FLAT ROCK AND HUROC DAM FEASIBILITY STUDY & RECOMMENDATION

HURON-CLINTON METROPARKS

HISTORICAL TIMELINE

1921: Land acquired by Henry and Clara Ford

1926: Ford Motor Co obtained a lease for 1.9 acres of land from the Detroit, Toledo and Ironton Railroad Company (DTI)

1929: Ford Motor Co constructs dam on leased property from DTI and also builds a lamp plant. Dam is constructed by Stone and Webster.

1951: Ford Motor Co sells the dam and 349 acres of adjoining land to the Metroparks

1956: The Village of Flat Rock and the Metroparks sign an agreement on February 15 to allow Flat Rock to build a water intake in the lock portion of the dam

1980: City of Flat Rock connects to Detroit City water and abandons their water intake

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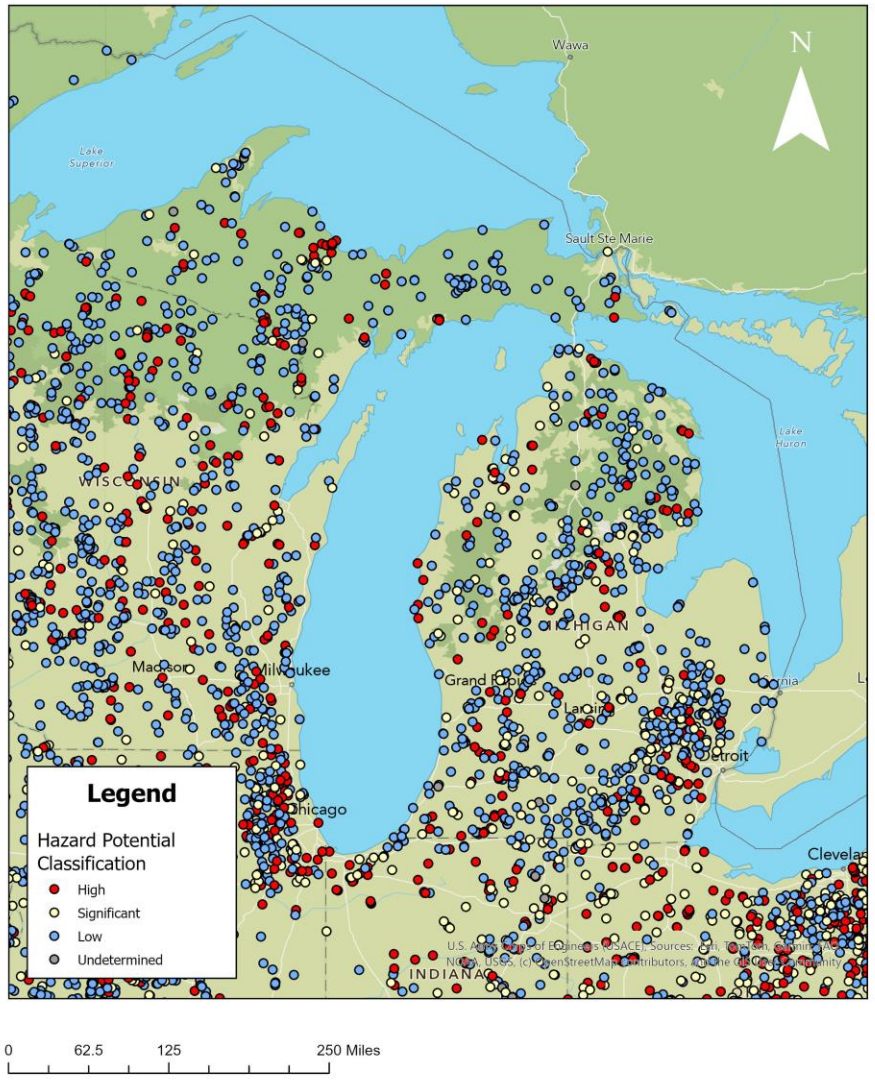
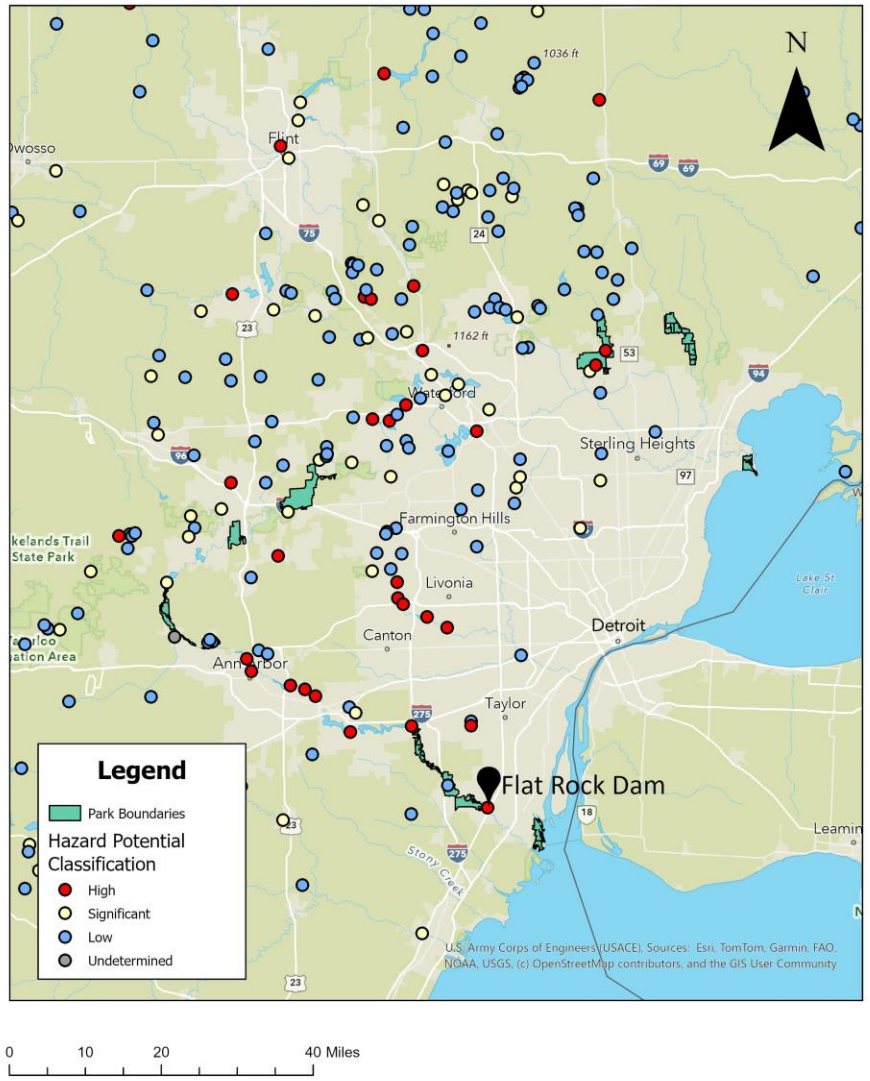
Hazard Potential Classification of Michigan Dams



Hazard Potential Classification of SE Michigan Dams



Data from National Inventory of Dams, USACE, https://nid.sec.usace.army.mil/#/

HURON-CLINTON METROPARKS

GRANT OVERVIEW

- In January 2022, the Metroparks worked with the Great Lakes Fisheries Commission (GLFC) to submit a grant application to NOAA's Great Lakes Fish Habitat Restoration Program for the Flat Rock Dam Feasibility Study
- The program aims to support projects that will lead to a significant and sustainable benefits for Great Lakes native fish species
- Our project is part of a larger suite of projects submitted by the Great Lakes Fisheries Commission

No.	Section/Project
1.	**Project Summary**
2.	**Applicant Qualifications**
3.	**Project Narratives**
A.	NEBAGAMON CREEK RAILROAD EMBANKMENT AND CULVERT REMOVAL PROJECT
B.	INNER SAGINAW BAY REEF RESTORATION PROJECT
C.	SALMON RIVER TRESTLE POOL PROJECT
D.	CAMPBELLS ROAD CULVERT REPLACEMENT PROJECT
E.	FLAT ROCK/HUROC DAM FISH PASSAGE PROJECT
F.	LITTLE BAY DE NOC, MI SHORELINE RESTORATION PROJECT
G.	SALMON RIVER PHASE 3 PROJECTS
H.	NORTHERN LAKE MICHIGAN (CHARLEVOIX/HARBOR SPRINGS) REEF RESTORATION PROJECT
4.	**Data Management Plan**

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GRANT OVERVIEW

- The grant was awarded in October 2022 for $1,686,539
- The Metroparks provided $25,000 in cash match, and over $45,000 in in-kind match with staff time
- There are 2 phases of the grant, first is the feasibility study phase, and next is the design phase. There is approximately $950,000 in grant funds for the design engineering
- The grant runs through September 30, 2026

Map shows the basin wide map of the GLFC partnership projects

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WHAT IS A FEASIBILITY STUDY?

- A feasibility study is a preliminary evaluation that analyzes key aspects of the proposed project. It is essential to evaluate options and understand long-term impacts.

- This study looks at 4 alternatives and conducts preliminary engineering (approximately 10% of the total design engineering that needs to be completed) to better understand the feasibility, impacts, and cost magnitude of each option.

- The study was conducted to review 4 design alternatives for the dam. Dams do not last in perpetuity. As such, we feel is our responsibility to be proactive in the management of the dam and have as much information about the future alternatives as possible to make decisions and to budget for future needs.

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CONSIDERATIONS REVIEWED IN THE FEASIBILITY STUDY

- Hydrologic: impoundment levels & flood evaluations
- Geotechnical and structural: Reviewing bedrock and hydraulic loads on bridge
- Economic impact: short & long-term
- Wetlands and Endangered Species
- Fish Passage
- Aquatic Organism Habitat
- Community Engagement
- Sediment
- Dam Safety
- Public Utilities
- Public Safety & Recreation: Looking at removing in-river barrier and creating an easier to access portage route
- Initial Construction & Life Cycle Costs
- Regulation Change Consideration: adds to ongoing maintenance costs

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COMMUNITY ENGAGEMENT

•August 4, 2023: Mailed invitations to first public meeting sent and flyers posted with City of Flat Rock, Huron Township, Flat Rock Community Center and Willow Metropark Office

•August 17, 2023: Email and social media invites sent for first public meeting

•**August 23, 2023: First public Meeting**

•**June 5, 2024: Adjacent Property Owner Meeting**

•October 4, 2024: Letters mailed and emailed to impoundment neighbors about Survey Work taking place

•February 19, 2025: Email invite for Stakeholders to the Second Public Open House

•February 20, 2025: Mailed invited to impoundment neighbors and project email subscribers to the Second Public Open House

•February 21, 2025: Email invite for stakeholders and project email subscribers to the Second Public Open House

•**March 6, 2025: Second Open House**

•March 6-17, 2025: Public Comment period

•April 25, 2025: Letters sent to City of Flat Rock and Huron Township offering transfer of Flat Rock Dam ownership. Update published to project webpage and shared with media.

•June 2, 2025: Email sent to project subscribers to inform Q&A from public comment and project closeout schedule was published to the website

•August 1, 2025: Final Feasibility Study report published on project webpage

HURON-CLINTON METROPARKS

OVERVIEW OF ALTERNATIVES 1, 3 & 4

Consideration	Alt 1: No action, fish passage improvement	Alt 3: Full dam removal with active restoration	Alt 4: Full dam removal with passive restoration
Hydrologic	No change in water levels	Decrease in water levels: 5-6.4 feet immediately upstream of Flat Rock Dam tapering to existing water surface elevation 14,200 feet upstream, 1.3-1.4 feet decrease in water levels between Flat Rock and Huroc Dams.	
Wetlands & Threatened and Endangered Species	Wetlands unaffected; mussel survey and relocation may be required within the footprint of the proposed fishway.	Existing fringe wetlands may dry with lowered impoundment, but exposed bottomlands expected to form some wetlands where excavated sediment are not placed. Potential net gain of 70 acres of wetlands.	
Fish Passage	Effective for Lake Sturgeon, Walleye, and White Bass.	Opens 19 river miles for fish habitat and migration	

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OVERVIEW OF ALTERNATIVES 1, 3 & 4

Consideration	Alt 1: No action, fish passage improvement	Alt 3: Full dam removal with active restoration	Alt 4: Full dam removal with passive restoration
Aquatic organism habitat	No improvement	Full removal provides largest habitat improvement by restoring a natural river system; active restoration mitigates temporary negative impacts and typically shows better short-term recovery.	Passive restoration may lead to temporary negative habitat impacts until equilibrium is re-established
Dam Safety	Flat Rock Dam remains a high-hazard dam.	Dams are removed, removing all long-term safety hazards and risk.	
Public Recreation	Recreational access unchanged with paddlers required to use gated portage route	Barrier removed and no portages required with the project area returned to a functioning riverine system	

HURON-CLINTON METROPARKS

OVERVIEW OF ALTERNATIVES 1, 3 & 4

Consideration	Alt 1: No action, fish passage improvement	Alt 3: Full dam removal with active restoration	Alt 4: Full dam removal with passive restoration
Regulation Change Consideration	Potential dam regulation changes may add $3.5 million to maintenance costs over 50 years.	Flat Rock Dam removed and no longer regulated by EGLE. No long-term maintenance costs anticipated.	
Initial Construction Cost	Flat Rock Dam – $2.6 Million	Flat Rock Dam – $37.09 Million.	Flat Rock Dam – $29.57 Million

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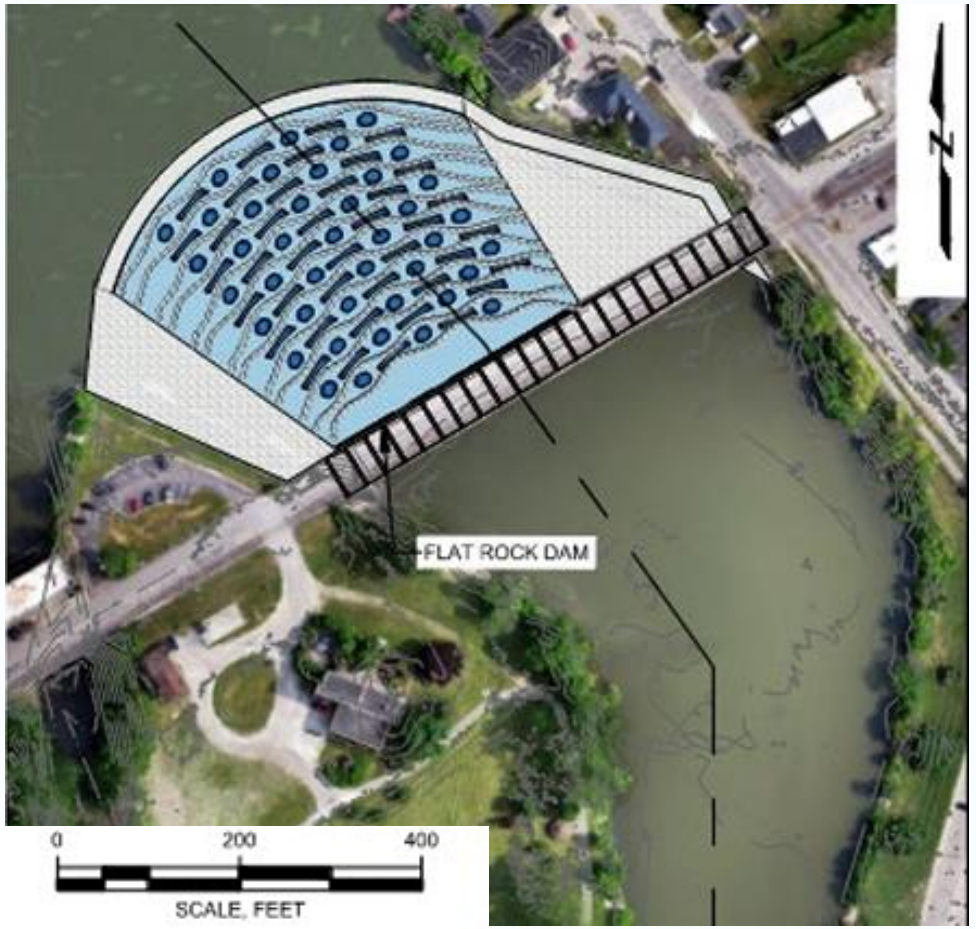
OVERVIEW OF RECOMMENDATION OF ALTERNATIVE #2: PARTIAL DAM REMOVAL

- Partial dam removal of the Flat Rock Dam includes building rock arch rapids to maintain a similar reservoir level and tailwater conditions
- These are human-made structures that look and function like natural rapids, made by placing large boulders in a series. The water flows over and around the rocks, creating gentle steps or mini-waterfalls that fish can swim through, instead of being completely blocked by a dam.
- Benefits: continues current recreational (i.e. flatwater) activities, maintains current impoundment levels to adjacent properties, holistically improves fish passage for native fish species, reduces the risks associated with the Flat Rock Dam, and removes the hazardous portage for paddlers.
- Drawbacks: this option perpetuates ongoing sediment buildup, contributes to potential water quality issues within the impoundment, continues to disrupt the river ecosystem, and requires ongoing maintenance costs.
- This style of dam modification has been implemented across the Midwest



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ALT #2: ENVIRONMENT & ECOSYSTEM CONSIDERATIONS

- Overall, good for the environment.
- Wetlands, shore areas and habitats will not be affected.
- Sediment movement and slow-flowing area that support fish, birds, and reptiles will mostly stay the same.
- After construction, the river bottom in that area will go from sandy to rocky.
    - This change might cause some short-term disruption but will improve habitat for fish and help them move upstream more easily over time.

ALT #2: WETLANDS & THREATENED AND ENDANGERED SPECIES

- Before starting, a mussel survey must be done in areas that will be disturbed (like spots where the riverbed is dug up or reinforced).
- Mussel surveys can be done up to five years in advance, but relocation needs to happen within two years of the project. If any federally protected mussels (like the Snuffbox) are found, the U.S. Fish and Wildlife Service (USFWS) must be consulted.

ALT #2: FISH HABITAT

- Various surveys performed by the MDNR have documented that the Huron River around Flat Rock supports 38 species of fish, only 8 of these species are present in the impoundment upstream of the Flat Rock Dam.
- The rock arch rapids that alternative #2 will provide, allows for upstream access to observed fish. Improved fish passage will also result in a greater diversity and abundance of mussels, as they require fish as hosts for reproduction.

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ALT #2: NATURE-LIKE FISHWAY

- Gaps in between the rocks will allow fish to burst swim through them and enter pools ranging from 2 to 6 feet deep providing resting locations for fish prior to approaching the next upstream rock.
- Construction materials for the proposed rapids should have a substrate that is advantageous for spawning of multiple species such as Lake Sturgeon.

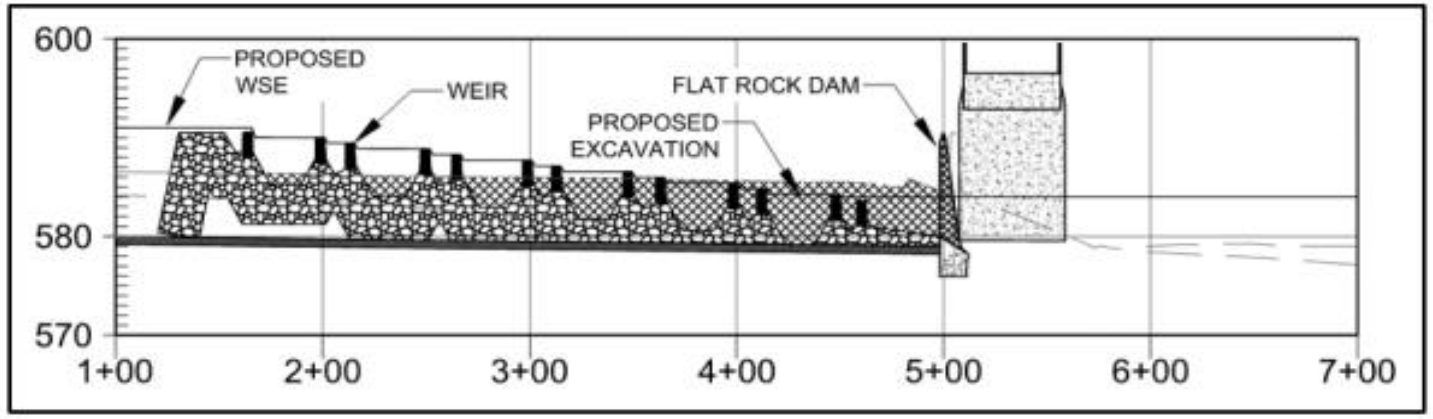

Figure 12: Partial Dam Removal - Profile View of Flat Rock

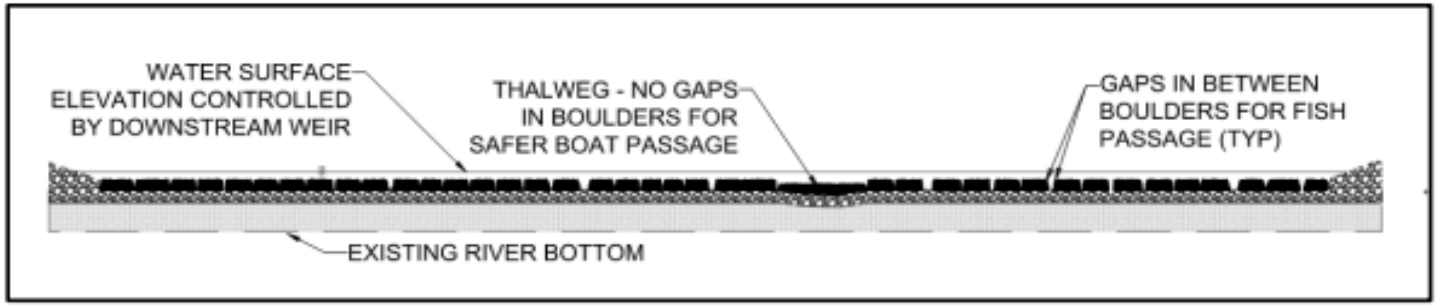

Figure 13: Partial Dam Removal - Cross Section of Rock Arch Rapids Weir

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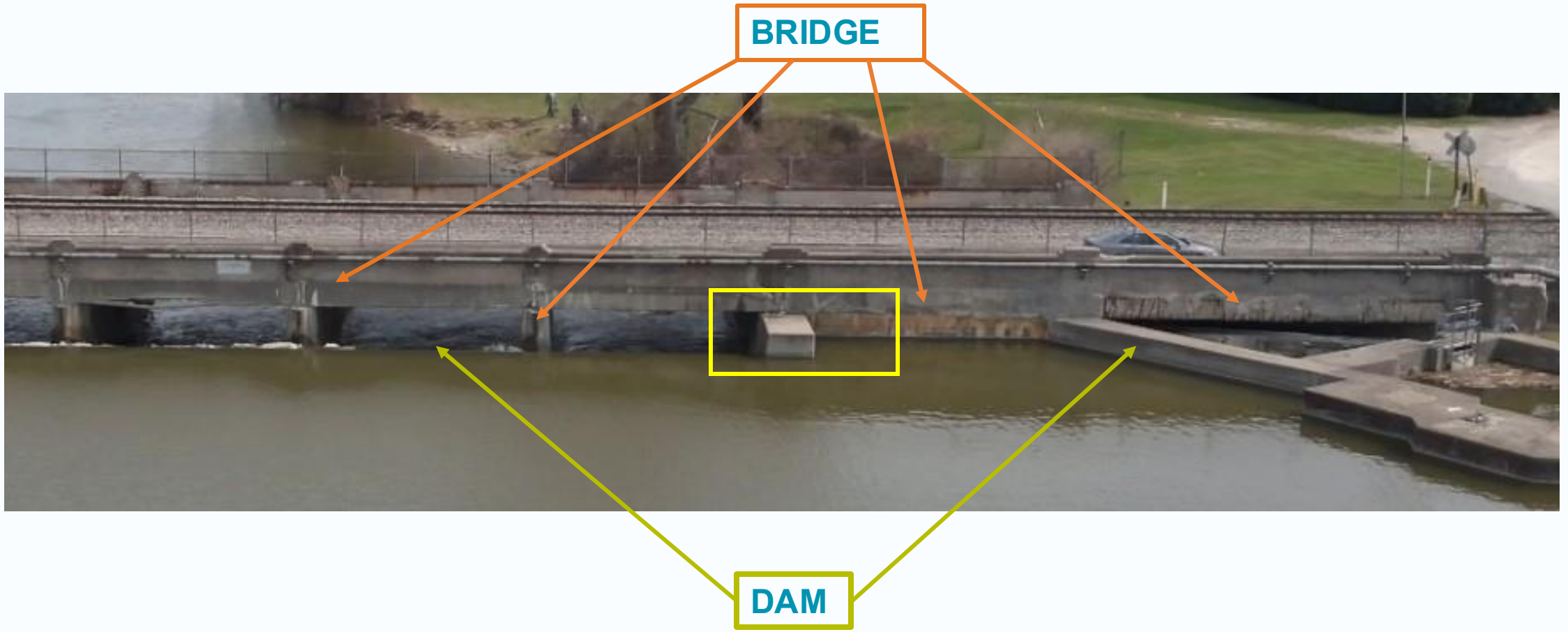
ALT #2: SEA LAMPREY BARRIER

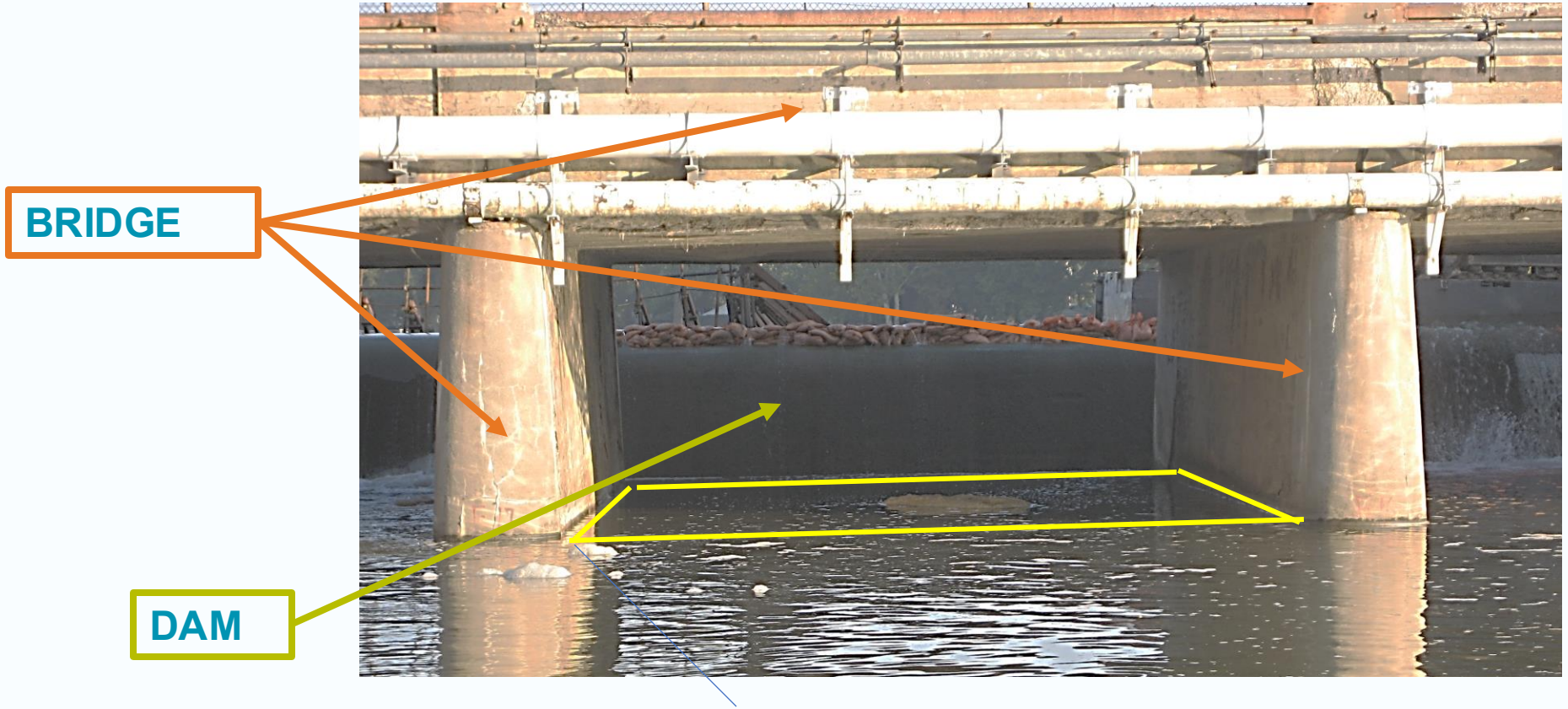
- The U.S. Fish and Wildlife Service (USFWS) has determined Sea Lamprey production potential in the Huron River to be low.
- The USFWS would continue Sea Lamprey monitoring efforts and determine the need for a sea lamprey barrier in the case that an infestation were detected.

DAM AND BRIDGE SECTIONS



HURON-CLINTON METROPARKS

DAM AND BRIDGE SECTIONS



DAM CONCRETE
REPAIRS 2008

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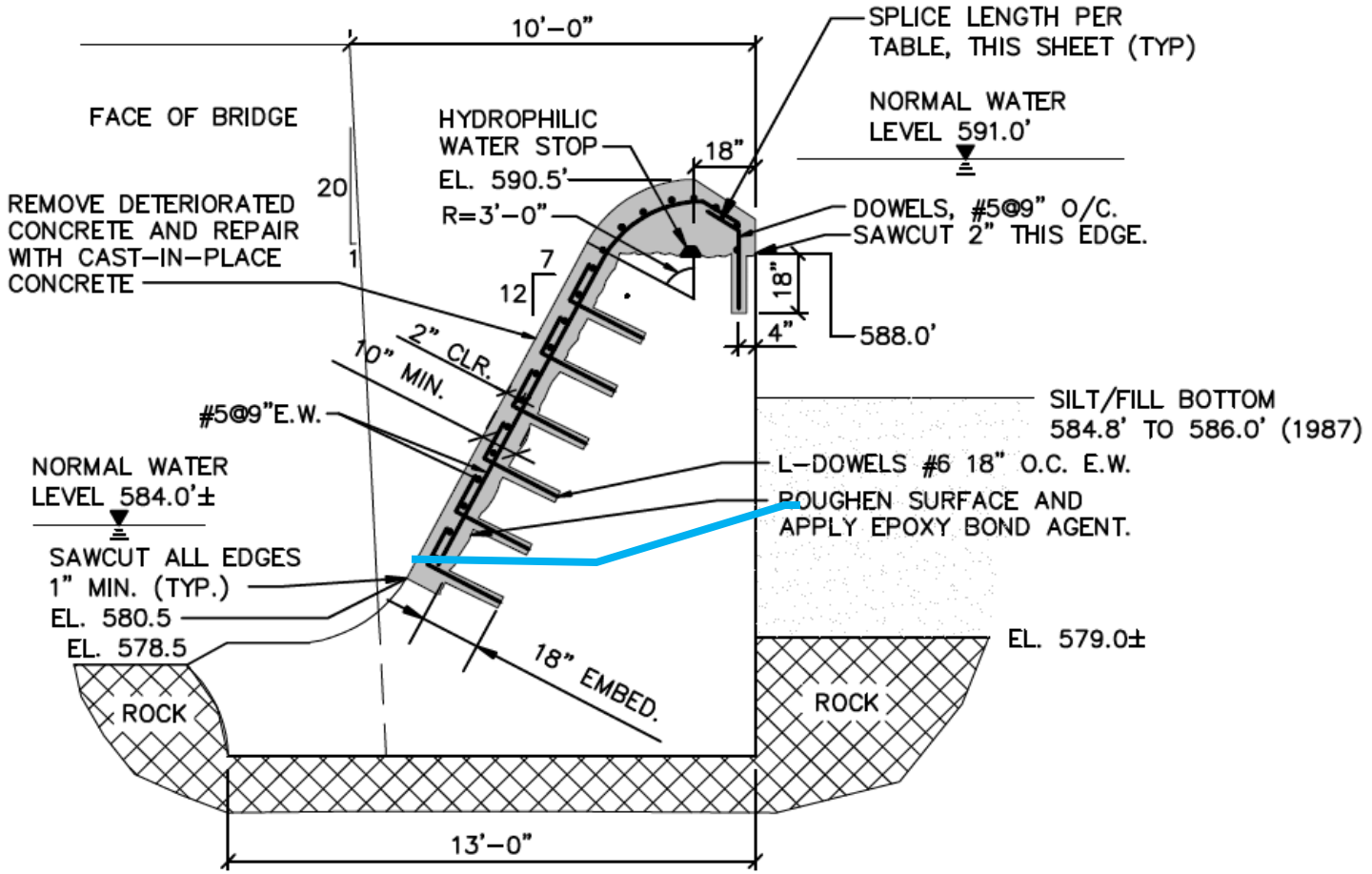
DAM SPILLWAY SECTION REPAIRS 2008



REPAIR TO SPILLWAY CREST AND OGEE SECTION

SCALE: NONE

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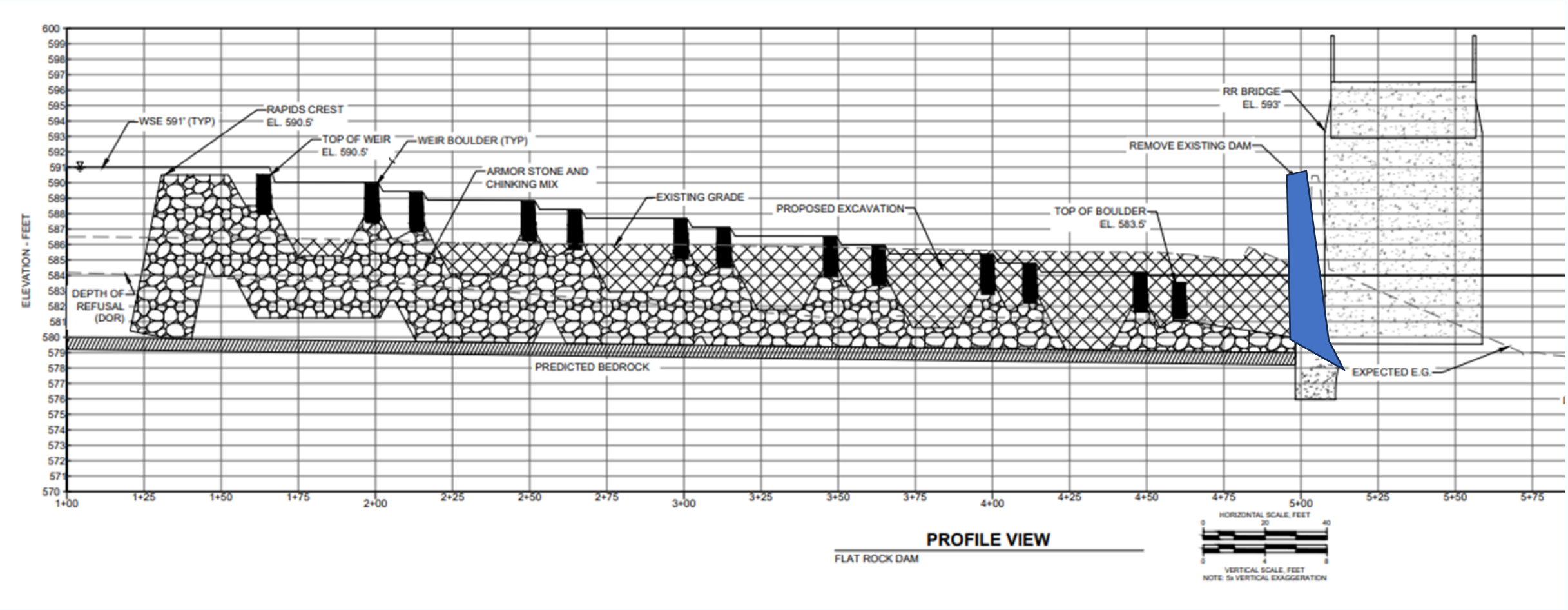
PARTIAL REMOVAL

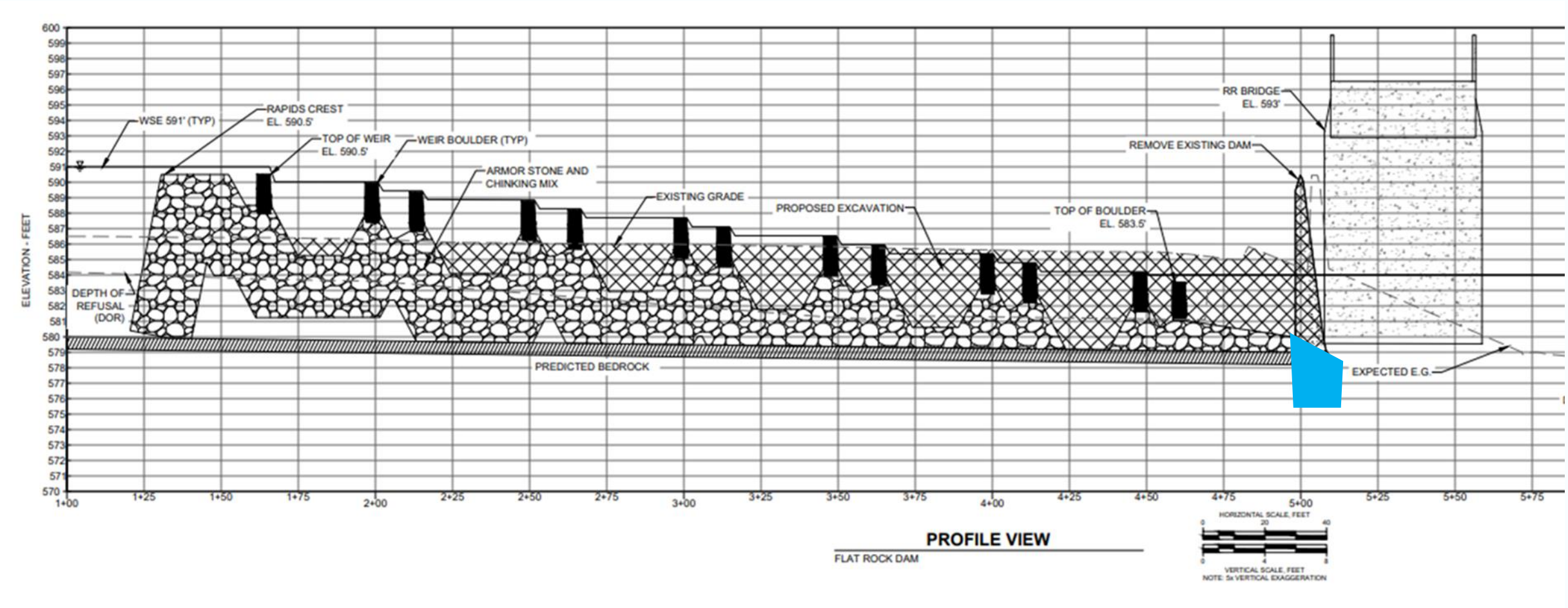


PROFILE VIEW

FLAT ROCK DAM

HURON-CLINTON METROPARKS

PARTIAL REMOVAL



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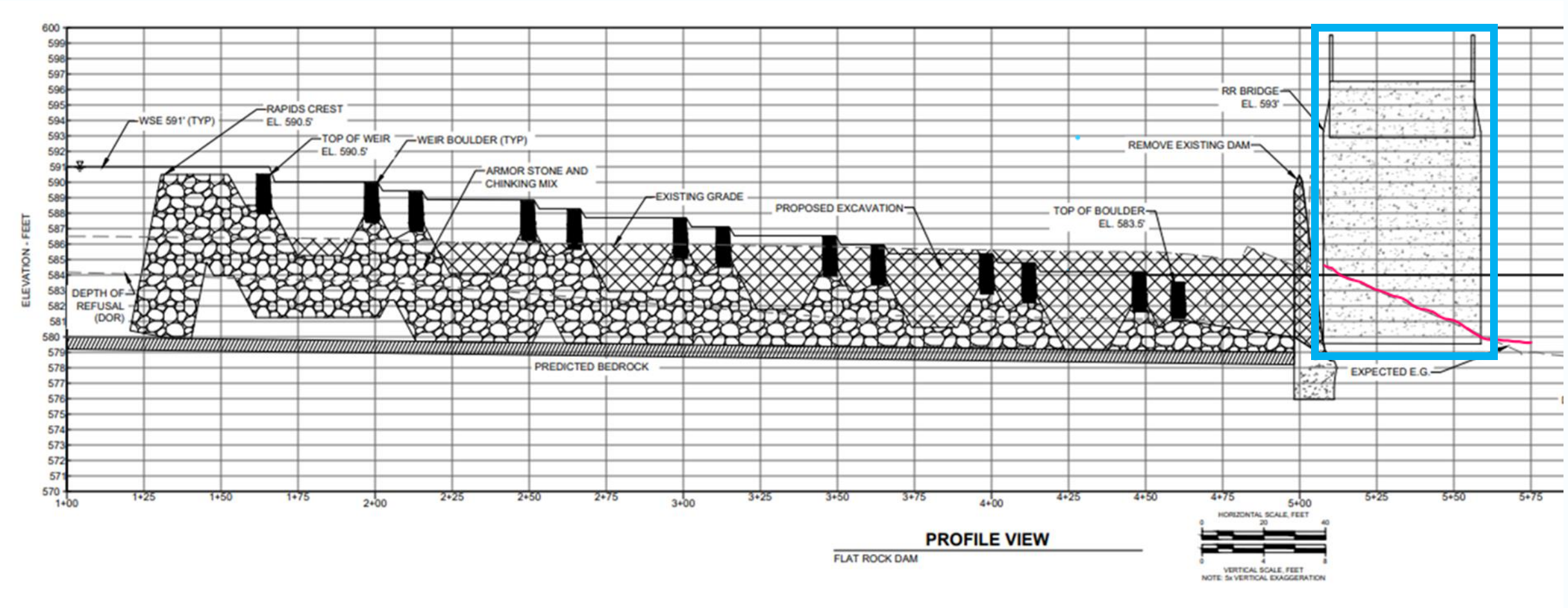
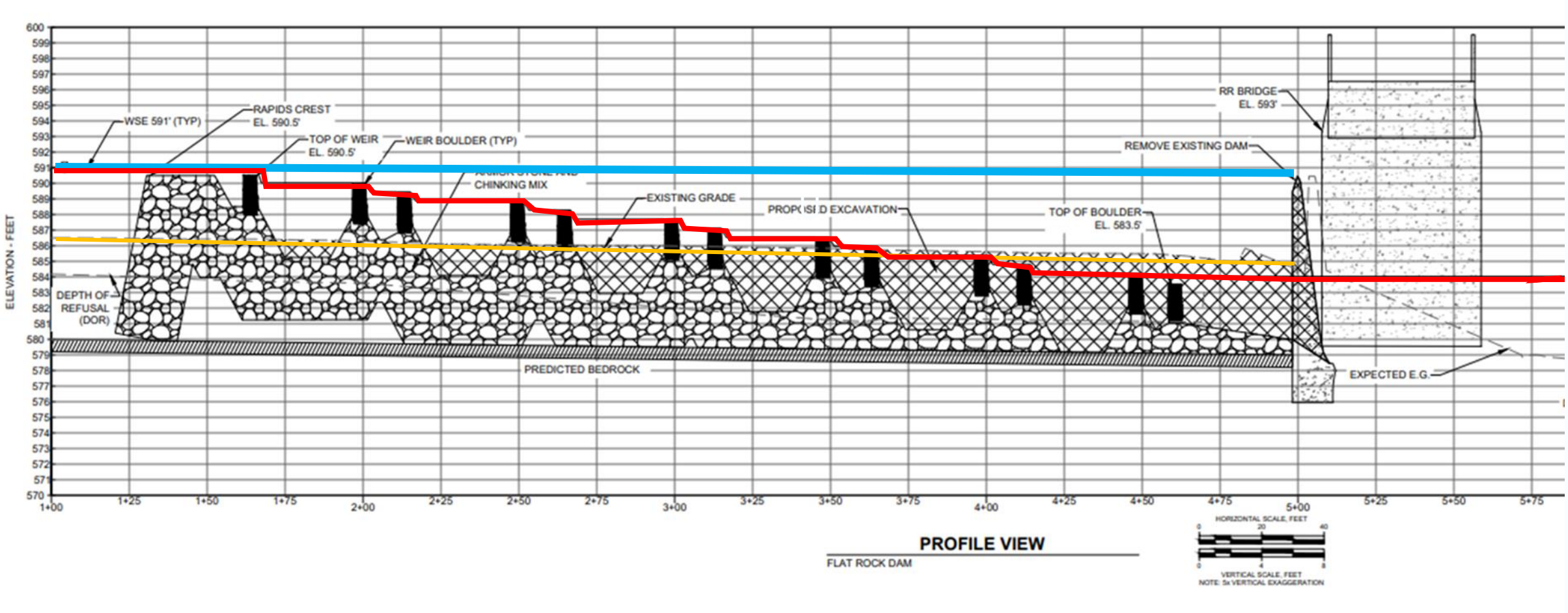


PARTIAL REMOVAL



PROFILE VIEW

FLAT ROCK DAM

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SEDIMENT TESTING

- Sediment samples were collected in September 2023 for the feasibility study. The feasibility study included 10 sediment cores as a preliminary investigation to understand the sediment contamination levels.

  None of the sediment sampling locations had pollutant levels that exceed the guidelines for aquatic ecosystem protection for metals, PAHs, or PCBs.

  There were 3 locations that measured arsenic levels exceeding the EGLE Part 201 Residential Direct Contact Values, but all were below the levels identified in the Michigan Background Soil Survey Criteria as meeting background soil concentrations for this region

- The current guidelines for sampling impounded sediment were followed from the WRD-048: *Sediment Testing for Dredging Projects.*
- Future sediment testing for any selected alternative will be completed per EGLE requirements and furthermore, a sediment management plan will be required.

  EGLE guidance for dredging and remediation projects typically require 94-109 samples to fully characterize the volumes of impounded sediments on site.

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ALT #2: ECONOMIC BENEFITS

- Current water levels of the impoundment would not change significantly

- Local economic value from construction
  Short term, removal of dam and construction of rock arch rapids could create 32 jobs, $2 million in wages, and add $3.3 million in local economic value.

This rock riffle in Pine River replaced a traditional dam built in 1910 to hold back water flowing from Norway Lake into the Pine River. The old dam was designated as "high hazard," thus in need of replacement. (Minnesota Prairie Roots copyrighted photo July 2024)

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ALT #2: ECONOMIC BENEFITS

Expected boost to recreation

- This would include fishing, canoeing, and kayaking which would also support more jobs and economic growth.
- In the area within 10 yrs, an increase would be expected (more than double) in opportunities for shopping, restaurant visits, lodging for recreation.

A kayaker paddles down Knutson Dam rapids on Cass Lake in Minnesota. The 2015 project removed the failing Knutson Dam and reconnected the Mississippi River at the outlet of Cass Lake with rock arch rapids, restoring spawning habitat for warm-water species such as walleye and white sucker. Courtesy of Minnesota DNR

An angler fishes midstream of Norway Brook in Pine River, Minnesota, on Thursday, June 30. The city, with help from the Minnesota Department of Natural Resources, recently replaced a century-old gated dam with a series of boulders – known as a rock riffle or rock arch rapids. Kirsti Marohn | MPR News

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COMMUNITY CONSIDERATIONS

- Maintains current level of impoundment
- Improves safety by mitigating structural risks
- Exhibits fiduciary responsibility for local community and Southeast Michigan

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ALT #2: ECONOMIC BENEFITS

Consideration	Alternative 1 – No Action: Fish Passage Improvements	Alternative 2 – Partial Dam Removal of the Flat Rock and Huroc Dams	Alternative 3 – Full Dam Removal of the Flat Rock and Huroc Dams with Active Restoration	Alternative 4 – Full Dam Removal of the Flat Rock and Huroc Dams with Passive Restoration
		rock arch rapids or utilize safer, easier to access portage route adjacent to river.		
Regulation Change Considerations	Potential dam regulation changes may add $3.5 million to maintenance costs over 50 years.	Potential dam regulation changes may add $600,000 to maintenance costs over 50 years.	Flat Rock Dam removed and no longer regulated by EGLE. No long-term maintenance costs anticipated.	
Initial Cost to Construct Estimate	Flat Rock Dam – $2.6 Million Huroc Dam – $750,000 Total – $3.35 Million	Flat Rock Dam – $11.35 Million Huroc Dam – $1.23 Million Total – $12.57 Million	Flat Rock Dam – $37.09 Million Huroc Dam – $2.84 Million Total – $39.93 Million	Flat Rock Dam – $29.57 Million Huroc Dam – $1.73 Million Total – $31.30 Million
Additional 50-year Life Cycle Cost Estimate (2024 Dollars and Future Dollars based on annual 4% interest rate)	*2024 Dollars:* $2.5 Million (No Legislation Change) / $6 Million (Legislation Change) *Future Dollars:* $13.85 Million (No Legislation Change) / $21.86 Million (Legislation Change)	*2024 Dollars:* $2.5 Million (No Legislation Change) / $3.1 Million (Legislation Change) *Future Dollars:* $13.84 Million (No Legislation Change) / $15.77 Million (Legislation Change)	*2024 Dollars:* $1.37 Million *Future Dollars:* $3.40 Million	*2024 Dollars: $1.62 Million* *Future Dollars: $3.70 Million*

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ALT #2: PERMITTING PROCESS

- Alternative #2, partial dam removal will require an EGLE Joint Permit. This joint permit application process is a coordinated approach to streamline the agencies and number of permits as part of a process. The U.S. Army Corps and EGLE are the primary permitting agencies, but also typically consult with the Michigan DNR and the U.S. Fish and Wildlife Service. It includes:
  - Part 315 Dam Safety: for constructing, repairing, or removing dams to make sure they meet safety requirements
  - Part 31 Water Resources Protection (Floodplains): For activities related to water use and discharge, protecting floodplain functions, and minimizing flooding impacts
  - Part 301: Inland Lakes and Streams: For activities like dredging, filling or constructing structures in or near inland lakes and streams
  - Part 303: Wetlands Protection: For activities that may alter or impact wetlands
  - Part 91: Soil Erosion and Sedimentation Control: For earth changes that disturb one or more acres of land or are within 500 feet of a lake or stream.

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NEXT STEPS

- The Huron-Clinton Metroparks board is scheduled to vote on the recommended alternative at the September Board of Commissioners meeting (Sept 11 @ Willow)
- The Metroparks can formally accept the funding for the future design work already secured through the NOAA grant award
- If authorized by the Board of Commissioners, a Request for Proposals would go out through our purchasing and engineering departments for design engineering
- Once an engineering consultant is selected, it is expected that design could take up to two years
- Review of the design with permitting agencies would be expected to take at least six to nine months after design is complete
- Concurrently, funds would have to be raised by securing grants, and budgeting for matching funds appropriately
- At that time, once permits are secured, the project could be put out for competitive bidding for potential construction contractors (2-3 month process).

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THANK YOU.