.37	19.80"	27.70"	16.50"	27.50"	-17%	-1%
Frantz Pond	1.05	19.77"	27.62"	15.80"	25.73"	-20%	-7%

Hydrology and Hydraulics Modelling



- Previous modeling updated using new PMP values from local PMP study
- Franz and Echo dams do not safely pass the required PMF design flood required for a Class I dam
- Swift Run dam does not safely pass the required 50% PMF design flow required for a Class II dam
- Required capacity may be achieved through combination of wider canal, larger spillway, and dam raises



Hydrology and Hydraulics Alternatives Modeling

- Currently re-analyzing most promising alternatives previously presented to public for Franz and Echo to “right-size” them based on new lower PMF values
- Currently re-analyzing Swift Run spillway size required based on new lower PMF values and re-classification to Class II

Scenario 1
Modified Natural Flows

Scenario 2
Raise Dam Wall + Widen Canal + New Spillway

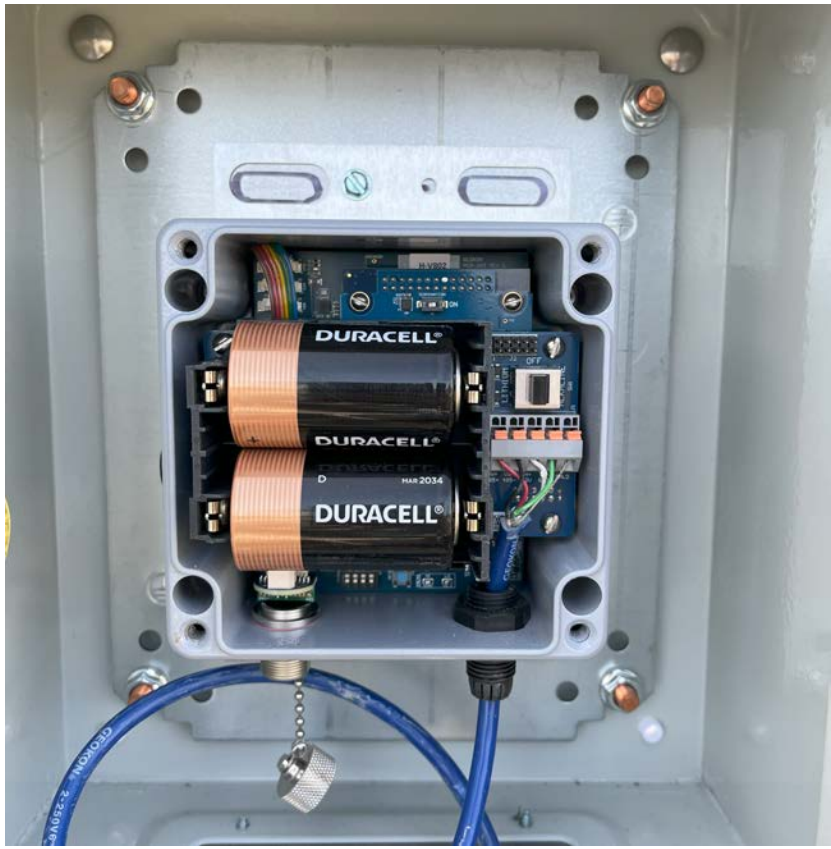
Scenario 6
Deepen Franz + Widen Spillway

Echo Lake Dam/Franz Pond Dam Stats

- Echo Lake Dam – dam height of 14.2 feet, 660-foot long embankment, crest width of 8 feet, crest elevation of 907.2 feet, storage capacity of 142 acre-feet
- Franz Pond Dam – dam height of 20.6 feet, 600-foot long embankment, crest width of 8 feet, crest elevation of 909.9 feet, storage capacity of 92 acre-feet
- For comparison:

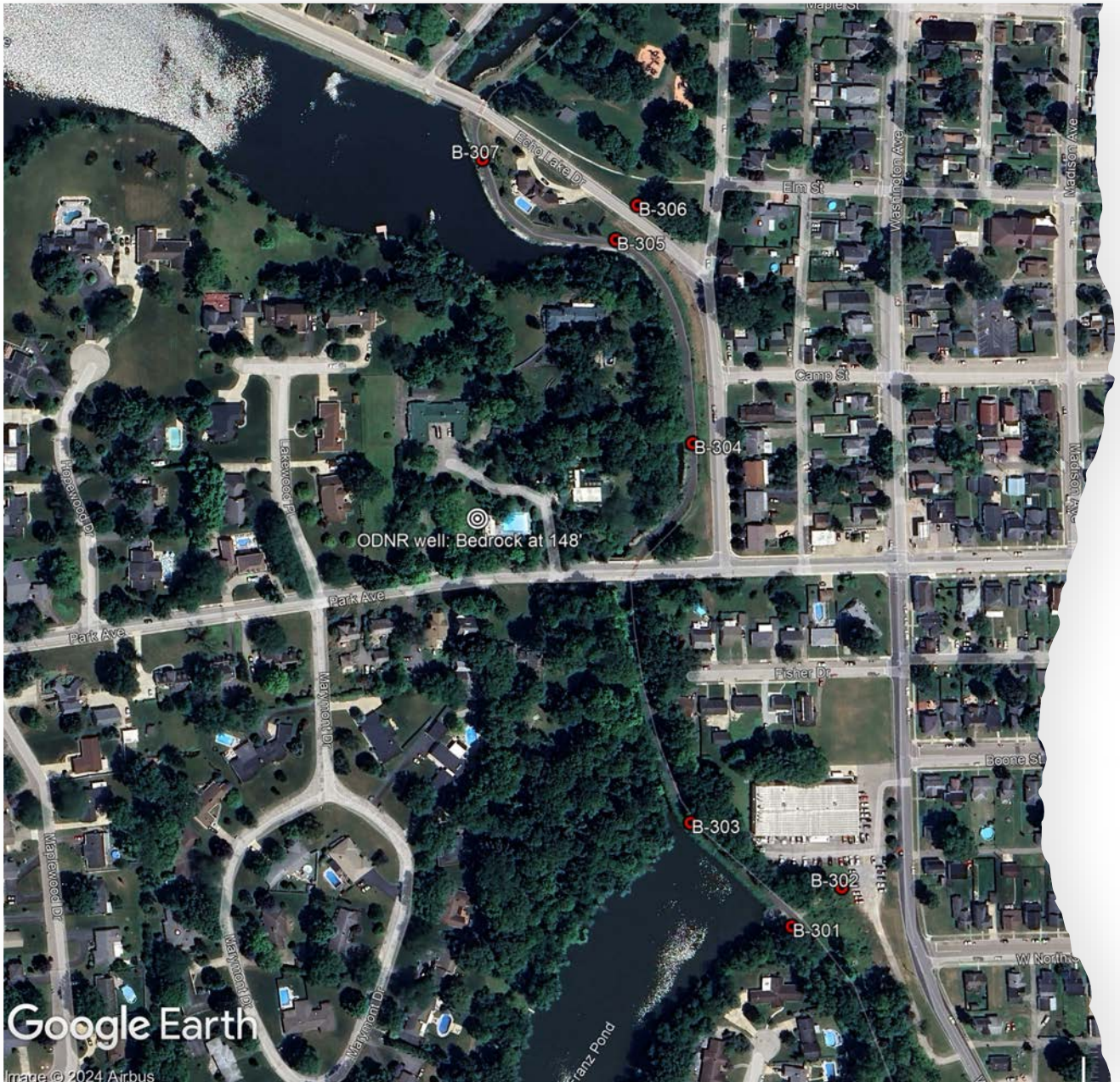
Swift Run Lake Dam – dam height of 39.4 feet, 1520-foot long embankment, crest width of 14 feet, crest elevation of 906.2 feet, storage capacity of 629 acre-feet

Geotechnical Exploration – Echo and Franz



- Geotechnical soil borings
- Twelve piezometers to monitor water levels throughout Echo Lake and Franz Pond
- Seepage and Stability Analysis

Geotechnical Exploration – Echo and Franz



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SUBSURFACE LOG

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Stantec Boring No. **B-304**

Client	City of Piqua	Boring Location	
Project Number	173410760	Surface Elevation 908.0 ft	Elevation Datum NAVD 88
Project Name	Piqua Dams: Echo Lake and Franz Pond	Date Started 12/21/24	Completed 12/21/24
Project Location	Piqua, Miami County, Ohio	Depth to Water N/A	Date/Time N/A
Inspector	[redacted]	Depth to Water N/A	Date/Time N/A
Drilling Contractor	Stantec Consulting Services Inc.	Drill Rig Type and ID	CME 45C#3, #812
Overburden Drilling and Sampling Tools (Type and Size)	3-1/4" HSA, 2" SS w/o liners, 3" Shelby Tubes		
Rock Drilling and Sampling Tools (Type and Size)			
Sampler Hammer Type	Automatic	Weight 140 lb	Drop 30" Efficiency 88.5%
Borehole Azimuth	N/A (Vertical)	Borehole Inclination (from Vertical)	Vertical

DEPTH(ft)	ELEVATION(ft)	SOIL/ROCK DESCRIPTION	STRATA PLOT	SAMPLES TYPE	NUMBER	RECOVERY ft	BLOWS / PRESS.(psi) / RQD (%)	MONITOR WELL / PIEZOMETER
0	908.0							
0	907.5	black, ASPHALT - 6 INCHES						
0	907.2	light gray, GRANULAR BASE - 4 INCHES						
1-5		SANDY LEAN CLAY LITTLE FINE TO COARSE GRAVEL, CL, brown, firm, damp to moist, iron oxide staining, (FILL)		B	01			
2-4				SS	01	0.7	2-3-4	
6	902.0			ST	01	1.7		
6-12		LEAN CLAY WITH SAND, TRACE GRAVEL, CL, light brown to brown, very stiff, damp, (POSSIBLE FILL) very moist at 15.0'		SS	02	1.5	6-10-12	
10-12				ST	02	1.0		

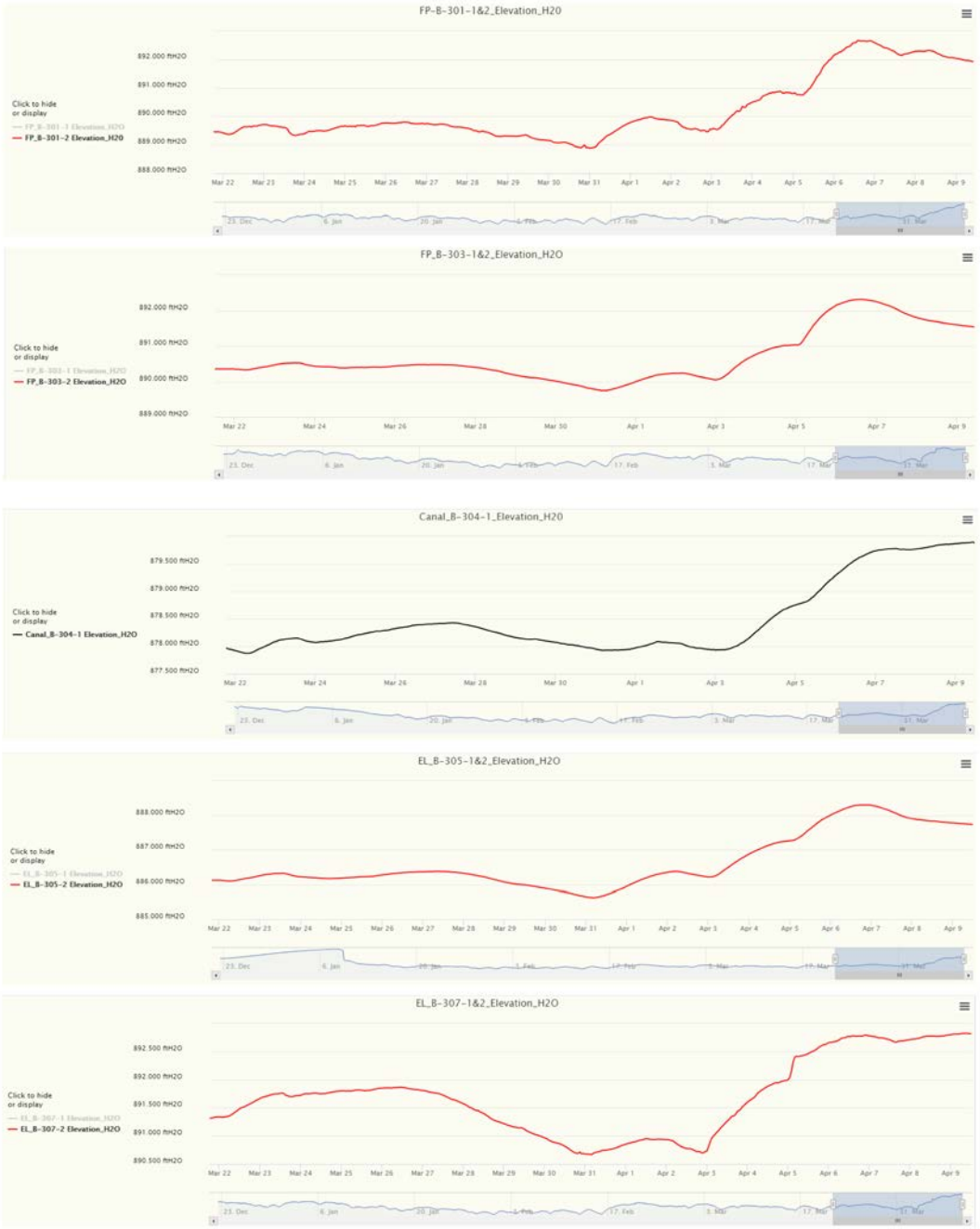
UNDRAINED SHEAR STRENGTH - tsf (1, 2, 3, 4)
WATER CONTENT & ATTERBERG LIMITS (W_P, W, W_L)
Pocket Penetrometer/Torvane (tsf) ★
STANDARD PENETRATION TEST, BLOWS/FOOT ●
10 20 30 40 50 60 70 80 90

Vibrating wire piezometer installed @ 34.3

Printed on 4/17/25

Geotechnical Findings and Analysis

- From April 3 to 8, 2025 approximately 4.67 inches of rain (recorded from James M Cox Dayton Intl Airport Station)
- Piezometer readings were taken on April 9th, 2025.
- Data taken from the instruments showed ground water levels rose on average 2.5 feet.



Geotechnical Findings and Analysis

- Laboratory testing was conducted on soil samples taken from the exploration phase.
- Stability and Seepage Analysis being conducted at various locations along Echo Lake, Franz Pond, and connecting Canal System
- Preliminary analysis suggest locations along current dams and canal do not meet recommended ODNR criteria.