

TECHNICAL MEMORANDUM



To: Audra Caler ¹
From: Mike Burke, P.E. ²
Date: September 2024, Revised February 2025
Project: Megunticook River Restoration Project
Re: Montgomery Dam Cost Analysis Memorandum

This memorandum describes the estimated opinions of probable cost associated with three different alternatives developed for the Montgomery Dam in Camden, ME. To expand the resolution of the estimated costs for cost variations and incremental cost factors discussed with the MRCAC, eleven incremental cost scenarios are presented within that are based on the three alternatives. The alternatives of interest and the associated cost scenarios are shown in Table 1 and were developed by the primary consultant Inter-Fluve, with assistance from Kleinschmidt Associates and Tandem Landscape Architects, for the Town of Camden. These cost opinions are intended to enable relative comparison, with additional design development to refine later opinions of cost as the level of design matures to further advance planning and funding. The cost opinions are organized so that the incremental costs of including a) fish passage, b) seawall adaptation and repair, and c) seawall and lower park resiliency measures (increased seawall crest and lower park elevation) can be separated for comparison. Detailed descriptions of the different items included in the opinions of cost and the assumptions made in preparing the cost analysis are described in the following pages. In comparison to the original September 2024 memo, Scenario DR1R was added in February to reflect additional refinements made to the dam removal scenario in fall 2024.

¹ Town of Camden, Town Manager

² Inter-Fluve, Principal Water Resources Engineer.

Table 1: Alternatives and Cost Scenarios Summary

Scenario ID	Dam Alternative	Fish Passage	Seawall & Lower Park
R0	Dam Rehabilitation	No Fish Passage	No Seawall Rehabilitation
R1	Dam Rehabilitation	No Fish Passage	Seawall Rehabilitation
R1R	Dam Rehabilitation	No Fish Passage	Seawall Rehabilitation with parapet wall elevation enhancement and park grade changes for resiliency
R1FP	Dam Rehabilitation	Pool & Weir Fishway	Seawall Rehabilitation
R1RFP	Dam Rehabilitation	Pool & Weir Fishway	Seawall Rehabilitation with parapet wall elevation enhancement and park grade changes for resiliency
P0	Partial Spillway Reconstruction	Pool & Weir Fishway	No Seawall Rehabilitation
P1	Partial Spillway Reconstruction	Pool & Weir Fishway	Seawall Rehabilitation
P1R	Partial Spillway Reconstruction	Pool & Weir Fishway	Seawall Rehabilitation with parapet wall elevation enhancement and park grade changes for resiliency
DR0	Dam Removal	Bedrock Channel Modifications	Seawall Adaptation
DR1	Dam Removal	Bedrock Channel Modifications	Seawall Adaptation with elevation enhancement and park grade changes for resiliency
DR1R (DR1 Revised)	Dam Removal	Bedrock Channel Modifications	Seawall Adaptation with elevation enhancement and park grade changes for resiliency, "Scenario C" as rendered in Fall 2024

COST ANALYSIS

The cost analysis was prepared based on 2024 dollars. The goal for the initial construction cost analysis fits in the range of Class 4 (study or feasibility) estimates according to the definitions developed by the American Association of Cost Engineering (AACE 2016³). According to the AACE, the expected accuracy range for Class 4 cost estimates is between -15% to -30% and +20% to +50%. For this application, based on the estimation approach including the integration of contingency, we regard the accuracy range as -15% to +20%.

The cost analysis includes initial construction costs, estimated operation and maintenance costs for a fifty-year planning horizon, and project delivery costs (project management, design, permitting, and construction period engineering).

The cost opinions are based on review of construction costs for similar items in past projects and applicable reference cost data. The actual implemented cost may vary from these estimates, based on market factors, detailed design development and possible optimization, and other factors. Refinement of quantities and unit prices will occur in future more detailed design phases.

Recent bid results (in particular between 2018 and 2023) have seen substantial escalation and volatility in bid pricing, experienced before, during and after the COVID-19 pandemic. The volatility and escalation commenced due to non-COVID factors but accelerated through the pandemic. Conversations with construction contractors suggest costs may continue to escalate with increased stimulus and infrastructure spending, rising rates of inflation, rising material and fuel costs, and labor shortages.

With the present economic developments nationally, which may include imposition of substantial tariffs on international trade and other factors including impacts to labor markets, it is expected that construction pricing volatility, including potentially significant additional cost escalation, will continue. Opinions of initial construction cost include a 30% construction contingency that includes considerations for the uncertainty due to the current level of design and these market factors. Refinement of designs, quantities and unit prices will continue in subsequent design phases.

HISTORICAL DAM REPAIR AND MAINTENANCE COSTS

A historical cost report⁴ was provided by the Town to Inter-Fluve which details known capital investments made by the Town of Camden on the Montgomery Dam since 1992. The historical cost report includes known investments made by the Town that had proof of receipt. However, we understand that this list is not exhaustive of all investments. These investments characterize repairs. No information has been provided regarding operation costs (labor and expense costs for Town staff to periodically operate gates, and other periodic operation and maintenance needs).

To inform an analysis of lifespan costs associated with the Montgomery Dam, an analysis of the reported historical costs was completed. All reported historical costs were escalated to 2023 dollars based on annual inflation index values from two primary sources, the RS Means Historical Construction Cost

³ AACE 2016. Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries. Rev. March 1, 2016.

⁴ Montgomery Dam Historic Cost Report, A. Caler

Index⁵, and the Engineering News Record Historical Construction Cost Index⁶. The average cost of the maintenance of the dam was then calculated based on 2023 dollars. A summary of the historical costs escalated to 2023 dollars is included in Appendix A.

ANALYSIS OF LIFESPAN COSTS

Annual operation and maintenance costs and periodic inspection and repair costs were included in the cost analysis. The dam removal scenarios are associated with the lowest lifespan costs, although nominal ongoing costs were assumed. These are not related to the dam (which would no longer exist), but the other constructed features that are components of that overall scenario, such as shoreline systems and vegetation. Compared to dam removal, the partially-retained dam with the pool and weir fishway and the dam rehabilitation alternative were assessed to have greater annual operation and maintenance costs, and greater periodic inspection and repair costs. Annual operation and maintenance costs were estimated based on typical values for small dams in Maine. The annual costs are scaled according to the anticipated operational requirements of each option. The periodic repair costs assumed for each option were informed by the historical dam repair and maintenance costs reported above.

Lifespan costs based on recurring costs in 2024 dollars were summarized in two alternate ways. First, they were escalated for an assumed 3.5% rate of inflation over the 50-year period and aggregated to represent a total lifespan cost. Second, the total lifespan costs were discounted to estimate the sum in 2024 dollars that would be required to be invested (in 2024) at a 2% effective interest rate (actual interest minus inflation) to pay for the total aggregated cost over time.

The 3.5% rate of inflation was selected based on the RS Means Heavy Construction Index (RS Means 2023⁷) over the period from 1985 to 2023. The index is regionally adjusted to Lewiston, Maine.

COST ANALYSIS ASSUMPTIONS

Several assumptions were made to facilitate preparation of the cost analysis for each option, discussed below.

General

The following assumptions were made in the development of the cost opinions.

- Costs are based on 2024 dollars.
- Costs were developed utilizing unit pricing from past projects, consultations with construction contractors, and RSMeans database considering union contractor pricing localized in the vicinity of Bath and Lewiston, Maine. Massachusetts and Maine Department of Transportation weighted average unit bid prices and recent contractor bids for comparable work were also utilized.
- The opinions of cost are based on conceptual layouts.

⁵ Accessed Online via Subscription: <https://www.rsmeans.com/products/online>

⁶ Accessed Online via Subscription: https://www.enr.com/economics/historical_indices

⁷ Accessed Online via Subscription: <https://www.rsmeans.com/products/online>

- The cost of sediment removal is included in all of the cost opinions.

Dam Rehabilitation (R0, R1, R1R, R1FP, R1RFP)

The following assumptions were made in the development of the dam rehabilitation cost opinion as required to bring the dam into compliance with regulatory dam safety requirements and modern design practices. See Figure 1 and Figure 2.

- The overflow concrete weir to the south of the dam gate will be demolished and rebuilt in-kind.
- The headgate will be removed. Due to the continuous horizontal connection of the spillway to gate area, the concrete extending to the north side of the sluiceway will be demolished to facilitate reconstruction of the gate area. Masonry fascia in the headgate area will be retained, reinstalled and restored.
- The sluiceway intake and concrete to the north of the headgate will be rebuilt, and gate will be reset with new operator.
- A locally-operated motorized gate actuator will be installed. Remote or automated operation was not considered.
- Concrete overlay will be provided on the interior wall of the dam on the north side of the gate, to encapsulate open joints, repair areas of deteriorated concrete, and reduce leakage potential, while reducing the risk of undermining the existing stone masonry walls on the north side (left side when looking downstream) of the spillway. The stone masonry on the east and north dam walls will be repointed.
- Masonry and fascia stone on other areas of the dam will be cleaned and repointed.

Partial Spillway Reconstruction (P0, P1, P1R)

The assumptions for dam repair under the Partial Spillway Reconstruction cost scenario are similar to the Dam Rehabilitation case discussed above, with the exception that the spillway would be reconstructed to an elevation that is 4 feet lower than the current condition.

Fish Passage

For the Partial Spillway Reconstruction (P series) options, it was assumed that the fishway will be a pool and weir fishway that is 10 feet wide and 230 feet long with 23 weirs and pools. For the Dam Rehabilitation (R series) options, the fishway would include 50 feet of additional length, with 5 additional weirs and pools. The fishway will be constructed of concrete with masonry facing. The inter-tidal extension of the fishway will be constructed of rock and boulders. A cost estimate for a headgate, handrails, and other miscellaneous items was included in the cost opinion.

Seawall and Lower Harbor Park Resiliency

For the development of selected Dam Rehabilitation and Partial Spillway Reconstruction cost opinions (R1, R1FP, & P1), it was assumed that the seawall elevation would be unchanged. Portions of the seawall would require minor repair such as chinking stone and capstone replacement. Other portions of the seawall that are in poor condition will be dismantled and reconstructed with the cut granite blocks. It is assumed the seawall will be repaired and reconstructed in-kind, however minor adjustments to the backfill, joint alignment, or buried geometry of the wall are anticipated to increase long term stability of those segments that are currently exhibiting signs of instability.

For other selected options which assumed resiliency upgrades for the seawall and lower park (R1R, R1RFP, P1R), it was assumed that the seawall would be rehabilitated as described above, and the crest of the seawall in the lower park area would be elevated by up to 4 feet. The ground surface retained by the wall will be elevated to the crest of the wall and graded to tie into upland grades.

Other alternatives to increase coastal flood resilience, such as grading changes to cut off coastal flooding pathways and vegetation changes to dissipate wave energy, are currently being considered by Project Partners. To facilitate a cost comparison among alternatives with and without seawall adaptations, costs associated with grading and vegetation changes to enhance resilience against coastal flooding were not considered.

Landscape Enhancement Costs

For all options, the costs associated with landscape enhancements such as bridges, overlooks, extensive path reconfiguration and other measures are not presently included in the cost opinions. The exception is Scenario DR1R, which does include the cost of an overlook structure and incremental slope restoration costs.

Building Retrofit Costs

For all options, the costs associated with potential associated building retrofits, either advisable based on the present building condition, or to mitigate potential project effects, are not presently included.

Cost Summary Tables

For all cost scenarios analyzed, the total costs are tabulated in Summary Table 2 and the costs associated with the dam, fish passage, and resiliency are separated in Summary Table 3, so that the relative costs can be reviewed against each other. Summary Table 2 and Summary Table 3 follow the figures shown below. Detailed conceptual cost tables for each cost scenario are included in Appendix B.

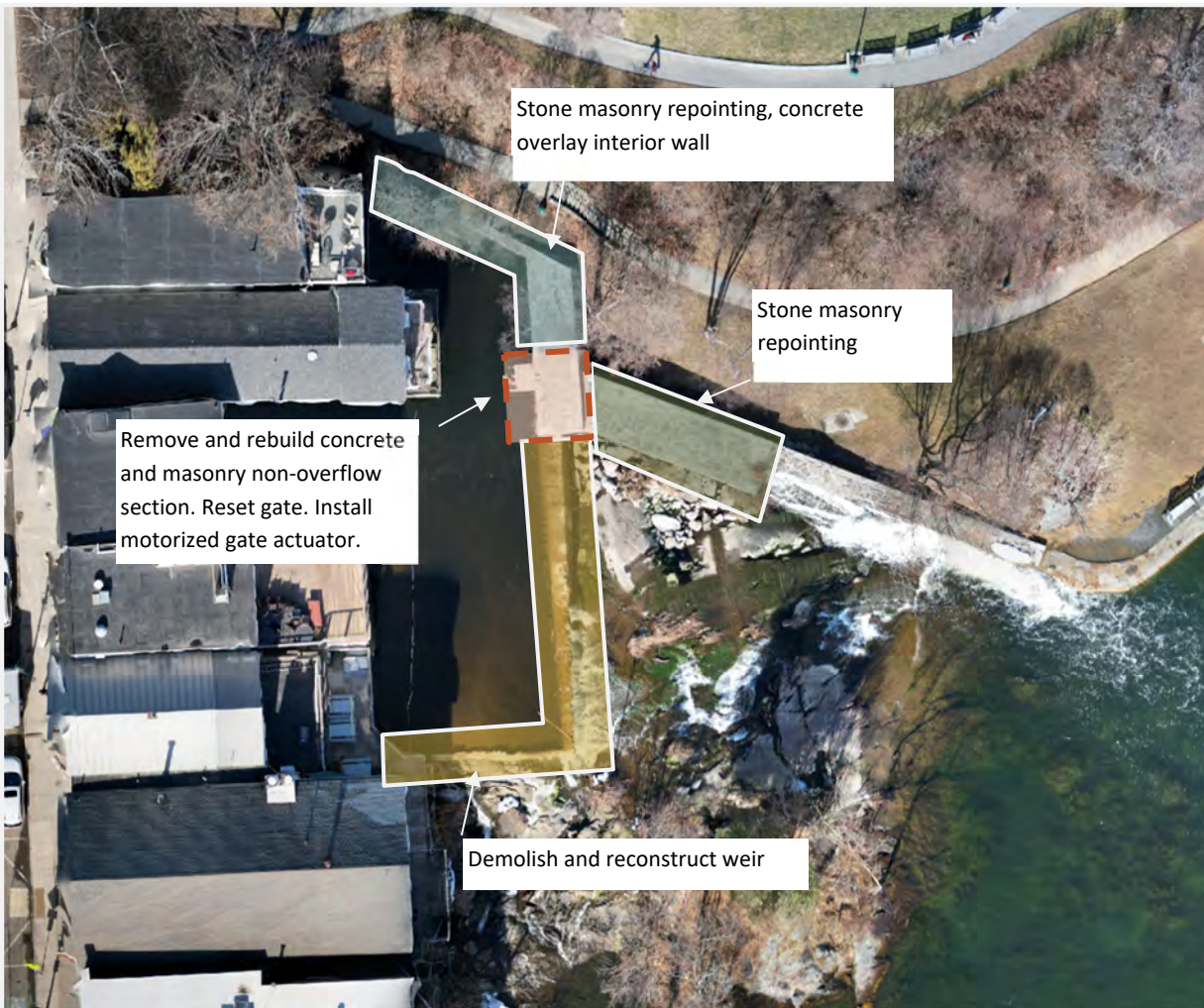


Figure 1: Conceptual Dam Rehabilitation Sketch (R1, R1R, R1FP)



Figure 2: Interior of Dam for north (upper left) to south (lower right) with Conceptual Concrete Overlay Area shaded. Other areas would be reconstructed.

Table 2: Summary of 2024 Montgomery Dam provisional cost analysis, rounded.

ID	Option	Initial Costs		Lifespan Costs	
		Construction Cost*	Project Delivery Cost**	Total Aggregated Lifespan Cost*** (3.5% Inflation over 50 years)	Capitalized Cost**** (2024 Investment to Finance Aggregated Lifespan Cost)
		(\$)	(\$)	(\$)	(\$)
R0 ¹	Status Quo Dam Reconstruction, No Seawall, No Resiliency, No Fish Passage	1,347,000	270,000	1,836,000	401,000
R1 ¹	Status Quo Dam Reconstruction, Seawall Reconstruction W/O Resiliency, No Fish Passage	2,157,000	432,000	3,358,000	698,000
R1FP ¹	Status Quo Dam Reconstruction, Seawall Reconstruction W/O Resiliency, W/ Pool & Weir Fishway	5,234,000	1,047,000	3,935,000	819,000
R1R ¹	Status Quo Dam Reconstruction, Seawall Reconstruction and Resiliency, No Fish Passage	2,775,000	556,000	3,201,000	668,000
R1RFP ¹	Status Quo Dam Reconstruction, Seawall Reconstruction and Resiliency, W/ Pool & Weir Fishway	5,830,000	1,166,000	3,778,000	790,000
P0 ¹	Partial Dam Reconstruction, No Seawall, No Park Resiliency, W/ Pool & Weir Fishway	3,871,000	775,000	2,098,000	464,000
P1 ¹	Partial Dam Reconstruction, Seawall Reconstruction W/O Resiliency, W/ Pool & Weir Fishway	4,647,000	930,000	3,778,000	790,000
P1R ¹	Partial Dam Reconstruction, Seawall Reconstruction & Resiliency, W/Pool & Weir Fishway	5,242,000	1,049,000	3,620,000	761,000
DR0 ¹	Dam Removal to Underlying Ledge Channel, Adaptation for Seawall and Lower Park W/O Resiliency	2,136,000	428,000	1,050,000	210,000
DR1 ¹	Dam Removal to Underlying Ledge Channel, Adaptation & Resiliency for Seawall and Lower Park	2,360,000	472,000	1,050,000	210,000
DR1R ²	Dam Removal to Underlying Ledge Channel, Adaptation & Resiliency for Seawall and Lower Park ('Scenario C', as rendered)	2,977,000	596,000	1,050,000	210,000

¹Costs summarized presently (08/13/24) do not include park facility enhancements (paths, bridges, etc) or building upgrades (if any).

²Costs summarized presently (02/06/25) include overlook and slope revegetation, but do not include other park facility enhancements (paths, bridges, etc) or building upgrades (if any).

*Includes 30% design and construction contingency.

**Includes project management, permitting, design, construction management and construction observation.

***Includes annual and periodic repair costs escalated at 3.5%, estimated for relative comparison

****Estimate of set-aside investment amount required to finance lifespan costs, discounted at estimated 2% effective interest rate (actual interest rate minus inflation)

Table 3: Summary of 2024 Montgomery Dam provisional cost analysis, rounded.

ID	Option	Initial Construction Costs By Category					
		Total Initial Construction Cost* (\$)	Dam Rehabilitation Cost** (\$)	Fish Passage Cost** (\$)	Seawall Rehabilitation Cost** (\$)	Seawall and Park Resiliency Cost** (\$)	Other Cost** (\$)
R0 ¹	Status Quo Dam Reconstruction, No Seawall, No Resiliency, No Fish Passage	1,347,000	1,261,000	0	0	0	86,000
R1 ¹	Status Quo Dam Reconstruction, Seawall Reconstruction W/O Resiliency, No Fish Passage	2,157,000	1,261,000	0	810,000	0	86,000
R1FP ¹	Status Quo Dam Reconstruction, Seawall Reconstruction W/O Resiliency, W/ Pool & Weir Fishway	5,235,000	1,155,000	3,220,000	777,000	0	83,000
R1R ¹	Status Quo Dam Reconstruction, Seawall Reconstruction and Resiliency, No Fish Passage	2,775,000	1,258,000	0	810,000	621,000	86,000
R1RFP ¹	Status Quo Dam Reconstruction, Seawall Reconstruction and Resiliency, W/ Pool & Weir Fishway	5,831,000	1,155,000	3,220,000	777,000	596,000	83,000
P0 ¹	Partial Dam Reconstruction, No Seawall, No Park Resiliency, W/ Pool & Weir Fishway	3,870,000	1,023,000	2,764,000	0	0	83,000
P1 ¹	Partial Dam Reconstruction, Seawall Reconstruction W/O Resiliency, W/ Pool & Weir Fishway	4,647,000	1,023,000	2,764,000	777,000	0	83,000
P1R ¹	Partial Dam Reconstruction, Seawall Reconstruction & Resiliency, W/Pool & Weir Fishway	5,243,000	1,023,000	2,764,000	777,000	596,000	83,000
DR0 ¹	Dam Removal to Underlying Ledge Channel, Adaptation for Seawall and Lower Park W/O Resiliency	2,136,000	0	1,157,000	893,000	0	86,000
DR1 ¹	Dam Removal to Underlying Ledge Channel, Adaptation & Resiliency for Seawall and Lower Park	2,360,000	0	1,157,000	893,000	224,000	86,000
DR1R ²	Dam Removal to Underlying Ledge Channel, Adaptation & Resiliency for Seawall and Lower Park ('Scenario C', as rendered)	2,977,000	0	1,474,000	893,000	292,000	318,000

¹Costs summarized presently (08/13/24) do not include park facility enhancements (paths, bridges, etc) or building upgrades (if any).

²Costs summarized presently (02/06/25) include overlook and slope revegetation, but do not include other park facility enhancements (paths, bridges, etc) or building upgrades (if any).

*Includes 30% design and construction contingency.

**Includes prorated (1) mobilization and demobilization, (2) erosion, sediment, pollution and water control, and (3) 30% design and construction contingency

APPENDIX A – HISTORICAL DAM REPAIR SUMMARY TABLE

Table A1: Summary of Known Historical Repair Costs for Montgomery Dam and Seawall (source: 09-21-2021 Montgomery Dam Historic Cost Report.docx, A. Caler)

Year	Description	Historic Cost (\$)	Adjusted 2023 (\$) RSMeans Historical Construction Cost Index	Adjusted 2023 (\$) Engineering News Record Historical Construction Cost Index
DAM				
1992	Structural analysis of dam condition	500	1,477	1,340
1992	Gate repair	7,602	22,462	20,371
1993	Significant repairs on the masonry walls of the dam and the sluiceway	8,000	23,103	20,511
1995	Repairs to the gate	1,500	4,094	3,662
1996	Summary costs from Town Manager	3,450	9,195	8,200
1998	Summary costs from Town Manager	5,150	13,141	11,621
1999	Summary costs from Town Manager	1,480	3,696	3,263
2000	Interior wall	2,800	6,802	6,012
2001	Dam repairs	6,100	14,321	12,846
2002	Dam repairs	8,400	19,169	17,162
2002	replace the outlet structure (gate)	?	?	?
2002	Dredged silt	?	?	?
2002	Resurface concrete spillway	?	?	?
2003	Grout injection, seal outlet structure	9,700	21,583	19,357
2004	Gate removed	7,000	14,307	13,142
2005	gate stem replaced	2,350	4,553	4,216
2007	Vegetation matience	150	260	252
2009	gate stem replaced	2,047	3,338	3,191
2009	Resurface dam spillway	?	?	?
2022	Sluiceway gate repair	5,000	4,943	5,135
2023	Sluiceway gate repair	?	?	?
Summary for Repair Events with Costs				
Total Repair Costs (Events with Costs)		71,229	166,444	150,281
Number of Repair Events With Costs		16	16	16
Mean Repair Event Cost		4,452	10,403	9,393
Summary of Repair Costs Per Decade				
Total Repair Events		21	21	21
Total Repair Costs (Estimated, Prorated for Events Without Costs)		93,488	218,458	197,244
Decades (1992-2023)		3	3	3
Repair Cost per Decade		31,163	72,819	65,748
SEAWALL				
1995	Summary costs from Town Manager	8,000	21,836	19,533
1996	Summary costs from Town Manager	7,000	18,656	16,638
1997	Summary costs from Town Manager	1,000	2,604	2,293
1998	Summary costs from Town Manager	8,000	20,414	18,051
2005	Repair seawall connection to the dam	28,940	56,066	51,918
Summary for Repair Events with Costs				
Total Repair Costs (Events with Costs)		52,940	119,576	108,433
Number of Repair Events With Costs		5	5	5
Mean Repair Event Cost		15,212	35,430	31,998
Summary of Repair Costs Per Decade				
Decades (1995-2005)		1	1	1
Repair Cost per Decade		52,940	119,576	108,433

APPENDIX B – DETAILED COST OPINION TABLES

(Note: Slight differences in numbers may appear between summary tables and detailed cost opinion tables due to rounding assumptions.)

Table R0. Conceptual Cost Analysis* for *Montgomery Dam, Status Quo Dam Rehabilitation, No Seawall, No Fish Passage*

*To date, does not include park facility improvements, building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 94,140	\$ 94,140	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 156,900	\$ 156,900	20% of other items; misc. water control activities, coffer dam, erosion and sedimentation control
Dam Rehabilitation						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 135	\$ 40,500	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Reconstruct concrete weir	80	CY	\$ 2,500	\$ 200,000	
8	Remove headgate and demolish concrete to north side of sluiceway	70	CY	\$ 150	\$ 10,500	remove to north side of sluiceway to facilitate reconstruction of gate area, preserve masonry fascia stone
9	Rebuild concrete section for restoration of gate and sluice intake	70	CY	\$ 2,500	\$ 175,000	
10	Gate reset with new operator	1	LS	\$ 30,000	\$ 30,000	Assume removal of gate and reset on new flume intake or waterproofing
11	Gate actuator	1	LS	\$ 50,000	\$ 50,000	Assume new gate actuator
12	Headgate area masonry overlay replacement/restoration	300	SF	\$ 150	\$ 45,000	
13	East Non-overflow Wall (Remaining Portion) refurbishment	8	CY	\$ 2,500	\$ 20,000	concrete overlay on interior wall to eliminate leakage
14	North Wall refurbishment	20	CY	\$ 2,500	\$ 50,000	concrete overlay on interior wall to eliminate leakage
15	Stone masonry repointing, preserved portions of non overflow, including east and north walls	800	SF	\$ 50	\$ 40,000	
16	Stone masonry repointing, preserved sluiceway (non-seawall)	850	SF	\$ 50	\$ 42,500	
Seawall Rehabilitation						
17	Seawall minor repair segments (straight section DS of spillway)		LF	\$ 200	\$ -	Minor repairs such as chinking stone, capstone placement
18	Seawall reconstruction segments		LF	\$ 1,000	\$ -	Wall rehabilitation including selective demolition and reconstruction
19	Seawall elevation enhancement for resiliency	-	LF	\$ 667	\$ -	Not Included
Adjacent Site Work						
20	Park elevation enhancement for resiliency - behind elevated wall	-	CY	\$ 50	\$ -	Not Included
21	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 1,038,000	
				Contingency (30%)	\$ 311,000	
				Project Construction Total	\$ 1,347,000	
Initial Construction Costs By Category						
Category					Total Cost	Notes
Dam Rehabilitation					\$1,261,000	
Fish Passage					\$0	
Seawall Rehabilitation					\$0	
Seawall and Park Resiliency					\$0	
Other					\$86,000	
Initial Construction Costs Total					\$1,347,000	
Initial Project Delivery Costs						
Item					Total Cost	Notes
Project Management (2%)					\$26,900	
Permitting (3%)					\$40,400	
Engineering Design (10%)					\$134,700	
Construction Contract Administration (2%)					\$26,900	
Construction Observation (3%)					\$40,400	
Initial Project Delivery Costs Total					\$270,000	
Total Initial Project Costs					\$1,617,000	

Lifespan Costs - 50-year planning horizon					
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)
Annual Operation and Maintenance	\$8,000	50	\$400,000	\$1,048,000	\$254,600
Repair and Rehabilitation (every 10 years)	\$50,000	5	\$250,000	\$787,600	\$145,700
Total Lifespan Costs			\$650,000	\$1,836,000	\$401,000

Table R1. Conceptual Cost Analysis* for *Montgomery Dam, Status Quo Dam Rehabilitation, Seawall Reconstruction W/O Resiliency, No Fish Passage*

*To date, does not include park facility improvements, building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 150,780	\$ 150,780	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 251,300	\$ 251,300	20% or other items; misc. water control activities, coffer dam, erosion and sedimentation control
Dam Rehabilitation						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 135	\$ 40,500	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Reconstruct concrete weir	80	CY	\$ 2,500	\$ 200,000	
8	Remove headgate and demolish concrete to north side of sluiceway	70	CY	\$ 150	\$ 10,500	remove to north side of sluiceway to facilitate reconstruction of gate area, preserve masonry fascia stone
9	Rebuild concrete section for restoration of gate and sluice intake	70	CY	\$ 2,500	\$ 175,000	
10	Gate reset with new operator	1	LS	\$ 30,000	\$ 30,000	Assume removal of gate and reset on new flume intake or waterproofing
11	Gate actuator	1	LS	\$ 50,000	\$ 50,000	Assume new gate actuator
12	Headgate area masonry overlay replacement/restoration	300	SF	\$ 150	\$ 45,000	
13	East Non-overflow Wall (Remaining Portion) refurbishment	8	CY	\$ 2,500	\$ 20,000	concrete overlay on interior wall to eliminate leakage
14	North Wall refurbishment	20	CY	\$ 2,500	\$ 50,000	concrete overlay on interior wall to eliminate leakage
15	Stone masonry repointing, preserved portions of non overflow, including east and north walls	800	SF	\$ 50	\$ 40,000	
16	Stone masonry repointing, preserved sluiceway (non-seawall)	850	SF	\$ 50	\$ 42,500	
Seawall Rehabilitation						
17	Seawall minor repair segments (straight section DS of spillway)	60	LF	\$ 200	\$ 12,000	Minor repairs such as chinking stone, capstone placement
18	Seawall reconstruction segments	460	LF	\$ 1,000	\$ 460,000	Wall rehabilitation including selective demolition and reconstruction
19	Seawall elevation enhancement for resiliency	-	LF	\$ 667	\$ -	Not Included
Adjacent Site Work						
20	Park elevation enhancement for resiliency - behind elevated wall	-	CY	\$ 50	\$ -	Not Included
21	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 1,659,000	
				Contingency (30%)	\$ 498,000	
				Project Construction Total	\$ 2,157,000	
Initial Construction Costs By Category						
Category					Total Cost	Notes
Dam Rehabilitation					\$1,261,000	
Fish Passage					\$0	
Seawall Rehabilitation					\$810,000	
Seawall and Park Resiliency					\$0	
Other					\$86,000	
Initial Construction Costs Total					\$2,157,000	
Initial Project Delivery Costs						
Item					Total Cost	Notes
Project Management (2%)					\$43,100	
Permitting (3%)					\$64,700	
Engineering Design (10%)					\$215,700	
Construction Contract Administration (2%)					\$43,100	
Construction Observation (3%)					\$64,700	
Initial Project Delivery Costs Total					\$432,000	
Total Initial Project Costs					\$2,589,000	

Lifespan Costs - 50-year planning horizon					
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)
Annual Operation and Maintenance	\$10,000	50	\$500,000	\$1,310,000	\$318,200
Repair and Rehabilitation (every 10 years)	\$130,000	5	\$650,000	\$2,047,700	\$378,900
Total Lifespan Costs			\$1,150,000	\$3,358,000	\$698,000

Table R1FP. Conceptual Cost Analysis* for *Montgomery Dam, Status Quo Dam Rehabilitation, Seawall Reconstruction W/O Resiliency, With Fish Passage*

*To date, does not include park facility improvements, building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 366,000	\$ 366,000	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 478,000	\$ 478,000	15% of other items:misc. water control activities, coffer dam, erosion and sedimentation control
Dam Rehabilitation						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 135	\$ 40,500	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Reconstruct concrete weir	80	CY	\$ 2,500	\$ 200,000	
8	Remove headgate and demolish concrete to north side of sluiceway	70	CY	\$ 150	\$ 10,500	remove to north side of sluiceway to facilitate reconstruction of gate area, preserve and replace masonry fascia stone
9	Rebuild concrete section for restoration of gate and sluice intake	70	CY	\$ 2,500	\$ 175,000	
10	Gate reset with new operator	1	LS	\$ 30,000	\$ 30,000	Assume removal of gate and reset on new flume intake or waterproofing
11	Gate actuator	1	LS	\$ 50,000	\$ 50,000	Assume new gate actuator
12	Headgate area masonry overlay replacement/restoration	300	SF	\$ 150	\$ 45,000	
13	East Non-overflow Wall (Remaining Portion) refurbishment	4	CY	\$ 2,500	\$ 10,000	concrete overlay on interior wall
14	North Wall refurbishment	20	CY	\$ 2,500	\$ 50,000	concrete overlay on interior wall
15	Stone masonry repointing, preserved portions of non overflow, including north walls	400	SF	\$ 50	\$ 20,000	
16	Stone masonry repointing, preserved sluiceway (non-seawall)	800	SF	\$ 50	\$ 40,000	
Fishway						
17	Subgrade preparation & demolition	740	CY	\$ 75	\$ 55,500	Misc for installation of new fishway
18	P&W Fishway Concrete	487	CY	\$ 2,500	\$ 1,217,391	28 pools at 0.8' drop
19	P&W Masonry Facing	5,600	SF	\$ 100	\$ 560,000	560' wall length x 10' deep
20	NLF in Inter-Tidal	50	LF	\$ 500	\$ 25,000	estimated
21	Headgate, handrails, other misc costs	1	LS	\$ 100,000	\$ 100,000	estimated
Seawall Rehabilitation						
22	Seawall minor repair segments (straight section DS of spillway)	60	LF	\$ 200	\$ 12,000	Minor repairs such as chinking stone, capstone placement
23	Seawall reconstruction segments	460	LF	\$ 1,000	\$ 460,000	Wall rehabilitation including selective demolition and reconstruction
24	Seawall elevation enhancement for resiliency		LF	\$ 667	\$ -	Assume elevation of the sea wall by approximately 4' by a cut stone parapet wall
Adjacent Site Work						
25	Park elevation enhancement for resiliency - behind elevated wall		CY	\$ 50	\$ -	fill of areas below elevation 11, 2.5' average fill
26	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 4,026,000	
				Contingency (30%)	\$ 1,208,000	
				Project Construction Total	\$ 5,234,000	
Initial Construction Costs By Category						
Category					Total Cost	Notes
Dam Rehabilitation					\$1,155,000	
Fish Passage					\$3,220,000	
Seawall Rehabilitation					\$777,000	
Seawall and Park Resiliency					\$0	
Other					\$83,000	
Initial Construction Costs Total					\$5,235,000	
Initial Project Delivery Costs						
Item					Total Cost	Notes
Project Management (2%)					\$104,700	
Permitting (3%)					\$157,000	
Engineering Design (10%)					\$523,400	
Construction Contract Administration (2%)					\$104,700	
Construction Observation (3%)					\$157,000	
Initial Project Delivery Costs Total					\$1,047,000	
Total Initial Project Costs					\$6,281,000	
Lifespan Costs - 50-year planning horizon						
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)	
Annual Operation and Maintenance	\$12,000	50	\$600,000	\$1,572,000	\$381,900	
Repair and Rehabilitation (every 10 years)	\$150,000	5	\$750,000	\$2,362,700	\$437,100	
Total Lifespan Costs			\$1,350,000	\$3,935,000	\$819,000	

Table R1R. Conceptual Cost Analysis* for Montgomery Dam, Status Quo Dam Rehabilitation, Seawall Reconstruction and Resiliency, No Fish Passage

*To date, does not include park facility improvements, building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 193,994	\$ 193,994	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 323,324	\$ 323,324	20% of other items:misc. water control activities, coffer dam, erosion and sedimentation control
Dam Rehabilitation						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 135	\$ 40,500	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Reconstruct concrete weir	80	CY	\$ 2,500	\$ 200,000	
8	Remove headgate and demolish concrete to north side of sluiceway	70	CY	\$ 150	\$ 10,500	remove to north side of sluiceway to facilitate reconstruction of gate area, preserve masonry fascia stone
9	Rebuild concrete section for restoration of gate and sluice intake	70	CY	\$ 2,500	\$ 175,000	
10	Gate reset with new operator	1	LS	\$ 30,000	\$ 30,000	Assume removal of gate and reset on new flume intake or waterproofing
11	Gate actuator	1	LS	\$ 50,000	\$ 50,000	Assume new gate actuator
12	Headgate area masonry overlay replacement/restoration	300	SF	\$ 150	\$ 45,000	
13	East Non-overflow Wall (Remaining Portion) refurbishment	8	CY	\$ 2,500	\$ 20,000	concrete overlay on interior wall to eliminate leakage
14	North Wall refurbishment	20	CY	\$ 2,500	\$ 50,000	concrete overlay on interior wall to eliminate leakage
15	Stone masonry repointing, preserved portions of non overflow, including east and north walls	800	SF	\$ 50	\$ 40,000	
16	Stone masonry repointing, preserved sluiceway (non-seawall)	800	SF	\$ 51	\$ 40,800	
Seawall Rehabilitation						
17	Seawall minor repair segments (straight section DS of spillway)	60	LF	\$ 200	\$ 12,000	Minor repairs such as chinking stone, capstone placement
18	Seawall reconstruction segments	460	LF	\$ 1,000	\$ 460,000	Wall rehabilitation including selective demolition and reconstruction
19	Seawall elevation enhancement for resiliency	460	LF	\$ 667	\$ 306,820	Assume elevation of the sea wall by approximately 4' by a cut stone parapet wall
Adjacent Site Work						
20	Park elevation enhancement for resiliency - behind elevated wall	1,100	CY	\$ 50	\$ 55,000	fill of areas below elevation 11, 2.5' average fill
21	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 2,134,000	
				Contingency (30%)	\$ 641,000	
				Project Construction Total	\$ 2,775,000	
Initial Construction Costs By Category						
Category					Total Cost	Notes
Dam Rehabilitation					\$1,258,000	
Fish Passage					\$0	
Seawall Rehabilitation					\$810,000	
Seawall and Park Resiliency					\$621,000	
Other					\$86,000	
Initial Construction Costs Total					\$2,775,000	
Initial Project Delivery Costs						
Item					Total Cost	Notes
Project Management (2%)					\$55,500	
Permitting (3%)					\$83,300	
Engineering Design (10%)					\$277,500	
Construction Contract Administration (2%)					\$55,500	
Construction Observation (3%)					\$83,300	
Initial Project Delivery Costs Total					\$556,000	
Total Initial Project Costs					\$3,331,000	

Lifespan Costs - 50-year planning horizon					
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)
Annual Operation and Maintenance	\$10,000	50	\$500,000	\$1,310,000	\$318,200
Repair and Rehabilitation (every 10 years)	\$120,000	5	\$600,000	\$1,890,200	\$349,700
Total Lifespan Costs			\$1,100,000	\$3,201,000	\$668,000

Table R1RFP. Conceptual Cost Analysis* for *Montgomery Dam, Status Quo Dam Rehabilitation, Seawall Reconstruction and Resiliency, Pool & Weir Fishway*
 *To date, does not include park facility improvements, building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 408,000	\$ 408,000	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 532,000	\$ 532,000	15% or other items:misc. water control activities, coffer dam, erosion and sedimentation control
Dam Rehabilitation						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 135	\$ 40,500	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Reconstruct concrete weir	80	CY	\$ 2,500	\$ 200,000	
8	Remove headgate and demolish concrete to north side of sluiceway	70	CY	\$ 150	\$ 10,500	remove to north side of sluiceway to facilitate reconstruction of gate area, preserve and replace masonry fascia stone
9	Rebuild concrete section for restoration of gate and sluice intake	70	CY	\$ 2,500	\$ 175,000	
10	Gate reset with new operator	1	LS	\$ 30,000	\$ 30,000	Assume removal of gate and reset on new flume intake or waterproofing
11	Gate actuator	1	LS	\$ 50,000	\$ 50,000	Assume new gate actuator
12	Headgate area masonry overlay replacement/restoration	300	SF	\$ 150	\$ 45,000	
13	East Non-overflow Wall (Remaining Portion) refurbishment	4	CY	\$ 2,500	\$ 10,000	concrete overlay on interior wall
14	North Wall refurbishment	20	CY	\$ 2,500	\$ 50,000	concrete overlay on interior wall
15	Stone masonry repointing, preserved portions of non overflow, including north walls	400	SF	\$ 50	\$ 20,000	
16	Stone masonry repointing, preserved sluiceway (non-seawall)	800	SF	\$ 50	\$ 40,000	
Fishway						
17	Subgrade preparation & demolition	740	CY	\$ 75	\$ 55,500	Misc for installation of new fishway
18	P&W Fishway Concrete	487	CY	\$ 2,500	\$ 1,217,391	28 pools at 0.8' drop
19	P&W Masonry Facing	5,600	SF	\$ 100	\$ 560,000	560' wall length x 10' deep
20	NLF in Inter-Tidal	50	LF	\$ 500	\$ 25,000	estimated
21	Headgate, handrails, other misc costs	1	LS	\$ 100,000	\$ 100,000	estimated
Seawall Rehabilitation						
22	Seawall minor repair segments (straight section DS of spillway)	60	LF	\$ 200	\$ 12,000	Minor repairs such as chinking stone, capstone placement
23	Seawall reconstruction segments	460	LF	\$ 1,000	\$ 460,000	Wall rehabilitation including selective demolition and reconstruction
24	Seawall elevation enhancement for resiliency	460	LF	\$ 667	\$ 306,820	Assume elevation of the sea wall by approximately 4' by a cut stone parapet wall
Adjacent Site Work						
25	Park elevation enhancement for resiliency - behind elevated wall	1,100	CY	\$ 50	\$ 55,000	fill of areas below elevation 11, 2.5' average fill
26	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 4,484,000	
				Contingency (30%)	\$ 1,346,000	
				Project Construction Total	\$ 5,830,000	
Initial Construction Costs By Category						
Category				Total Cost	Notes	
Dam Rehabilitation				\$1,155,000		
Fish Passage				\$3,220,000		
Seawall Rehabilitation				\$777,000		
Seawall and Park Resiliency				\$596,000		
Other				\$83,000		
Initial Construction Costs Total				\$5,831,000		
Initial Project Delivery Costs						
Item				Total Cost	Notes	
Project Management (2%)				\$116,600		
Permitting (3%)				\$174,900		
Engineering Design (10%)				\$583,000		
Construction Contract Administration (2%)				\$116,600		
Construction Observation (3%)				\$174,900		
Initial Project Delivery Costs Total				\$1,166,000		
Total Initial Project Costs				\$6,996,000		

Lifespan Costs - 50-year planning horizon					
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)
Annual Operation and Maintenance	\$12,000	50	\$600,000	\$1,572,000	\$381,900
Repair and Rehabilitation (every 10 years)	\$140,000	5	\$700,000	\$2,205,200	\$408,000
Total Lifespan Costs			\$1,300,000	\$3,778,000	\$790,000

Table P0. Conceptual Cost Analysis* for *Montgomery Dam, Partial Dam Reconstruction, No Seawall, With Pool & Weir Fishway*
 *To date, does not include park facility improvements, building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 271,000	\$ 271,000	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 353,000	\$ 353,000	15% or other items:misc. water control activities, coffer dam, erosion and sedimentation control
Dam Rehabilitation						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 135	\$ 40,500	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Reconstruct concrete weir	50	CY	\$ 2,500	\$ 125,000	
8	Remove headgate and demolish concrete to north side of sluiceway	70	CY	\$ 150	\$ 10,500	remove to north side of sluiceway to facilitate reconstruction of gate area, preserve and replace masonry fascia stone
9	Rebuild concrete section for restoration of gate and sluice intake	70	CY	\$ 2,500	\$ 175,000	
10	Gate reset with new operator	1	LS	\$ 30,000	\$ 30,000	Assume removal of gate and reset on new flume intake or waterproofing
11	Gate actuator	1	LS	\$ 50,000	\$ 50,000	Assume new gate actuator
12	Headgate area masonry overlay replacement/restoration	300	SF	\$ 150	\$ 45,000	
13	East Non-overflow Wall (Remaining Portion) refurbishment	4	CY	\$ 2,500	\$ 10,000	concrete overlay on interior wall
14	North Wall refurbishment	20	CY	\$ 2,500	\$ 50,000	concrete overlay on interior wall
15	Stone masonry repointing, preserved portions of non overflow, including north walls	300	SF	\$ 50	\$ 15,000	
16	Stone masonry repointing, preserved sluiceway (non-seawall)	800	SF	\$ 50	\$ 40,000	
Fishway						
17	Subgrade preparation & demolition	740	CY	\$ 75	\$ 55,500	Misc for installation of new fishway
18	P&W Fishway Concrete	400	CY	\$ 2,500	\$ 1,000,000	23 pools at 0.8' drop
19	P&W Masonry Facing	5,000	SF	\$ 100	\$ 500,000	460' wall length x 10' deep
20	NLF in Inter-Tidal	50	LF	\$ 500	\$ 25,000	estimated
21	Headgate, handrails, other misc costs	1	LS	\$ 100,000	\$ 100,000	estimated
Seawall Rehabilitation						
22	Seawall minor repair segments (straight section DS of spillway)		LF	\$ 200	\$ -	Minor repairs such as chinking stone, capstone placement
23	Seawall reconstruction segments		LF	\$ 1,000	\$ -	Wall rehabilitation including selective demolition and reconstruction
24	Seawall elevation enhancement for resiliency		LF	\$ 667	\$ -	Assume elevation of the sea wall by approximately 4' by a cut stone parapet wall
Adjacent Site Work						
25	Park elevation enhancement for resiliency - behind elevated wall		CY	\$ 50	\$ -	fill of areas below elevation 11, 2.5' average fill
26	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 2,977,000	
				Contingency (30%)	\$ 894,000	
Project Construction Total					\$ 3,871,000	
Initial Construction Costs By Category						
Category					Total Cost	Notes
Dam Rehabilitation					\$1,023,000	
Fish Passage					\$2,764,000	
Seawall Rehabilitation					\$0	
Seawall and Park Resiliency					\$0	
Other					\$83,000	
Initial Construction Costs Total					\$3,870,000	
Initial Project Delivery Costs						
Item					Total Cost	Notes
Project Management (2%)					\$77,400	
Permitting (3%)					\$116,100	
Engineering Design (10%)					\$387,100	
Construction Contract Administration (2%)					\$77,400	
Construction Observation (3%)					\$116,100	
Initial Project Delivery Costs Total					\$775,000	
Total Initial Project Costs					\$4,646,000	

Lifespan Costs - 50-year planning horizon					
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)
Annual Operation and Maintenance	\$10,000	50	\$500,000	\$1,310,000	\$318,200
Repair and Rehabilitation (every 10 years)	\$50,000	5	\$250,000	\$787,600	\$145,700
Total Lifespan Costs			\$750,000	\$2,098,000	\$464,000

Table P1. Conceptual Cost Analysis* for Montgomery Dam, Partial Dam Reconstruction, Seawall Reconstruction W/O Resiliency, Pool & Weir Fishway

*To date, does not include park facility improvements, building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 325,000	\$ 325,000	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 424,000	\$ 424,000	15% of other items:misc. water control activities, coffer dam, erosion and sedimentation control
Dam Rehabilitation						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 135	\$ 40,500	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Reconstruct concrete weir	50	CY	\$ 2,500	\$ 125,000	
8	Remove headgate and demolish concrete to north side of sluiceway	70	CY	\$ 150	\$ 10,500	remove to north side of sluiceway to facilitate reconstruction of gate area, preserve and replace masonry fascia stone
9	Rebuild concrete section for restoration of gate and sluice intake	70	CY	\$ 2,500	\$ 175,000	
10	Gate reset with new operator	1	LS	\$ 30,000	\$ 30,000	Assume removal of gate and reset on new flume intake or waterproofing
11	Gate actuator	1	LS	\$ 50,000	\$ 50,000	Assume new gate actuator
12	Headgate area masonry overlay replacement/restoration	300	SF	\$ 150	\$ 45,000	
13	East Non-overflow Wall (Remaining Portion) refurbishment	4	CY	\$ 2,500	\$ 10,000	concrete overlay on interior wall
14	North Wall refurbishment	20	CY	\$ 2,500	\$ 50,000	concrete overlay on interior wall
15	Stone masonry repointing, preserved portions of non overflow, including north walls	300	SF	\$ 50	\$ 15,000	
16	Stone masonry repointing, preserved sluiceway (non-seawall)	800	SF	\$ 50	\$ 40,000	
Fishway						
17	Subgrade preparation & demolition	740	CY	\$ 75	\$ 55,500	Misc for installation of new fishway
18	P&W Fishway Concrete	400	CY	\$ 2,500	\$ 1,000,000	23 pools at 0.8' drop
19	P&W Masonry Facing	5,000	SF	\$ 100	\$ 500,000	460' wall length x 10' deep
20	NLF in Inter-Tidal	50	LF	\$ 500	\$ 25,000	estimated
21	Headgate, handrails, other misc costs	1	LS	\$ 100,000	\$ 100,000	estimated
Seawall Rehabilitation						
22	Seawall minor repair segments (straight section DS of spillway)	60	LF	\$ 200	\$ 12,000	Minor repairs such as chinking stone, capstone placement
23	Seawall reconstruction segments	460	LF	\$ 1,000	\$ 460,000	Wall rehabilitation including selective demolition and reconstruction
24	Seawall elevation enhancement for resiliency		LF	\$ 667	\$ -	Assume elevation of the sea wall by approximately 4' by a cut stone parapet wall
Adjacent Site Work						
25	Park elevation enhancement for resiliency - behind elevated wall		CY	\$ 50	\$ -	fill of areas below elevation 11, 2.5' average fill
26	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 3,574,000	
				Contingency (30%)	\$ 1,073,000	
				Project Construction Total	\$ 4,647,000	
Initial Construction Costs By Category						
Category					Total Cost	Notes
Dam Rehabilitation					\$1,023,000	
Fish Passage					\$2,764,000	
Seawall Rehabilitation					\$777,000	
Seawall and Park Resiliency					\$0	
Other					\$83,000	
Initial Construction Costs Total					\$4,647,000	
Initial Project Delivery Costs						
Item					Total Cost	Notes
Project Management (2%)					\$92,900	
Permitting (3%)					\$139,400	
Engineering Design (10%)					\$464,700	
Construction Contract Administration (2%)					\$92,900	
Construction Observation (3%)					\$139,400	
Initial Project Delivery Costs Total					\$930,000	
Total Initial Project Costs					\$5,577,000	

Lifespan Costs - 50-year planning horizon					
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)
Annual Operation and Maintenance	\$12,000	50	\$600,000	\$1,572,000	\$381,900
Repair and Rehabilitation (every 10 years)	\$140,000	5	\$700,000	\$2,205,200	\$408,000
Total Lifespan Costs			\$1,300,000	\$3,778,000	\$790,000

Table P1R. Conceptual Cost Analysis* for Montgomery Dam, Partial Dam Reconstruction, Seawall Reconstruction and Resiliency, Pool & Weir Fishway

*To date, does not include park facility improvements, building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 367,000	\$ 367,000	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 478,000	\$ 478,000	15% of other items:misc. water control activities, coffer dam, erosion and sedimentation control
Dam Rehabilitation						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 135	\$ 40,500	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Reconstruct concrete weir	50	CY	\$ 2,500	\$ 125,000	
8	Remove headgate and demolish concrete to north side of sluiceway	70	CY	\$ 150	\$ 10,500	remove to north side of sluiceway to facilitate reconstruction of gate area, preserve and replace masonry fascia stone
9	Rebuild concrete section for restoration of gate and sluice intake	70	CY	\$ 2,500	\$ 175,000	
10	Gate reset with new operator	1	LS	\$ 30,000	\$ 30,000	Assume removal of gate and reset on new flume intake or waterproofing
11	Gate actuator	1	LS	\$ 50,000	\$ 50,000	Assume new gate actuator
12	Headgate area masonry overlay replacement/restoration	300	SF	\$ 150	\$ 45,000	
13	East Non-overflow Wall (Remaining Portion) refurbishment	4	CY	\$ 2,500	\$ 10,000	concrete overlay on interior wall
14	North Wall refurbishment	20	CY	\$ 2,500	\$ 50,000	concrete overlay on interior wall
15	Stone masonry repointing, preserved portions of non overflow, including north walls	300	SF	\$ 50	\$ 15,000	
16	Stone masonry repointing, preserved sluiceway (non-seawall)	800	SF	\$ 50	\$ 40,000	
Fishway						
17	Subgrade preparation & demolition	740	CY	\$ 75	\$ 55,500	Misc for installation of new fishway
18	P&W Fishway Concrete	400	CY	\$ 2,500	\$ 1,000,000	23 pools at 0.8' drop
19	P&W Masonry Facing	5,000	SF	\$ 100	\$ 500,000	460' wall length x 10 ' deep
20	NLF in Inter-Tidal	50	LF	\$ 500	\$ 25,000	estimated
21	Headgate, handrails, other misc costs	1	LS	\$ 100,000	\$ 100,000	estimated
Seawall Rehabilitation						
22	Seawall minor repair segments (straight section DS of spillway)	60	LF	\$ 200	\$ 12,000	Minor repairs such as chinking stone, capstone placement
23	Seawall reconstruction segments	460	LF	\$ 1,000	\$ 460,000	Wall rehabilitation including selective demolition and reconstruction
24	Seawall elevation enhancement for resiliency	460	LF	\$ 667	\$ 306,820	Assume elevation of the sea wall by approximately 4' by a cut stone parapet wall
Adjacent Site Work						
25	Park elevation enhancement for resiliency - behind elevated wall	1,100	CY	\$ 50	\$ 55,000	fill of areas below elevation 11, 2.5' average fill
26	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 4,032,000	
				Contingency (30%)	\$ 1,210,000	
Project Construction Total					\$ 5,242,000	
Initial Construction Costs By Category						
Category					Total Cost	Notes
Dam Rehabilitation					\$1,023,000	
Fish Passage					\$2,764,000	
Seawall Rehabilitation					\$777,000	
Seawall and Park Resiliency					\$596,000	
Other					\$83,000	
Initial Construction Costs Total					\$5,243,000	
Initial Project Delivery Costs						
Item					Total Cost	Notes
Project Management (2%)					\$104,800	
Permitting (3%)					\$157,300	
Engineering Design (10%)					\$524,200	
Construction Contract Administration (2%)					\$104,800	
Construction Observation (3%)					\$157,300	
Initial Project Delivery Costs Total					\$1,049,000	
Total Initial Project Costs					\$6,291,000	

Lifespan Costs - 50-year planning horizon					
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)
Annual Operation and Maintenance	\$12,000	50	\$600,000	\$1,572,000	\$381,900
Repair and Rehabilitation (every 10 years)	\$130,000	5	\$650,000	\$2,047,700	\$378,900
Total Lifespan Costs			\$1,250,000	\$3,620,000	\$761,000

Table DR0. Conceptual Cost Analysis* for *Montgomery Dam Removal to Underlying Ledge Channel, Seawall Adaptation, W/O Resiliency for Seawall and Lower Park*

*To date, does not include park facility improvements, building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 149,300.00	\$ 150,000	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 248,800	\$ 249,000	20% or other items:misc. water control activities, coffer dam, erosion and sedimentation control
Dam Removal & Channel Restoration						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 135	\$ 40,500	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Remove headgate and demolish & remove non-overflow dam	1	LS	\$ 50,000	\$ 50,000	
8	Demolish and remove sluiceway and sea wall to grounding basin	1	LS	\$ 50,000	\$ 50,000	
9	Misc. Grading/Excavation	1,500	CY	\$ 75	\$ 112,500	Harbor Park area, needs updated estimate
10	Lower slope restoration	150	LF	\$ 1,000	\$ 150,000	Stabilize and restore exposed slope
11	Misc adaptive management	1,200	CY	\$ 200	\$ 240,000	Allowance for adaptive management
Seawall Rehabilitation						
12	Seawall adaptation segments	520	LF	\$ 1,000	\$ 520,000	Wall adaptation east of grounding basin, per concept design, including selective demolition and reconstruction, new wall construction, essentially two walls.
13	Seawall elevation enhancement for resiliency		LF	\$ 667	\$ -	Assume elevation of the back sea wall by approximately 4' by a cut stone parapet wall
Adjacent Site Work						
14	Park elevation enhancement for resiliency - behind elevated wall		CY	\$ 50	\$ -	fill of areas below elevation 11, 2.5' average fill
15	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 1,643,000	
				Contingency (30%)	\$ 493,000	
				Project Construction Total	\$ 2,136,000	
Initial Construction Costs By Category						
Category					Total Cost	Notes
Dam Rehabilitation					\$0	
Fish Passage					\$1,167,000	
Seawall Rehabilitation					\$893,000	
Seawall and Park Resiliency					\$0	
Other					\$86,000	
Initial Construction Costs Total					\$2,136,000	
Initial Project Delivery Costs						
Item					Total Cost	Notes
Project Management (2%)					\$42,700	
Permitting (3%)					\$64,100	
Engineering Design (10%)					\$213,600	
Construction Contract Administration (2%)					\$42,700	
Construction Observation (3%)					\$64,100	
Initial Project Delivery Costs Total					\$428,000	
Total Initial Project Costs					\$2,564,000	
Lifespan Costs - 50-year planning horizon						
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)	
Annual Operation and Maintenance	\$2,000	50	\$100,000	\$262,000	\$63,600	
Repair and Rehabilitation (every 10 years)	\$50,000	5	\$250,000	\$787,600	\$145,700	
Total Lifespan Costs			\$350,000	\$1,050,000	\$210,000	

Table DR1. Conceptual Cost Analysis* for Montgomery Dam Removal to Underlying Ledge Channel, Seawall Adaptation, Resiliency for Seawall and Lower Park

*To date, does not include park facility improvements, building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 164,906.00	\$ 165,000	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 274,812	\$ 275,000	20% or other items:misc. water control activities, coffer dam, erosion and sedimentation control
Dam Removal & Channel Restoration						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 135	\$ 40,500	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Remove headgate and demolish & remove non-overflow dam	1	LS	\$ 50,000	\$ 50,000	
8	Demolish and remove sluiceway and sea wall to grounding basin	1	LS	\$ 50,000	\$ 50,000	
9	Misc. Grading/Excavation	1,500	CY	\$ 75	\$ 112,500	Harbor Park area, needs updated estimate
10	Lower slope restoration	150	LF	\$ 1,000	\$ 150,000	Stabilize and restore exposed slope
11	Misc adaptive management	1,200	CY	\$ 200	\$ 240,000	Allowance for adaptive management
Seawall Rehabilitation						
12	Seawall adaptation segments	520	LF	\$ 1,000	\$ 520,000	Wall adaptation east of grounding basin, per concept design, including selective demolition and reconstruction, new wall construction, essentially two walls
13	Seawall elevation enhancement for resiliency	180	LF	\$ 667	\$ 120,060	Assume elevation of the back sea wall by approximately 4' by a cut stone parapet wall
Adjacent Site Work						
14	Park elevation enhancement for resiliency - behind elevated wall	200	CY	\$ 50	\$ 10,000	fill of areas below elevation 11, 2.5' average fill
15	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 1,815,000	
				Contingency (30%)	\$ 545,000	
				Project Construction Total	\$ 2,360,000	
Initial Construction Costs By Category						
Category					Total Cost	Notes
Dam Rehabilitation					\$0	
Fish Passage					\$1,157,000	
Seawall Rehabilitation					\$893,000	
Seawall and Park Resiliency					\$224,000	
Other					\$86,000	
Initial Construction Costs Total					\$2,360,000	
Initial Project Delivery Costs						
Item					Total Cost	Notes
Project Management (2%)					\$47,200	
Permitting (3%)					\$70,800	
Engineering Design (10%)					\$236,000	
Construction Contract Administration (2%)					\$47,200	
Construction Observation (3%)					\$70,800	
Initial Project Delivery Costs Total					\$472,000	
Total Initial Project Costs					\$2,832,000	
Lifespan Costs - 50-year planning horizon						
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)	
Annual Operation and Maintenance	\$2,000	50	\$100,000	\$262,000	\$63,600	
Repair and Rehabilitation (every 10 years)	\$50,000	5	\$250,000	\$787,600	\$145,700	
Total Lifespan Costs			\$350,000	\$1,050,000	\$210,000	

Table DR1R. Conceptual Cost Analysis* for Montgomery Dam Removal to Underlying Ledge Channel, Seawall Adaptation, Resiliency for Seawall and Lower Park
rev 02/06/2024 *To date, includes overlook and slope vegetation restoration, but does not include other park facility improvements or building upgrades (if any)

Initial Project Costs						
Construction Cost Items						
No.	Item	Quantity	Unit	Unit Cost	Total Cost	Notes
Direct Costs						
1	Mobilization and General Conditions	1	LS	\$ 208,056.00	\$ 209,000	10% of other items; includes clearing and grubbing; traffic control as necessary
2	Erosion, Pollution & Water Control	1	LS	\$ 346,712	\$ 347,000	20% or other items:misc. water control activities, coffer dam, erosion and sedimentation control
Dam Removal & Channel Restoration						
3	Infrastructure construction phase evaluation, monitoring, support	1	LS	\$ 15,000	\$ 15,000	
4	Earthwork	80	CY	\$ 50	\$ 4,000	
5	Sediment Excavation	300	CY	\$ 150	\$ 45,000	Excavate Sediment From Impoundment
6	Demolish and remove concrete weir	80	CY	\$ 150	\$ 12,000	
7	Remove headgate and demolish & remove non-overflow dam	1	LS	\$ 50,000	\$ 50,000	
8	Demolish and remove sluiceway and sea wall to grounding basin	1	LS	\$ 50,000	\$ 50,000	
9	Misc. Grading/Excavation	1,500	CY	\$ 75	\$ 112,500	Harbor Park area, needs updated estimate
10	Lower slope restoration	150	LF	\$ 1,000	\$ 150,000	Stabilize and restore exposed slope
11	Misc adaptive management	1,200	CY	\$ 350	\$ 420,000	Allowance for adaptive management
Seawall Rehabilitation						
12	Seawall adaptation segments	520	LF	\$ 1,000	\$ 520,000	Wall adaptation east of grounding basin, per concept design, including selective demolition and reconstruction, new wall construction, essentially two walls.
13	Seawall elevation enhancement for resiliency	180	LF	\$ 667	\$ 120,060	Assume elevation of the back sea wall by approximately 4' by a cut stone parapet wall
Adjacent Site Work						
14	Park elevation enhancement for resiliency - behind elevated wall	1,000	CY	\$ 50	\$ 50,000	
15	Slope revegetation	4,000	SF	\$ 15	\$ 60,000	
16	Overlook	1	EA	\$ 75,000	\$ 75,000	
17	Site Restoration	0.5	AC	\$ 100,000	\$ 50,000	
				Construction Subtotal	\$ 2,290,000	
				Contingency (30%)	\$ 687,000	
				Project Construction Total (2024 \$)	\$ 2,977,000	
Construction Costs By Category						
Category					Total Cost (2024\$)	Notes
Dam Rehabilitation					\$0	
Fish Passage					\$1,474,000	
Seawall Rehabilitation					\$893,000	
Seawall and Park Resiliency					\$292,000	
Other					\$318,000	
Initial Construction Costs Total (2024 \$)					\$2,977,000	
Initial Project Delivery Costs						
Item					Total Cost	Notes
Project Management (2%)					\$59,500	
Permitting (3%)					\$89,300	
Engineering Design (10%)					\$297,700	
Construction Contract Administration (2%)					\$59,500	
Construction Observation (3%)					\$89,300	
Initial Project Delivery Costs Total					\$596,000	
Total Initial Project Costs					\$3,573,000	
Lifespan Costs - 50-year planning horizon						
Item	Event Cost (2024 dollars)	Intervals	Total Cost (2024 dollars)	Total Aggregated Cost (Escalated for 3.5% Inflation over 50 years)	Total Capitalized Cost (2024 Investment to Finance Total Aggregated Cost, Assumes Interest Exceeds Inflation by 2%)	
Annual Operation and Maintenance	\$2,000	50	\$100,000	\$262,000	\$63,600	
Repair and Rehabilitation (every 10 years)	\$50,000	5	\$250,000	\$787,600	\$145,700	
Total Lifespan Costs			\$350,000	\$1,050,000	\$210,000	