

**Lake Montauk Harbor, New York
Navigation Improvements
Feasibility Study**

**Appendix B: Cost Engineering
October 2020**

APPENDIX B – COST ESTIMATES

Table of Contents

INTRODUCTION.....	1
SUMMARY OF ALTERNATIVES	1
QUANTITIES	1
RECOMMENDED PLAN.....	2
OPERATIONAL & PLANNING CONSIDERATIONS	3
EQUIPMENT CONSIDERATIONS	4
RISK ANALYSIS	5
PLANNING, ENGINEERING AND DESIGN.....	6
CONSTRUCTION MANAGMENT	6
UNIT PRICE COST ESTIMATE.....	7
MITIGATION COSTS	7
ANNUALIZED COST	7
CONSTRUCTION EXECUTION & SCHEDULE.....	8
COST SUMMARY	9

List of Tables

Table B1 – TAKEOFF QUANTITIES BY ALTERNATIVES	2
Table B2 – FIRST COST SUMMARY TABLE	3
Table B3 – CONTINGENCY FACTORS	6
Table B4 – ANNUALIZED COST SUMMARY TABLE	8

List of Figures

Figure B1 – Construction Schedule	9
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Attachments

Total Project Cost Summary

Abbreviated Risk Analysis

Cost Certificate



Introduction

This appendix documents the development of the estimated cost for the Recommended Plan for expansion of the entrance channel at Lake Montauk Harbor. To evaluate alternatives, three categories of improvements were considered and cost estimates were prepared. This document summarizes the estimates considered and provides greater detail for the recommended plan.

Summary of Alternatives

Alternative 1 is the Without Project Future Condition. In this alternative, the existing 150FT-wide federally authorized channel and adjacent 50FT-wide deposition basin will continue to be maintained to a depth of -12FT MLW.

Three (3) general improvement designs were considered for this feasibility study:

- Alternative 2 involves deepening the existing 150FT wide federal channel and 50FT deposition basin.
- Alternative 3 involves deepening the existing 150FT wide federal channel and an expanded 100FT deposition basin.
- Alternative 4 is the same as Alternative 3 but with additional mechanical excavation and trucking of sand from the fillet east of the inlet.

Each improvement design alternative was evaluated at depths of 14' (+2' OD), 15' (+2' OD), 16' (+2' OD), 17' (+2' OD), & 18' (+2' OD). This resulted in a total of fifteen (15) alternatives for which preliminary cost estimates were generated during the study. The Recommended Plan was selected from these fifteen and then optimized on the basis of maximized Net Benefits.

Other than the mechanically excavated fillet mining component of Alternative 4, all other material will be dredged and placed on the shoreline inlet via pipeline from a small/medium-sized (16") cutter suction dredge working within the channel to create a berm. The berm is not an engineered berm however a maximum height of 9FT MLW and a maximum length of 3,000LF must be maintained with a set slope.

Quantities

Volume takeoffs for the alternatives considered were calculated based off of survey data collected on April 16, 2018 with more updated survey to be taken place in the PED phase. Table B1 summarizes the ten alternatives for which cost estimates were generated for cost benefit analysis within the feasibility study.



Table B1: Takeoff Quantities by Alternatives

Alternatives	Available Dredge + OD Volume (CY)				
	14'+2'	15'+2'	16'+2'	17'+2'	18'+2'
2 Deepen Channel + 50FT Depo Basin	51,800	83,200	109,000	135,400	163,000
3 Deepen Channel + 100FT Depo Basin	83,200	117,300	145,800	174,900	205,300
4 Deepen Channel + 100FT Depo Basin + East Fillet mining	90,200	124,300	152,800	181,900	212,300

See Attachment 1 of the Engineering appendix for the full analysis of the available dredge volume takeoff calculations.

Recommended Plan

The recommended plan is the 17' + 2' depth scenario of Alternative 3. This alternative involves deepening the existing 150FT-wide channel, alongside a widened and deepened adjacent deposition basin to be 100FT-wide.

In addition to the estimated construction costs, the study's Project Delivery Team (PDT) considered all work that might contribute added costs to this project. As shown in the First Cost Summary Table below (Table B2), the PDT determined that costs associated with Real Estate (Account 01) include costs associated with easements in the form of a non-standard estate during construction. Utility or other structural relocations (Account 02), and Environmental and Cultural Resource Mitigation efforts (Accounts 06 and 18) will not be incurred on this project.



Table B2: First Cost Summary Table

LAKE MONTAUK HARBOR NAVIGATION IMPROVEMENT FEASIBILITY

October 2020 Price Level

Feasibility Report Cost Estimate Summary

Feat. Acct.	Description	Qty	UoM	Subtotal	Cont. %	Cont \$\$	Total Cost
01	LANDS AND DAMAGES	1	LS	\$ 748,097	20%	\$ 149,619	\$ 897,716
12	NAVIGATION PORTS & HARBORS	1	LS	\$3,271,855	25%	\$ 816,843	\$4,088,699
30	PLANNING, ENGINEERING & DESIGN	1	LS	\$ 997,654	7%	\$ 70,255	\$1,067,910
31	CONSTRUCTION MANAGEMENT	1	LS	\$ 327,870	7%	\$ 23,039	\$ 350,909
TOTAL				\$5,345,477		\$ 1,059,757	\$6,405,234

Lake Montauk Harbor Navigation Improvement Feasibility Study cost estimate summary for recommended plan, Alternative 3: Channel + widened deposition basin deepened to 17' + 2'.

Planning, Engineering and Development costs, (Account 30) are estimated as 7% of the excavation portion of the first cost. Construction Management costs (Account 31) are estimated at 7% of the same base cost. Contingencies for all accounts except for Real Estate were developed by the PDT through Abbreviated Risk Analysis (see p. A6 in this appendix for complete ARA). Real Estate contingency was provided by the Real Estate office.

Operational & Planning Considerations

The following operational considerations were used in developing the construction cost estimates.

- Mobilization and demobilization were based on the use of one small/medium-sized cutter suction dredge, 3000FT of pipeline and all associated plant. It is estimated that 21 days will be required for mobilization and 20 days will be required for demobilization.
- Dredging operations will be 24 hours per day operating 7 days a week.
- This feasibility-level estimate for placement and monitoring of the beachfill stockpile includes a \$100,000 monthly cost for labor and equipment involved in 24/7 operations.

Operations and Maintenance costs associated with the two sets of alternatives are as summarized as follows:



- Alternative 1 is the “No Change” alternative where O&M costs are assumed to be based on current sedimentation patterns and maintenance dredging every four years, starting in 2026. At 8,000CY of anticipated sedimentation, or 32,000CY to be dredged every four years, the anticipated O&M cost associated with Alternative 1 is \$5.5M over a 50YR period of analysis, including a 24% contingency.
- Alternative 2 does not incorporate a widened deposition basin. As such, maintenance dredging is anticipated to remain the current pace at every four years. At 8,000CY of anticipated sedimentation per year, that works out to 32,000CY to be dredged every four years. With the same unit, mob/demob and contingency costs applied as to the base estimate, which works out to approximately \$5.3M of maintenance over the course of the 50YR period of analysis. This amount is slightly lower than the O&M anticipated in Alternative 1, because the first year of maintenance dredging would be one year later in Alternative 2.
- Alternative 3 does incorporate a 100FT widened deposition basin, compared to the current 50FT-wide basin. This wider basin allows for less frequent maintenance dredging to be done every 7 years. At 8,000CY of anticipated sedimentation per year, that works out to 56,000CY to be dredged every seven years. That works out to approximately \$3.9M of maintenance over the course of the 50YR period of analysis.
- Alternative 4 is the same as Alternative 3, but with the additional mining of the East Fillet during initial expansion and with each O&M cycle. O&M costs works out to \$4.0M over the course of the 50YR period of analysis.

Equipment Considerations

Project Delivery Team members anticipate that a small/medium cutter suction dredge (CSD) will be used for this navigation improvement project. Recent maintenance of this channel has been executed with such a tool and the scope of this deepening/widening project matches closely enough that similar performance can be anticipated here. Sand with higher compaction and competence can be expected, as well as possible debris or rock associated with older sedimentation or older maintenance of the channel. The risk that a small CSD cannot excavate larger debris or rock is considered in the risk analysis and the possible need for special equipment (such as a mechanical dredge) is captured in the contingency. The bulk of the work is expected to be performed by a cutter suction dredge and its attendant plant.

The water-side equipment assembly for such a project includes:

- A dredge with a 16” discharge pipe is used in this estimate.
- Two small attendant tug boats for positioning the dredge and anchors.



- One small A-Frame anchor barge for moving and storing anchors, floating pipeline.
- One dual-purpose crewboat and survey vessel.

Land-side equipment and labor includes:

- One dozer and one front end loader
- Two surveyors

Risk Analysis

An Abbreviated Risk Analysis (ARA) was conducted by the Project Delivery Team on May 29, 2019 to consider risks facing all alternatives. The ARA summary in Table B3 below reflects all risks considered for the selected plan.

Major risks associated with the dredging line item include the potential for shoaling to increase the volumes to be dredged and the potential to encounter rock or debris which cannot be removed by the small cutter suction dredge modeled. It can be reasoned that earlier deepening and maintenance dredging operations may have resulted in the side-casting of larger debris or boulders which may now require mechanical excavation. Fuller discussion of likelihood and impact for these risks are shared in the attached ARA Risk Register (starts on page D-A3). Taken together, the risks identified inform a 25% contingency associated with the dredging line item.

Contingencies associated with the Planning, Engineering and Design and the Construction Management Accounts (30 and 31) correspond with the risk that the standard calculated PED and S&A costs calculated as a percentage of the underlying construction estimate are not sufficient for the corresponding activities. In each of these two accounts the calculated risk generated by the ARA works out to 7%. Risk associated with the Lands and Damages is captured in the 20% contingency provided by the Real Estate office.



Table B3: Contingency Factors

Element	Contingency Factor
Navigation Ports & Harbor	25%
Lands & Damages	20%
Planning, Engineering, and Design	7%
Construction Management	7%

Planning, Engineering and Design

The cost was developed for all activities associated with the planning, engineering and design effort. The cost for this account includes the preparation of Design Documentation Reports, plans, and specifications for the Lake Montauk Harbor project and engineering support during construction through project completion. It includes all the in-house labor based upon work-hour requirements, material and facility costs, travel, and overhead. The percentage breakdown in the Total Project Cost Summary (TPCS), as shown in Table B5 on the attachment, was developed based on input from respective offices in accordance with the CWBS.

Construction Management

The cost was developed for all construction management activities from pre-award requirements through final contract closeout. This cost includes the in-house labor based upon work-hour requirement, materials, facility costs, support contracts, travel and overhead. The cost was developed based on the input from the construction division in accordance with the civil works breakdown structure (CWBS) and includes, but is not limited to, anticipated items such as the salaries of the resident engineer and staff. Surveyors, inspectors, drafters, clerical, and custodial personnel; operation, maintenance and fixed charges for transportation and for transportation and for other field equipment; field supplies; construction management, general construction management, general construction supervision; and project office administration, distributive cost of area office and general overhead charged to the project.



Unit Price Cost Estimate

The unit prices were developed using the Corps of Engineers Dredge Estimating Program (CEDEP). The CEDEP uses the following inputs:

- The dredgeability and area of the material (from the Geotechnical investigation)
- The volume of the material
- Productivity is affected by the ratio of bank height to cutterhead depth. Values used are corroborated against maintenance experience in the same channel.
- Operational costs and ownership costs (determined from other dredging projects constructed in NY and other similar areas)

The cost of excavating and placement of dredged material from the channel and expanded deposition basin is based upon the volume to be dredged and unit prices. Also included is the cost of mobilizing/demobilizing the equipment and contingencies. All costs are summarized in the tables provided.

Mitigation Costs

Mitigation accounts are assumed to be zero (\$0) on this project. PDT members have determined that no cultural resources are anticipated to be impacted in the channel or the beach and that the impacts on air will not surpass the threshold to require environmental mitigation. Also, environmental planners have deemed that this channel improvement project will have no impact on wetlands.

Annualized Cost

The table below reflects the annualized cost based on a current discount rate of 2.50% and the first costs calculated. These costs include contingencies as developed with the Abbreviated Risk Analysis described above.



Table B4: Annualized Cost Summary Table

LAKE MONTAUK HARBOR NAVIGATION IMPROVEMENT FEASIBILITY STUDY

Annualized Cost Summary

First Cost	\$	6,405,234
Sunk Cost	\$	-
Investment Cost		
Interest During Construction ^(a)	\$	71,200
Total Investment Cost:	\$	6,476,434
Annual Costs		
Annualized Investment Cost ^(b)	\$	228,346
Annualized Operation & Maintenance Repair, Replacement & Rehabilitatic	\$	143,367
Total Annual Cost*	\$	371,714

*October 2020 Price Level

(a) Based on 3 months of construction @ 2.50% (IDC, E&D, RE and Sunk costs calculated separately and included in

(b) Annualized investment cost only includes the remaining features. For annualized investment cost with the sunk cost, please see the economic appendix. $i = 2.50\%$ and $n = 50$ yrs

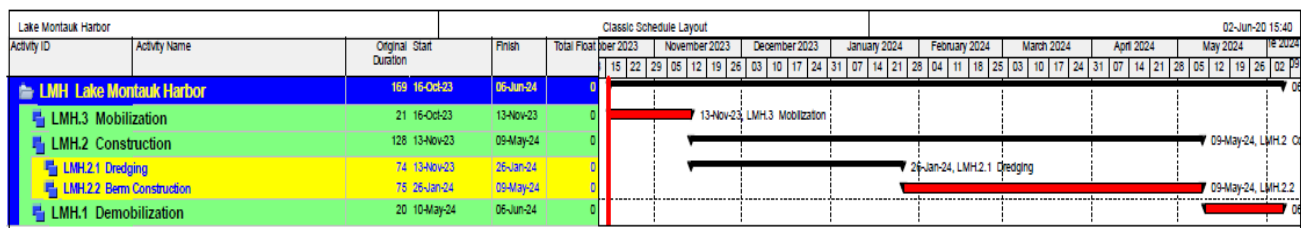
(c) Assume \$143,367 additional O&M costs associated with expansion, per PDT discussion.

Construction Execution & Schedule

Construction of the recommended alternative (17' + 2' depth with an expanded, 100FT-wide deposition basin) requires mobilization of the dredge and appurtenant plant, dredging with beachfill placement and demobilization. With the anticipated construction start in the fall of 2023, the following schedule reflects anticipated mob/demob and dredging productions as estimated with the CEDEP program. October 16 was chosen as the date for the Notice to Proceed based on the applicable environmental window restrictions.



Figure B1: Construction Schedule



Sample Construction Schedule for 8 months estimated duration following Oct 16, 2023 Notice to Proceed

Navigation Ports & Harbor Cost Summary

The Recommended Plan is the 17' + 2' depth alternative of the Lake Montauk Harbor entrance channel and 100FT deposition expansion design. This estimate assumes one 16" cutter-suction dredge working with attendant offshore and beach-side assemblies for removal of 174,900CY within 74 calendar days of active dredging and another 75 working days for berm construction at the shoreline west of the inlet. The total project cost, including Lands and Damages, Planning Engineering and Design and Construction Management plus contingencies, fully funded for construction in FY2024 is estimated at \$7.3M.



Table B5: Total Project Cost Summary (TPCS)

PROJECT: Lake Montauk Harbor Deepening Feasibility										DISTRICT: NAN		PREPARED: 10/6/2020			
PROJECT NO: P2 107876										POC: CHIEF, COST ENGINEERING, Mukesh Kumar					
LOCATION: Lake Montauk Harbor, New York															
This Estimate reflects the scope and schedule in report;										Lake Montauk Harbor Feasibility Design and Quantity Documents - Alt 3: Channel & Depo Deepening +100FT Widened Basin (17' +2')					
Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)					TOTAL PROJECT COST (FULLY FUNDED)				
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST (\$K) C	CNTG (\$K) D	CNTG (%) E	TOTAL (\$K) F	Program Year (Budget EC): 2021 Effective Price Level Date: 1 OCT 20				Spent Thru: 1-Oct-19 (\$K)	TOTAL FIRST COST (\$K) K	INFLATED (%) L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
						ESC (%) G	COST (\$K) H	CNTG (\$K) I	TOTAL (\$K) J						
12	NAVIGATION PORTS & HARBORS	\$3,177	\$793	25.0%	\$3,970	3.0%	\$3,272	\$817	\$4,089	\$0	\$4,089	12.9%	\$3,693	\$922	\$4,615
CONSTRUCTION ESTIMATE TOTALS:		\$3,177	\$793		\$3,970	3.0%	\$3,272	\$817	\$4,089	\$0	\$4,089	12.9%	\$3,693	\$922	\$4,615
01	LANDS AND DAMAGES	\$748	\$150	20.0%	\$898	0.0%	\$748	\$150	\$898	\$0	\$898	12.1%	\$838	\$168	\$1,006
30	PLANNING, ENGINEERING & DESIGN	\$954	\$67	7.0%	\$1,021	4.6%	\$998	\$70	\$1,068	\$0	\$1,068	16.3%	\$1,160	\$82	\$1,242
31	CONSTRUCTION MANAGEMENT	\$314	\$22	7.0%	\$336	4.6%	\$328	\$23	\$351	\$0	\$351	17.0%	\$384	\$27	\$411
PROJECT COST TOTALS:		\$5,192	\$1,032	19.9%	\$6,224		\$5,345	\$1,060	\$6,405	\$0	\$6,405	13.6%	\$6,075	\$1,198	\$7,274
		CHIEF, COST ENGINEERING, Mukesh Kumar													
		PROJECT MANAGER, Nathanael Wales										ESTIMATED TOTAL PROJECT COST: \$7,274			
		CHIEF, REAL ESTATE, Karen Kennedy													



Table B5 Cont'd: Total Project Cost Summary (TPCS)

PROJECT: Lake Montauk Harbor Deepening Feasibility

LOCATION: Lake Montauk Harbor, New York

This Estimate reflects the scope and schedule in report;

DISTRICT: NAN

POC: CHIEF, COST ENGINEERING, Mukesh Kumar

PREPARED: 10/6/2020

Lake Montauk Harbor Feasibility Design and Quantity Documents

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: Effective Price Level:		1-Mar-20 1-Oct-19		Program Year (Budget EC): Effective Price Level Date:		2021 1 OCT 20						
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	INFLATED (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
12	NAVIGATION PORTS & HARBORS	\$3,177	\$793	25.0%	\$3,970	3.0%	\$3,272	\$817	\$4,089	2025Q2	12.9%	\$3,693	\$922	\$4,615
CONSTRUCTION ESTIMATE TOTALS:		\$3,177	\$793	25.0%	\$3,970		\$3,272	\$817	\$4,089			\$3,693	\$922	\$4,615
01	LANDS AND DAMAGES	\$748	\$150	20.0%	\$898	0.0%	\$748	\$150	\$898	2025Q1	12.1%	\$838	\$168	\$1,006
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	\$78	\$6	7.0%	\$84	4.6%	\$82	\$6	\$87	2025Q1	16.0%	\$95	\$7	\$101
1.0%	Planning & Environmental Compliance	\$31	\$2	7.0%	\$34	4.6%	\$33	\$2	\$35	2025Q1	16.0%	\$38	\$3	\$41
14.8%	Engineering & Design	\$469	\$33	7.0%	\$502	4.6%	\$490	\$35	\$525	2025Q1	16.0%	\$569	\$40	\$609
1.0%	Reviews, ATRs, IEPRs, VE	\$31	\$2	7.0%	\$34	4.6%	\$33	\$2	\$35	2025Q1	16.0%	\$38	\$3	\$41
1.0%	Life Cycle Updates (cost, schedule, risks)	\$31	\$2	7.0%	\$34	4.6%	\$33	\$2	\$35	2025Q1	16.0%	\$38	\$3	\$41
1.0%	Contracting & Reprographics	\$31	\$2	7.0%	\$34	4.6%	\$33	\$2	\$35	2025Q1	16.0%	\$38	\$3	\$41
2.9%	Engineering During Construction	\$93	\$7	7.0%	\$100	4.6%	\$98	\$7	\$105	2025Q2	17.0%	\$114	\$8	\$122
2.0%	Planning During Construction	\$63	\$4	7.0%	\$67	4.6%	\$66	\$5	\$70	2025Q2	17.0%	\$77	\$5	\$82
2.9%	Adaptive Management & Monitoring	\$93	\$7	7.0%	\$100	4.6%	\$98	\$7	\$105	2025Q2	17.0%	\$114	\$8	\$122
1.0%	Project Operations	\$31	\$2	7.0%	\$34	4.6%	\$33	\$2	\$35	2025Q1	16.0%	\$38	\$3	\$41
31	CONSTRUCTION MANAGEMENT													
6.8%	Construction Management	\$216	\$15	7.0%	\$232	4.6%	\$226	\$16	\$242	2025Q2	17.0%	\$265	\$19	\$283
1.4%	Project Operation:	\$44	\$3	7.0%	\$47	4.6%	\$46	\$3	\$49	2025Q2	17.0%	\$54	\$4	\$57
1.7%	Project Management	\$53	\$4	7.0%	\$57	4.6%	\$56	\$4	\$60	2025Q2	17.0%	\$65	\$5	\$70
CONTRACT COST TOTALS:		\$5,192	\$1,032		\$6,224		\$5,345	\$1,060	\$6,405			\$6,075	\$1,198	\$7,274



Table B6: Abbreviated Risk Analysis – Lake Montauk Harbor Deepening + 100FT Expanded Deposition Basin (17’ + 2’), Alternative 3 (Recommended Plan)

Abbreviated Risk Analysis																																																
Project Name & Location: Lake Montauk Harbor, Long Island, New York				District: NAN																																												
Project Development Stage/Alternative: Feasibility (Recommended Plan)				Alternative: Alt 3: Channel & Depo Deepening +100l																																												
Risk Category: Moderate Risk: Typical Project Construction Type				Meeting Date: 5/29/2019																																												
Total Estimated Construction Contract Cost =				\$	3,271,855																																											
CWWBS	Feature of Work		Contract Cost	% Contingency	\$ Contingency	Total																																										
1	01 LANDS AND DAMAGES	Real Estate	\$ 748,097	20%	\$ 149,619.40	\$ 897,716																																										
2	12 NAVIGATION, PORTS AND HARBORS	Inlet Channel and Shoal Dredge (cutterhead)	\$ 3,271,855	25%	\$ 816,900	\$ 4,088,755																																										
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 997,654	7%	\$ 70,200	\$ 1,067,854																																										
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 327,870	7%	\$ 23,100	\$ 350,970																																										
<table><tr><th colspan="7">Totals</th></tr><tr><td></td><td>Real Estate</td><td>\$</td><td>748,097</td><td>20%</td><td>\$ 149,619</td><td>\$ 897,716</td></tr><tr><td></td><td>Total Construction Estimate</td><td>\$</td><td>3,271,855</td><td>25%</td><td>\$ 816,900</td><td>\$ 4,088,755</td></tr><tr><td></td><td>Total Planning, Engineering & Design</td><td>\$</td><td>997,654</td><td>7%</td><td>\$ 70,200</td><td>\$ 1,067,854</td></tr><tr><td></td><td>Total Construction Management</td><td>\$</td><td>327,870</td><td>7%</td><td>\$ 23,100</td><td>\$ 350,970</td></tr><tr><td colspan="2">Total</td><td>\$</td><td>5,345,477</td><td>20%</td><td>\$ 1,059,819</td><td>\$ 6,405,296</td></tr></table>							Totals								Real Estate	\$	748,097	20%	\$ 149,619	\$ 897,716		Total Construction Estimate	\$	3,271,855	25%	\$ 816,900	\$ 4,088,755		Total Planning, Engineering & Design	\$	997,654	7%	\$ 70,200	\$ 1,067,854		Total Construction Management	\$	327,870	7%	\$ 23,100	\$ 350,970	Total		\$	5,345,477	20%	\$ 1,059,819	\$ 6,405,296
Totals																																																
	Real Estate	\$	748,097	20%	\$ 149,619	\$ 897,716																																										
	Total Construction Estimate	\$	3,271,855	25%	\$ 816,900	\$ 4,088,755																																										
	Total Planning, Engineering & Design	\$	997,654	7%	\$ 70,200	\$ 1,067,854																																										
	Total Construction Management	\$	327,870	7%	\$ 23,100	\$ 350,970																																										
Total		\$	5,345,477	20%	\$ 1,059,819	\$ 6,405,296																																										
Range Estimate (\$000's)				Base	50%	80%																																										
				\$5,345k	\$5,981k	\$6,405k																																										
* 50% based on base is at 50% CL.																																																



Table B6 Cont'd: Abbreviated Risk Analysis – Lake Montauk Harbor Deepening + 100FT Expanded Deposition Basin (17' + 2'), Alternative 3 (Recommended Plan)

	B	C	D	F	G	H	I	J
10	Use/ View	Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
11		Project Scope Growth		Maximum Project Growth				60%
13	Yes	PS-2	Inlet Channel and Shoal Dredge (cutterhead)	Potential for local interests to request deeper authorization than current TSP.	Fishing fleets can include deeper draft vessels and possible that these interests will press for deeper draft authorization. Impact to be captured in quantity differences considered separately.	Negligible	Possible	0
24	Yes	PS-13	Planning, Engineering, & Design	Potential for scope growth and added features?	Negligible cost change anticipated associated with scope growth (other than quantities)	Negligible	Possible	0
25	Yes	PS-14	Construction Management	Potential for scope growth and added features?	Negligible cost change anticipated associated with scope growth (other than quantities)	Negligible	Possible	0
26		Acquisition Strategy		Maximum Project Growth				40%
28	Yes	AS-2	Inlet Channel and Shoal Dredge (cutterhead)	Contracting plan firmly established? Bid schedule developed to reduce quantity risks?	Contracting plan isn't firmly established, but it will probably be unrestricted IFB. This acquisition assumption was taken into consideration while preparing the estimate. Based on past experiences, different acquisition strategies offer negligible impact on cost.	Negligible	Unlikely	0
39	Yes	AS-13	Planning, Engineering, & Design	No concerns		Negligible	Unlikely	0
40	Yes	AS-14	Construction Management	No concerns		Negligible	Unlikely	0
41		Construction Elements		Maximum Project Growth				30%
43	Yes	CON-2	Inlet Channel and Shoal Dredge (cutterhead)	Special equipment or subcontractors needed associated with unanticipated work conditions (boulders, etc) Potential for modification and claims.	Possible side-casted boulders from prior dredging. Other material encountered which will require mechanical dredge.	Significant	Possible	3
54	Yes	CON-13	Planning, Engineering, & Design	No concerns		Negligible	Possible	0
55	Yes	CON-14	Construction Management	Potential for modification and claims.		Negligible	Possible	0



Table B6 Cont'd: Abbreviated Risk Analysis – Lake Montauk Harbor Deepening + 100FT Expanded Deposition Basin (17' + 2'), Alternative 3 (Recommended Plan)

	B	C	D	F	G	H	I	J
56		<u>Quantities for Current Scope</u>		Maximum Project Growth				20%
58	Yes	Q-2	Inlet Channel and Shoal Dredge (cutterhead)	Shoaling to increase dredge quantity.	Since the project is in the feasibility stage, quantities may change. Based on input provided from the designer, quantities are preliminary and will be updated after pre-construction survey.	Marginal	Very LIKELY	3
69	Yes	Q-13	Planning, Engineering, & Design	No concerns		Negligible	Unlikely	0
70	Yes	Q-14	Construction Management	No concerns		Negligible	Unlikely	0
71		<u>Specialty Fabrication or Equipment</u>		Maximum Project Growth				75%
73	Yes	FE-2	Inlet Channel and Shoal Dredge (cutterhead)	No concerns		Negligible	Unlikely	0
84	Yes	FE-13	Planning, Engineering, & Design	No concerns		Negligible	Unlikely	0
85	Yes	FE-14	Construction Management	No concerns		Negligible	Unlikely	0
86		<u>Cost Estimate Assumptions</u>		Maximum Project Growth				35%
88	Yes	EST-2	Inlet Channel and Shoal Dredge (cutterhead)	Assumptions related to prime and subcontractor markups/assignments? Assumptions regarding crew, productivity, overtime?	Crews, pipeline length, overtime, markups, etc., were assumed for the dredging. They were based on historical data. Every dredging job is different, assumptions may deviate a little, depending on site conditions.	Moderate	Possible	2
99	Yes	EST-13	Planning, Engineering, & Design	Straight 12% PED cost based on previous experience of similar projects.	May not be sufficient should PED phase discover additional, non-standard elements for planning, engineering or design.	Marginal	Possible	1
100	Yes	EST-14	Construction Management	9.9% S&A cost estimated based on standard cost formula.	May not be sufficient should construction phase discover additional, non-standard elements such as changes in conditions which require modifications to the contract.	Marginal	Possible	1
101		<u>External Project Risks</u>		Maximum Project Growth				40%
103	Yes	EX-2	Inlet Channel and Shoal Dredge (cutterhead)	Potential for severe adverse weather.	Every job has a potential for severe adverse weather, there's no reason to think that this project would have a more than average severe adverse weather impact.	Marginal	Possible	1
114	Yes	EX-13	Planning, Engineering, & Design	No concerns		Negligible	Unlikely	0
115	Yes	EX-14	Construction Management	No concerns		Negligible	Unlikely	0



Cost Review Comments and Responses

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For Project No. 107876

**NAN – Lake Montauk Harbor, East Hampton NY
Navigation Improvements Feasibility Study**

The Lake Montauk Harbor Navigation Improvements Feasibility Study, as presented by New York District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of October 22, 2020, the Cost MCX certifies the estimated total project cost:

FY21 Project First Cost: \$6,405,000
Fully Funded Amount: \$7,274,000

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management through the period of Federal Participation.



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Date: 2020.10.22 09:16:37 -07'00'
Michael P. Jacobs, PE, CCE
Chief, Cost Engineering MCX
Walla Walla District

PROJECT: Lake Montauk Harbor Deepening Feasibility						DISTRICT: NAN						PREPARED: 10/6/2020					
PROJECT NO: P2 107876						POC: CHIEF, COST ENGINEERING, Mukesh Kumar											
LOCATION: Lake Montauk Harbor, New York																	
This Estimate reflects the scope and schedule in report; Lake Montauk Harbor Feasibility Design and Quantity Documents - Alt 3: Channel & Depo Deepening +100FT Widened Basin (17' +2')																	
Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)					
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST (\$K) C	CNTG (\$K) D	CNTG (%) E	TOTAL (\$K) F	ESC (%) G	COST (\$K) H	CNTG (\$K) I	TOTAL (\$K) J	Program Year (Budget EC): Effective Price Level Date:		TOTAL FIRST COST (\$K) K	INFLATED (%) L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O	
										2021 1 OCT 20	Spent Thru: 1-Oct-19 (\$K)						
12	NAVIGATION PORTS & HARBORS	\$3,177	\$793	25.0%	\$3,970	3.0%	\$3,272	\$817	\$4,089		\$0	\$4,089	12.9%	\$3,693	\$922	\$4,615	
CONSTRUCTION ESTIMATE TOTALS:		\$3,177	\$793		\$3,970	3.0%	\$3,272	\$817	\$4,089		\$0	\$4,089	12.9%	\$3,693	\$922	\$4,615	
01	LANDS AND DAMAGES	\$748	\$150	20.0%	\$898	0.0%	\$748	\$150	\$898		\$0	\$898	12.1%	\$838	\$168	\$1,006	
30	PLANNING, ENGINEERING & DESIGN	\$954	\$67	7.0%	\$1,021	4.6%	\$998	\$70	\$1,068		\$0	\$1,068	16.3%	\$1,160	\$82	\$1,242	
31	CONSTRUCTION MANAGEMENT	\$314	\$22	7.0%	\$336	4.6%	\$328	\$23	\$351		\$0	\$351	17.0%	\$384	\$27	\$411	
PROJECT COST TOTALS:		\$5,192	\$1,032	19.9%	\$6,224		\$5,345	\$1,060	\$6,405		\$0	\$6,405	13.6%	\$6,075	\$1,198	\$7,274	
CHIEF, COST ENGINEERING, Mukesh Kumar																	
ESTIMATED TOTAL PROJECT COST: \$7,274																	
PROJECT MANAGER, Nathanael Wales																	
CHIEF, REAL ESTATE, Karen Kennedy																	

PROJECT: Lake Montauk Harbor Deepening Feasibility

LOCATION: Lake Montauk Harbor, New York

This Estimate reflects the scope and schedule in report;

Lake Montauk Harbor Feasibility Design and Quantity Documents

DISTRICT: NAN

POC: CHIEF, COST ENGINEERING, Mukesh Kumar

PREPARED: 10/6/2020

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: Effective Price Level:		1-Mar-20 1-Oct-19		Program Year (Budget EC): Effective Price Level Date:		2021 1 OCT 20						
WBS NUMBER	Civil Works Feature & Sub-Feature Description	RISK BASED				ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	INFLATED (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
		COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)									
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
12	NAVIGATION PORTS & HARBORS	\$3,177	\$793	25.0%	\$3,970	3.0%	\$3,272	\$817	\$4,089	2025Q2	12.9%	\$3,693	\$922	\$4,615
CONSTRUCTION ESTIMATE TOTALS:		\$3,177	\$793	25.0%	\$3,970		\$3,272	\$817	\$4,089			\$3,693	\$922	\$4,615
01	LANDS AND DAMAGES	\$748	\$150	20.0%	\$898	0.0%	\$748	\$150	\$898	2025Q1	12.1%	\$838	\$168	\$1,006
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	\$78	\$6	7.0%	\$84	4.6%	\$82	\$6	\$87	2025Q1	16.0%	\$95	\$7	\$101
1.0%	Planning & Environmental Compliance	\$31	\$2	7.0%	\$34	4.6%	\$33	\$2	\$35	2025Q1	16.0%	\$38	\$3	\$41
14.8%	Engineering & Design	\$469	\$33	7.0%	\$502	4.6%	\$490	\$35	\$525	2025Q1	16.0%	\$569	\$40	\$609
1.0%	Reviews, ATRs, IEPRs, VE	\$31	\$2	7.0%	\$34	4.6%	\$33	\$2	\$35	2025Q1	16.0%	\$38	\$3	\$41
1.0%	Life Cycle Updates (cost, schedule, risks)	\$31	\$2	7.0%	\$34	4.6%	\$33	\$2	\$35	2025Q1	16.0%	\$38	\$3	\$41
1.0%	Contracting & Reprographics	\$31	\$2	7.0%	\$34	4.6%	\$33	\$2	\$35	2025Q1	16.0%	\$38	\$3	\$41
2.9%	Engineering During Construction	\$93	\$7	7.0%	\$100	4.6%	\$98	\$7	\$105	2025Q2	17.0%	\$114	\$8	\$122
2.0%	Planning During Construction	\$63	\$4	7.0%	\$67	4.6%	\$66	\$5	\$70	2025Q2	17.0%	\$77	\$5	\$82
2.9%	Adaptive Management & Monitoring	\$93	\$7	7.0%	\$100	4.6%	\$98	\$7	\$105	2025Q2	17.0%	\$114	\$8	\$122
1.0%	Project Operations	\$31	\$2	7.0%	\$34	4.6%	\$33	\$2	\$35	2025Q1	16.0%	\$38	\$3	\$41
31	CONSTRUCTION MANAGEMENT													
6.8%	Construction Management	\$216	\$15	7.0%	\$232	4.6%	\$226	\$16	\$242	2025Q2	17.0%	\$265	\$19	\$283
1.4%	Project Operation:	\$44	\$3	7.0%	\$47	4.6%	\$46	\$3	\$49	2025Q2	17.0%	\$54	\$4	\$57
1.7%	Project Management	\$53	\$4	7.0%	\$57	4.6%	\$56	\$4	\$60	2025Q2	17.0%	\$65	\$5	\$70
CONTRACT COST TOTALS:		\$5,192	\$1,032		\$6,224		\$5,345	\$1,060	\$6,405			\$6,075	\$1,198	\$7,274