Exeter Reservoir Dam Feasibility Study

River Advisory Committee Project Update #4

July 17, 2025

Presented By

Stephanie Hudock, PE
VHB Project Engineer

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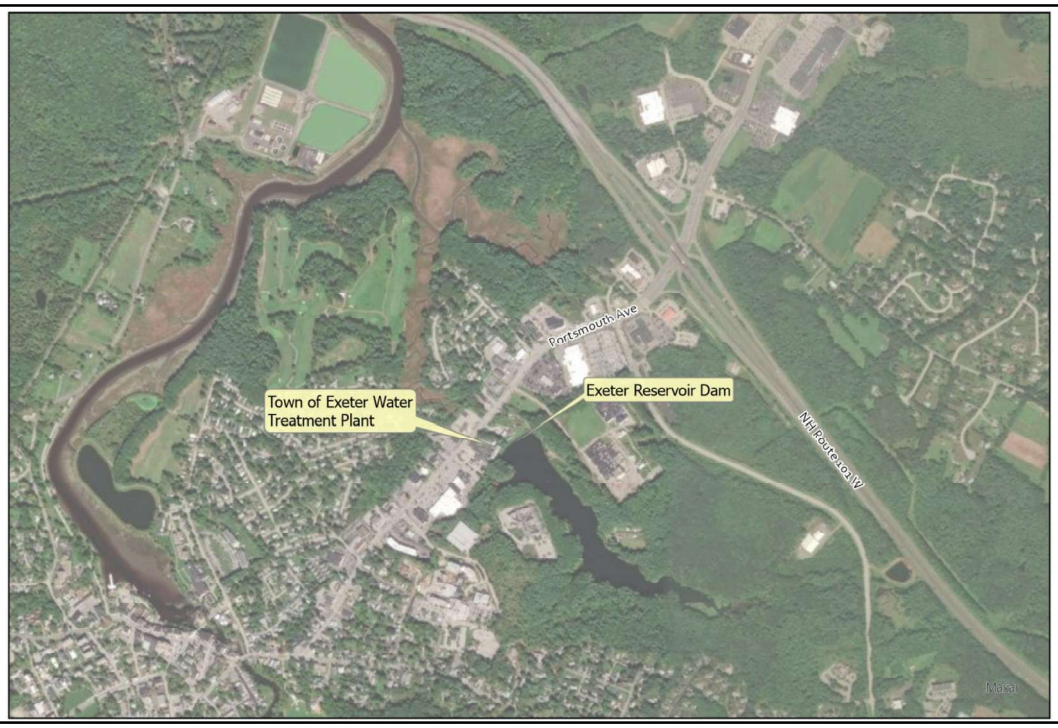

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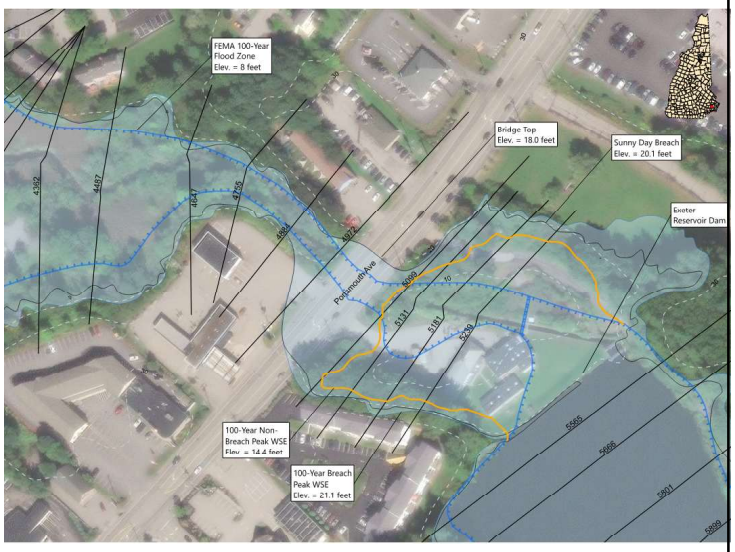
Background

- Commonly known as WaterWorks Dam
- Pickpocket Dam Letter of Deficiency requesting Breach Analysis
  - Exeter Reservoir only had simplified Breach Analysis
- Breach Analysis confirmed High-Hazard Classification
  - Overtops Portsmouth Avenue
  - Flood heights greater than 1' on 1st floor of 3 structures - water treatment plant (4,500 customers) and 21 Webster Ave
- Feasibility Study to evaluate alternatives to bring dam into compliance
  - Pass 1,000 Year Event with 1' of freeboard without manual operations



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Exeter Reservoir Dam

- High Hazard and in Poor Condition
- Concrete face earth fill dam with steel sheet piling
  - 15' high and 248' long
  - Top of Concrete ~23.4'
- 49' long spillway that leads into 8' wide and 220' long sluiceway
  - Top of Stoplogs: 21.6'
  - Top of Concrete Weir: 19.65'

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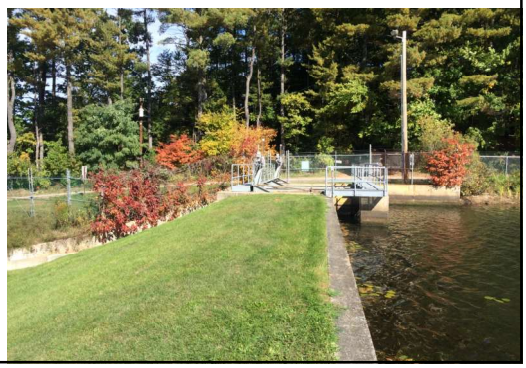

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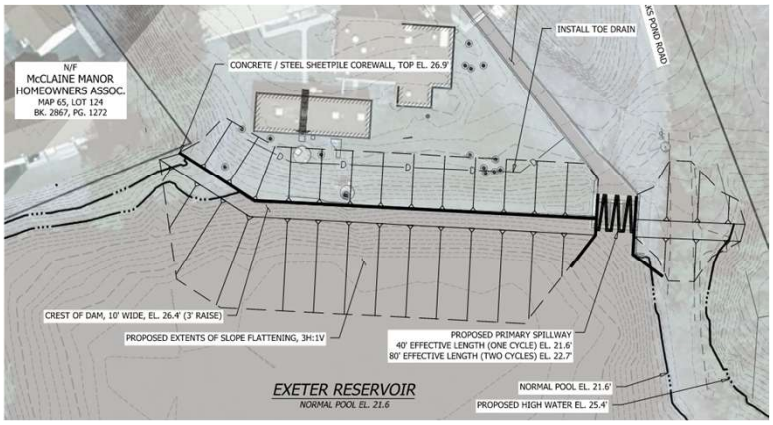
Alternative 1:

- Raise top of dam 3.0 feet (earthen fill), replace spillway with labyrinth weir having 120-foot effective length



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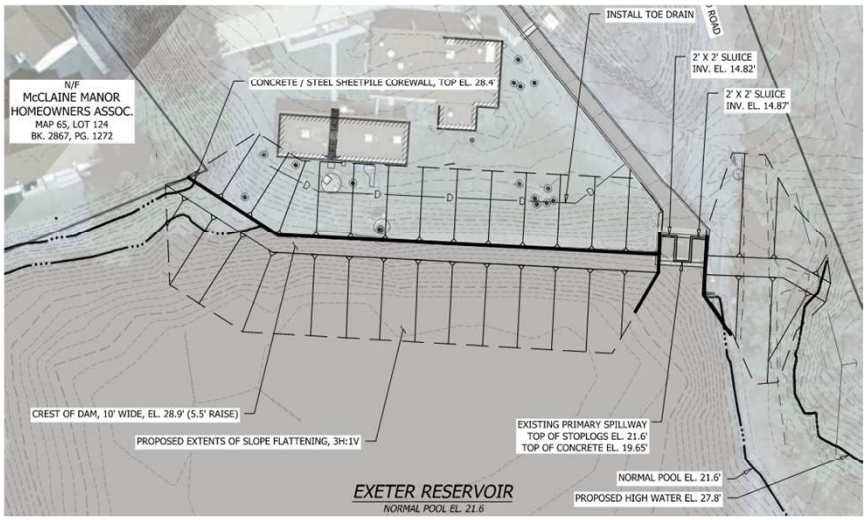
Alternative 2

- Raise top of dam 5.5 feet (earthen fill), keep existing spillway
  - Would acquiring 20-feet beyond limits of embankment into 105 Portsmouth Ave Property
  - Slight impact to WTP could be avoided.



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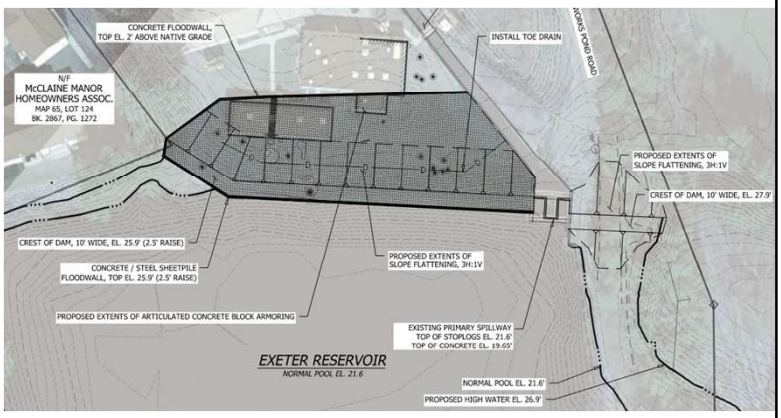
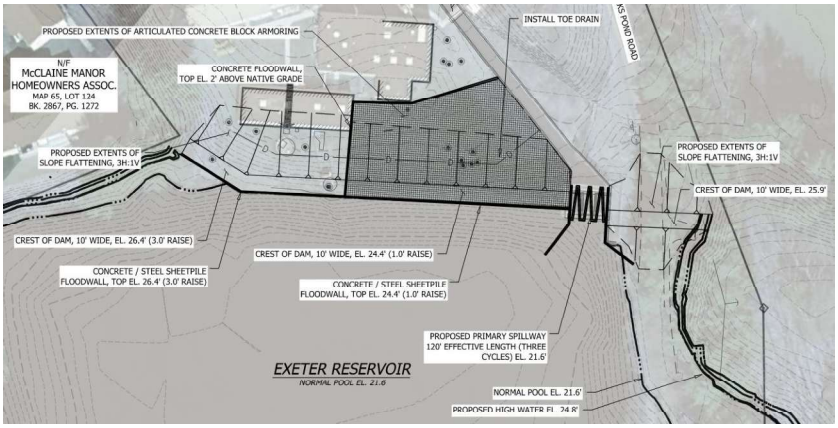
Alternative 3

- Raise top of dam 2.5 feet (earthen fill), keep existing spillway, install overtopping protection
  - Would require removal / reconfiguration of the SWTP



Alternative 4

- Raise top of dam 1.0/3.0 feet (earthen fill or floodwall), replace spillway with labyrinth weir having 120-foot effective length, install overtopping protection over 150 feet of dam
- Will require floodproofing of Surface Water Treatment Plant



Cost Comparison

	Alt 1: Raise Dam, Labyrinth Spillway	Alt 2: Raise Dam, Existing Spillway	Alt 3: Raise Dam, Overtopping Protection, Existing Spillway	Alt 4: Raise Dam, 150' Overtopping Protection, Labyrinth Spillway
Construction Components				
General Items	$156,310	$64,375	$115,475	$135,035
Mob. & Demob.	$18,600	$18,000	$18,000	$18,000
Erosion Controls	$29,100	$29,100	$12,785	$12,785
Control of Water	$310,000	$310,000	N/A	$220,000
Raise Dam	$912,275	$2,062,550	$681,800	$403,600
Extend / Raise Core Wall	$140,850	$676,350	$100,800	$82,050
Install Toe Drain	$22,116	$22,116	$22,116	$22,116
Install Labyrinth Spillway	$925,700	N/A	N/A	$925,700
Install Overtopping Protection	N/A	N/A	$549,800	$290,000
Install Concrete Floodwall	N/A	N/A	$96,000	$68,000
General Items				
30% Design Contingency	$755,000	$985,000	$480,000	$654,000
Const. Cost w/Contg.	**$3,269,000**	**$4,267,000**	**$2,077,000**	**$2,832,000**
Engineering & Permitting	$505,000	$655,000	$327,000	$425,000
Project Admin Costs	$50,000	$50,000	$50,000	$50,000
Const. Phase Services	$326,900	$426,700	$207,700	$283,200
Total Const. Phase Cost	**$4,151,000**	**$5,399,000**	**$2,662,000**	**$3,605,000**

* Cost to reconstruct sluiceway estimated at $1.25 Million

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Hydraulic Findings

- Alternative 1:
  - 2-Year Event: Increased discharge rate
  - 50 & 100 Year Events: Discharge rate and water surface elevation reduced
  - 1,000 Year Events: Peak discharges decrease, but water surface elevation slightly increased
- Alternative 3:
  - 2-Year Event: Operates identically to existing conditions
  - Greater than 2-year Events: Results in lower peak discharges and higher water surface elevations
  - Comparison to Alternative 1: Peak discharges are generally less than or equal to those in Alternative 1, but water surface elevations are higher

Alternative 4:

- Similar results to Alternative 1

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Hydraulic Findings Continued

Upstream of Dam

	Existing			Alternative 1			Alternative 3			Alternative 4		
River Flow	Peak Flow (cfs)	Water Surface Elev.	Avg. Velocity (fps)	Peak Flow (cfs)	Water Surface Elev.	Avg. Velocity (fps)	Peak Flow (cfs)	Water Surface Elev.	Avg. Velocity (fps)	Peak Flow (cfs)	Water Surface Elev.	Avg. Velocity (fps)
Normal Flow	10	21.8	0	10	21.7	0	10	21.8	0	10	21.7	0
2-Yr	187	22.9	0	2334	22.4	0	1867	22.9	0.04	234	22.4	0
50-Yr	977	24.2	0.2	947	23.7	0.2	815	25	0.2	947	23.7	0.2
100-Yr	1,165	24.3	0.2	1,125	24	0.2	980	25.4	0.2	1,125	234	0.2
1000-Yr	2,019	24.9	0.3	1,952	25	0.3	1,951	26.7	0.3	1,989	24.9	0.3
Future 1000 -Yr	2,394	25.1	0.4	2,319	25.4	0.3	2,349	26.9	0.3	2,369	25.2	0.4

Downstream of Dam

	Existing			Alt 1			Alt 3			Alt 4		
River Flow	Peak Flow (cfs)	Water Surface Elev.	Avg. Velocity (fps)	Peak Flow (cfs)	Water Surface Elev.	Avg. Velocity (fps)	Peak Flow (cfs)	Water Surface Elev.	Avg. Velocity (fps)	Peak Flow (cfs)	Water Surface Elev.	Avg. Velocity (fps)
Normal Flow	10	4	0.6	10.6	4	0.6	10	4	0.6	10	4	0.6
2-Yr	192	5.5	2.9	240	5.7	3.2	192	5.5	2.9	240	5.7	3.2
50-Yr	1,000	7.3	7.5	969	7.3	7.3	884	7.1	7.1	969	7.3	7.3
100-Yr	1,187	7.6	8.1	1141	7.5	7.9	1001	7.3	7.5	1,141	7.5	7.9
1000-Yr	4,061	9.9	14.9	3,960	9.9	14.7	3,946	9.9	14.7	4,020	9.9	14.8
Future 1000 - Yr	4,811	10.4	16	4,711	10.3	15.9	4,742	10.3	15.9	4,768	10.3	16

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Questions?

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Pickpocket Dam Removal

River Advisory Committee Project Update #1

July 17, 2025

Paul Vlasich, PE
Town Engineer
Stephanie Hudock, PE
VHB – Water Resources Engineer

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General Updates

- Grants
  - Great Bay 2030 Approved
    - $300,000 in funding
    - Finalizing scope of work
    - Utilizing GB2030 funds this year would allow for project completion up to the 60% design plans and early permitting stages
  - Submitted NOAA CZM Grant in January
    - Original selection notice planned for March 2025, Delayed due to new federal grant review process
    - Likely not selected, CZM office has notified potential awardees to begin the negotiation process
  - Submitted NOAA Barrier Removal Grant in February
    - Selection notice planned for late Fall 2025
  - Submitted Pre-Proposal for NWFW National Coastal Resilience Grant
    - Not selected

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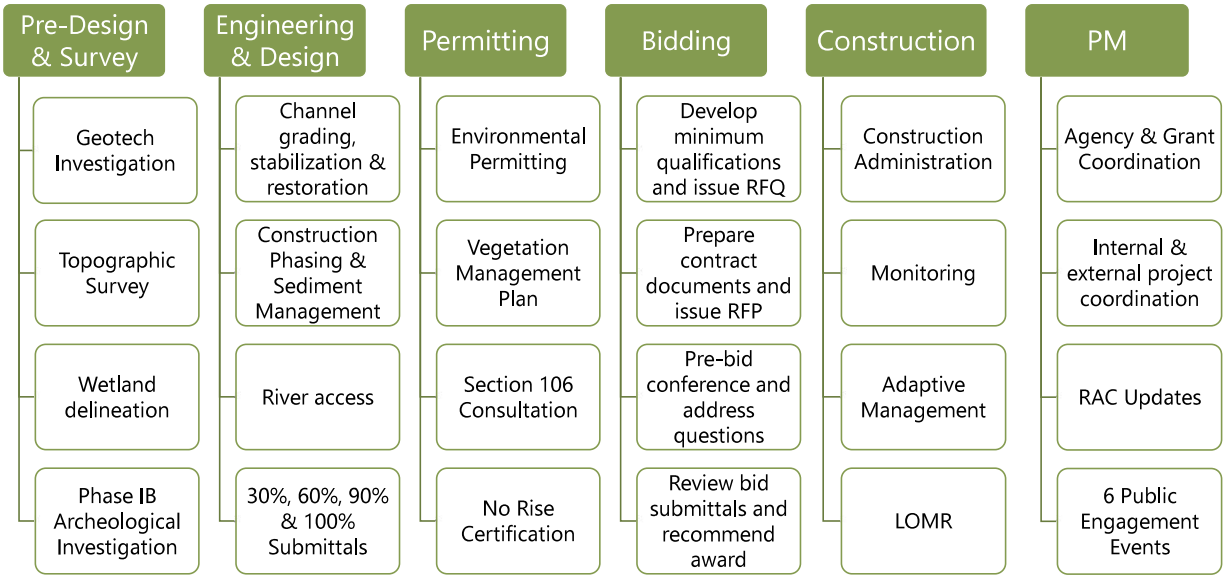
Scope of Work



Questions?