

Appendix F – Cost Engineering

Aquatic Ecosystem Restoration for Gulf Intracoastal Waterway (GIWW) – Beneficial Use of Dredged Material, Texas

Section 204

Draft Integrated Detailed Project Report and Environmental Assessment

July 2024



**US Army Corps
of Engineers**

Galveston District

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List of Acronyms

ARA – Abbreviated Risk Analysis

CEDEP – Cost Engineering Dredge Estimating Program

MCACES – Micro-Computer Aided Cost Estimating System

PDT – Project Delivery Team

TPCS – Total Project Cost Summary

Cost MCX – Walla Walla District Cost Engineering Mandatory Center of Expertise

TSP – Tentatively Selected Plan

1 Cost Engineering

1.1 Cost Description

The cost estimate was prepared using the latest Unit Price Books and labor rates for fiscal year 2023 (October 2022) and in accordance with Engineering Regulation (ER) 1110-2-1302. This study focuses on beneficial use of dredged material for a saline marsh creation at Goose Island State Park. Five (5) alternative placement arrangements were considered:

- Alternative 3A: Saline Marsh in Existing Cells.
- Alternative 3B: Saline Marsh in Existing Cells and Living Shoreline.
- Alternative 3C: Saline Marsh and High Emergent Marsh in Existing Cells, Addition of New Low Emergent Marsh Cells.
- Alternative 3D: Saline Marsh in Existing Cells, Addition of New Low and High Emergent Marsh Cells.
- Alternative 3E: Saline Marsh in Existing Cells, Addition of New Low and High Emergent Marsh Cells, and Living Shoreline. Dropped from further consideration as it damages existing seagrass areas.

Alternative 3D was selected as the TSP. *Table 1* contains the costs of each alternative including the base plan/Federal Standard. Base plan cost varies per alternative, because base plan dredge quantities match dredge quantities needed per alternative. Each alternative requires a different quantity of dredged material.

The PDT developed, quality controlled, and verified quantities. The estimate was organized in accordance with the work breakdown structure using the following codes of account.

ACCOUNT CODE 01 - LANDS AND DAMAGES: The Galveston District Real Estate Division developed costs and contingency for Lands and Damages.

ACCOUNT CODE 06 – FISH AND WILDLIFE FACILITIES: Hydraulics & Hydrology Branch and Environmental developed quantities for Fish and Wildlife Facilities. The cost was based on similar work done by the Galveston District. This account consists of spartina planting and work related to the new low and high emergent marsh cells and a containment berm and includes the cost for all labor, equipment, and material.

ACCOUNT CODE 12 – NAVIGATION PORTS AND HARBORS: Hydraulics & Hydrology Branch developed quantities for Navigation Ports and Harbors. It was assumed a 24" pipeline dredge would dredge material from Gulf Intercoastal Waterway and place it into the marsh using traditional dredging methods for the area. The dredging cost was developed using CEDEP and based on standard operating practices for the Galveston District.

ACCOUNT CODE 30 – PLANNING, ENGINEERING, AND DESIGN: The cost for this account code was developed using a percentage of the construction work and in coordination with Project Manager and PDT

ACCOUNT CODE 31 - CONSTRUCTION MANAGEMENT: The cost for this account code was developed using a percentage of the construction work and in coordination with Project Manager and PDT.

Table 1: Alternatives cost summary includes total base plan cost, total alternative cost, and incremental cost.

Alternatives	Alt 3A		Alt 3B		Alt 3C		Alt 3D		Alt 3E	
	Base Plan	Alternative	Base Plan	Alternative	Base Plan	Alternative	Base Plan	Alternative	Base Plan	Alternative
01 Real Estate		\$858,660.75		\$1,737,328.50		\$782,514.00		\$781,434.00		\$1,227,156.75
06 Fish and Wildlife Facilities		\$929,591.46		\$1,123,719.66		\$2,311,728.30		\$2,311,728.30		\$2,431,357.74
12 Navigation, ports & harbors	\$2,755,714.50	\$4,601,958.48	\$2,927,799.00	\$4,800,219.48	\$3,167,980.20	\$5,218,224.48	\$3,168,074.70	\$5,258,166.48	\$3,340,916.46	\$5,547,599.82
30 Planning, Eng & design	\$275,562.00	\$633,276.00	\$292,824.00	\$754,488.00	\$316,764.00	\$826,056.00	\$316,764.00	\$829,962.00	\$334,152.00	\$912,492.00
31 Construction Mngt	\$220,500.00	\$506,646.00	\$234,234.00	\$603,666.00	\$253,386.00	\$660,870.00	\$253,386.00	\$663,894.00	\$267,246.00	\$729,918.00
Total Project Cost	\$3,251,800.00	\$7,530,200.00	\$3,454,900.00	\$9,019,500.00	\$3,738,200.00	\$9,799,400.00	\$3,738,300.00	\$9,845,200.00	\$3,942,400.00	\$10,848,600.00
Incremental Project Cost		\$4,278,400.00		\$5,564,600.00		\$6,061,200.00		\$6,106,900.00		\$6,906,200.00

Cost does not include escalation/inflation.

1.2 Construction Schedule

The construction schedule was estimated given CEDEP values for dredging time as well as prior projects of similar scope with regards to marsh and containment berm work. The resulting calendars (Figure 1 and Figure 2) show the resulting project (by contract) schedule and the construction schedule. Alternative 3D would have an estimated construction duration of 13 months. The duration includes all work related to alternative 3D.

Alternative	Description	Duration (month)	Design Midpoint	Start Date	Mid-Point	End Date
3D	Dredging/Containment Dike	11	Apr-24 2024Q3	1-Oct-24	17-Mar-25 2025Q2	31-Aug-25

Figure 1: Alternative Contract Schedule

ALT	Activity	DURATION (MONTHS)	FY 2025												FY 2026											
			YEAR 1												YEAR 2											
			OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
3D	Dredging/Containment Dike	11.0	1	2	3	4	5	6	7	8	9	10	11	12												

Figure 2: Alternative Construction Schedule.

Print Date Wed 21 December 2022
Eff. Date 10/1/2022

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Title Page

The costs for work breakdown Accounts 01,30, and 31 were developed and found in the TPCS only to prevent errors. The escalation percentage is developed from the construction schedule and included in the TPCS.

Estimated by USACE SWG ECE-P

Designed by USACE SWG EC

Prepared by Stephanie Nieves-Perez

Preparation Date 11/1/2022

Effective Date of Pricing 10/1/2022

Estimated Construction Time 330 Days

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Labor ID: NLS2021 EQ ID: EP22R06

Currency in US dollars

TRACES MII Version 4.4

Figure 3: MCACES Report

Project Cost Summary Report.....	1
Base Plan.....	1
Alt 3D.....	1
12 Navigation, Ports & Harbors.....	1
Alternatives	1
Alt 3D.....	1
06 Fish and Wildlife Facilities.....	1
12 Navigation, Ports & Harbors.....	1

Print Date Wed 21 December 2022
 Eff. Date 10/1/2022

U.S. Army Corps of Engineers
 Project : GIWW CAP 204
 COE Standard Report Selections

Time 14:47:28

Project Cost Summary Report Page 1

	Description	Quantity	UOM	DirectCost	ContractCost	ProjectCost
Project Cost Summary Report				7,734,112	8,522,199	8,522,199
Base Plan		1.00	JOB	2,514,345	2,514,345	2,514,345
Alt 3D		1.00	JOB	2,514,345	2,514,345	2,514,345
12 Navigation, Ports & Harbors		1.00	JOB	2,514,345	2,514,345	2,514,345
Alternatives		1.00	JOB	5,219,767	6,007,854	6,007,854
Alt 3D		1.00	JOB	5,219,767	6,007,854	6,007,854
06 Fish and Wildlife Facilities		1.00	JOB	1,226,969	1,834,705	1,834,705
12 Navigation, Ports & Harbors		1.00	JOB	3,992,798	4,173,148	4,173,148

1.3 Abbreviated Risk Analysis

An ARA was developed with the participation of the PDT. The results were used to develop the project contingences. The ARA resulted in a 26% contingency. This contingency is applied to all costs except Real Estate. Costs include a Base Plan/Federal Standard alternative to obtain the incremental costs.

Risk Level					
Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Moderate	Significant	Critical

Figure 4: Risk Level

Meeting Date: 12-Sep-22

PDT Members

Note: PDT involvement is commensurate with project size and involvement.

Represents	Name
Project Management:	Reuben Trevino
Planner:	Hana Schlang
Real Estate:	Britney Nealon/Micaela
Technical Lead:	Brenda Hayden
H&H	Frederick Fenner
Cost Engineering:	Stephanie Nieves-Perez
Environmental:	Raven Blakeway
Archeologist	John Campbell
Participant	Martin Regner

Figure 5: ARA Attendance

Table 2: ARA Inputs and Results

Abbreviated Risk Analysis

Project (less than \$40M): **GIWW CAP 204** Alternative: **All**

Project Development Stage/Alternative: **Alternative Formulation**

Risk Category: **Low Risk: Typical Construction, Simple** Meeting Date: **9/12/2022**

Total Estimated Construction Contract Cost = **\$ 20,000**

	CWWBS	Feature of Work	Estimated Cost	% Contingency	\$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	\$ -	0%	\$ -	\$ -
1	06 FISH AND WILDLIFE FACILITIES	Marsh creation	\$ 10,000	27%	\$ 2,655	\$ 12,655
2	12 NAVIGATION, PORTS AND HARBORS	Dredging	\$ 10,000	26%	\$ 2,632	\$ 12,632
3			\$ -	0%	\$ -	\$ -
4			\$ -	0%	\$ -	\$ -
5			\$ -	0%	\$ -	\$ -
6			\$ -	0%	\$ -	\$ -
7			\$ -	0%	\$ -	\$ -
8			\$ -	0%	\$ -	\$ -
9			\$ -	0%	\$ -	\$ -
10			\$ -	0%	\$ -	\$ -
11			\$ -	0%	\$ -	\$ -
12	All Other	Remaining Construction Items	\$ -	0.0%	\$ -	\$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ -	0%	\$ -	\$ -
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ -	0%	\$ -	\$ -
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)				\$ -	\$ -

Totals						
	Real Estate	\$ -	0%	\$ -	\$ -	\$ -
	Total Construction Estimate	\$ 20,000	26%	\$ 5,287	\$ 25,287	\$ 25,287
	Total Planning, Engineering & Design	\$ -	0%	\$ -	\$ -	\$ -
	Total Construction Management	\$ -	0%	\$ -	\$ -	\$ -
	Total Excluding Real Estate	\$ 20,000	26%	\$ 5,287	\$ 25,287	\$ 25,287

Confidence Level Range Estimate (\$000's)	Base	50%	80%
	\$20k	\$23k	\$25k

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analysis. Must include justification. Does not allocate to Real Estate.

* 80% based on base is at 5% CL.

Table 3: Abbreviated Risk Analysis

Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Management & Scope Growth			Maximum Project Growth			40%
PS-1	Marsh creation	* Potential for scope growth, added features?	No concerns anticipated. There is an adjacent private channel that will be (to be confirmed by HH) modeled and surveyed during PED – GOV due diligence to confirm no impact. However, no impact to project or channel anticipated.	Negligible	Unlikely	0
PS-2	Dredging	* Potential for scope, growth, added features? Funding difficulties?	No concerns anticipated.	Negligible	Unlikely	0
Acquisition Strategy			Maximum Project Growth			30%
AS-1	Marsh creation	* 8a or small business likely?	Dredge assumed to be large business. Historically, we have seen large business dredges subcontract placement area (marsh) work to small businesses, which results in a markup on a markup. Current marsh estimate is based on a large business. It is possible to see a large business subcontract this work, resulting in a markup on markup with marginal cost increase.	Marginal	Possible	1
AS-2	Dredging	* Contracting plan firmly established?	Dredging work will be by a large business, i.e. it will be combined with our maintenance program/project. Dredging rates should be historically reasonable. There is a risk that we create a standalone contract for this work. It is possible it could go small business with marginal cost increases. Assumed conventional contracting practices of IFB.	Marginal	Possible	1
Construction Elements			Maximum Project Growth			15%
CON-1	Marsh creation	* subcontractors needed? Material Settlement?	Need soil borings to cross-check settlement of riprap. Riprap (armoring) is a minor feature. Results of borings (during PED) could possibly require more riprap, creating a marginal cost increase. Marsh work may be perform by a subcontractor.	Marginal	Possible	1

CE-2	Dredging	• construction methods? Placement?	Assumes placing material in an existing, confined area. While alternatives include creating a new containment berm (mechanically placed) and armoring it, there is no concern with placing material.	Negligible	Unlikely	0
Technical Design & Quantities				Maximum Project Growth		20%
T-1	Marsh creation	Possibility for increased quantities due to loss, waste, subsidence, other? Sufficient investigations to develop quantities?	No new bathymetry and topography. Survey data used based on NOAA charts and Ducks Unlimited data. Ducks Unlimited data based on survey/quantity. HH analysis of NOAA data vs. Ducks data shows they align. However, new bathymetry would improve quantity confidence. There is a possible risk for quantity overruns. Additional investigations will be conducted during PED.	Marginal	Possible	1
T-2	Dredging	Possibility for increased quantities due to loss, waste, subsidence, other? Sufficient investigations to develop quantities?	Dredge quantity subject to change. For example, OM could dredge GIWW before this is built, reducing the available material for use. Or a storm could hit and create shoaling with extra material. There is a possible risk for quantity overruns. Additional investigations will be conducted during PED.	Moderate	Possible	2
Cost Estimate Assumptions				Maximum Project Growth		25%
EST-1	Marsh creation	• Site accessibility, transport delays, congestion?	Current assumption is that access will be by boat.	Negligible	Possible	0
EST-2	Dredging	Assumptions regarding crew, productivity, overtime? *fuel fluctuations can impact dredging costs	Cost estimate was consistent with level of design performed. Use of historical data & parametric estimating is acceptable for early study milestones, but costs could increase with later refinement. However, use of CEDEP for dredging helps to reduce impact of under estimating costs. Fuel fluctuation was taken into consideration.	Negligible	Possible	0
External Project Risks				Maximum Project Growth		20%
EX-1	Marsh creation	• Funding Constraints • Potential for severe adverse weather?	There is potential for weatehr damages and delays, e.g. tropical depressions or hurricanes, should project construction occur during hurricane seasons, which is anticipated. There is more certainty that the district will get the funding.	Significant	Possible	3
EX-2	Dredging	• Funding Constraints • Potential for severe adverse weather?	There is potential for weatehr damages and delays, e.g. tropical depressions or hurricanes, should project construction occur during hurricane seasons, which is anticipated. It is uncertain on when and if funding for dredging will be appropriated.	Significant	Possible	3

1.4 Total Project Cost Summary

A Total Project Cost Summary was prepared for the TSP. The summary consists of estimated cost, project first cost and total project cost, and includes contingency and escalation/inflation for the project. The Cost MCX Cost Certification was received 2023-03-03. A subsequent price leveling update was completed to FY24 indices and the updated Cost MCX Cost Certification, dated 2024-07-24, is shown in Table 4. The total project cost (Fully Funded) for alternative 3D is \$10,972,000. Subtracting the cost of the Federal Standard (Base Plan - \$4,029,000), which will be funded by Operations and Maintenance funds, the final bottom line total for a fully funded project is **\$6,943,000**.

Table 4: Total Project Cost Summary

WALLA WALLA COST ENGINEERING MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For Project No. 455266

SWG – Gulf Intracoastal Waterway – Beneficial Use of Dredged Material Section 204 Aquatic Ecosystem Restoration

The Gulf Intracoastal Waterway Beneficial Use of Dredged Material, as presented by Galveston 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 July 24, 2024, the Cost MCX certifies the estimated total project cost:

FY24 Project First Cost: \$6,459,000
Fully Funded Amount: \$6,943,000

Cost Certification assumes Efficient Implementation (Funding). 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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Michael P. Jacobs, PE, CCE
Chief, Cost Engineering MCX
Walla Walla District

**** TOTAL PROJECT COST SUMMARY ****

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PROJECT: **Beneficial Use of Dredged Material (CAP Sec 204)**
PROJECT N: **455266**
LOCATION: **Gulf Intracoastal Waterway, Texas**

DISTRICT: **SWG - Galveston District** PREPARED: **11/1/2022**
POC: **CHIEF, COST ENGINEERING, Martin B. Regner, P.E.,**

This Estimate reflects the scope and schedule in report; Draft Report

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST FUNDED) (FULLY			
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	Program Year (Budget EC): Effective Price Level Date:				2024 1-Oct- 23 Spent Thru: 1-Oct-22 (\$K)	TOTAL FIRST COST (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
						ESC (%)	COST (\$K)	CNTG (\$K)	REMAINING COST (\$K)						
06	FISH & WILDLIFE FACILITIES	\$1,846	\$498	27%	\$2,345	3.4%	\$1,909	\$516	\$2,425		\$2,425	8.3%	\$2,068	\$558	\$2,626
12	NAVIGATION PORTS & HARBORS	\$1,667	\$433	26%	\$2,101	0.1%	\$1,668	\$434	\$2,102		\$2,102	6.8%	\$1,782	\$463	\$2,245
CONSTRUCTION ESTIMATE TOTALS:		\$3,513	\$932		\$4,445	1.8%	\$3,578	\$949	\$4,527		\$4,527	7.6%	\$3,850	\$1,022	\$4,871
01	LANDS AND DAMAGES	\$579	\$203	35%	\$781	3.0%	\$596	\$209	\$805		\$805	4.8%	\$625	\$219	\$844
30	PLANNING, ENGINEERING & DESIGN	\$570	\$152	27%	\$722	4.8%	\$597	\$160	\$757		\$757	8.5%	\$648	\$173	\$822
31	CONSTRUCTION MANAGEMENT	\$281	\$73	26%	\$354	4.3%	\$293	\$76	\$369		\$369	9.9%	\$322	\$84	\$406
PROJECT COST TOTALS:		\$4,943	\$1,360	28%	\$6,303		\$5,065	\$1,394	\$6,459		\$6,459	7.5%	\$5,445	\$1,497	\$6,943

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PROJECT MANAGER, Katrina White

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CHIEF, REAL ESTATE, Timothy Nelson

CHIEF, PLANNING, Andrea Cantanzaro

CHIEF, ENGINEERING, Willie J. Honza, P.E.

CHIEF, OPERATIONS, Chris Frabotta

CHIEF, CONSTRUCTION,, Pablo Hernandez, P.E.

CHIEF, CONTRACTING, Shamekia Chapman

CHIEF, PM-PB, Elizabeth Fiocchi

CHIEF, DPM, Byron Williams, PMP

ESTIMATED TOTAL PROJECT COST: \$6,943

**** TOTAL PROJECT COST SUMMARY ****

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**** CONTRACT COST SUMMARY ****

PROJECT: Beneficial Use of Dredged Material (CAP Sec 204)
LOCATION: Gulf Intracoastal Waterway, Texas
This Estimate reflects the scope and schedule in report; Draft Report

DISTRICT: SWG - Galveston District
POC: CHIEF, COST ENGINEERING, Martin B. Regner, P.E., T.C.C.E.
PREPARED: 11/1/2022

WBS Structure		ESTIMATED COST				PROJECT FIRST COST Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: Estimate Price Level:		1-Nov-22 1-Oct-22		Program Year (Budget EC): Effective Price Level Date:		2024 1 -Oct-23						
		RISK BASED												
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	ESC (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
Alternative 3D														
06	FISH & WILDLIFE FACILITIES	\$1,846	\$498	27.0%	\$2,345	3.4%	\$1,909	\$516	\$2,425	2027Q1	8.3%	\$2,068	\$558	\$2,626
12	NAVIGATION PORTS & HARBORS	\$4,182	\$1,087	26.0%	\$5,269	0.1%	\$4,184	\$1,088	\$5,272	2027Q1	6.8%	\$4,469	\$1,162	\$5,631
CONSTRUCTION ESTIMATE TOTALS:		\$6,028	\$1,586	26.3%	\$7,613		\$6,094	\$1,603	\$7,697			\$6,537	\$1,720	\$8,257
01	LANDS AND DAMAGES	\$579	\$203	35.0%	\$781	3.0%	\$596	\$209	\$805	2025Q4	4.8%	\$625	\$219	\$844
30 PLANNING, ENGINEERING & DESIGN														
0.8%	Project Management	\$48	\$12	26.0%	\$60	4.3%	\$50	\$13	\$63	2026Q1	6.6%	\$53	\$14	\$67
0.7%	Planning & Environmental Compliance	\$42	\$11	26.0%	\$53	4.3%	\$44	\$11	\$55	2026Q1	6.6%	\$47	\$12	\$59
2.0%	Engineering & Design	\$121	\$31	26.0%	\$152	4.3%	\$126	\$33	\$159	2026Q1	6.6%	\$135	\$35	\$170
0.8%	Reviews, ATRs, IEPRs, VE	\$48	\$12	26.0%	\$60	4.3%	\$50	\$13	\$63	2026Q1	6.6%	\$53	\$14	\$67
	Real Estate	\$48	\$17	35.0%	\$64	4.3%	\$50	\$17	\$67	2026Q1	6.6%	\$53	\$19	\$72
	Life Cycle Updates (cost, schedule, risks)	\$30	\$8	26.0%	\$38	4.3%	\$31	\$8	\$39	2026Q1	6.6%	\$33	\$9	\$42
0.5%	Contracting & Reprographics	\$30	\$8	26.0%	\$38	4.3%	\$31	\$8	\$39	2027Q1	9.9%	\$34	\$9	\$43
1.0%	Engineering During Construction	\$60	\$16	26.0%	\$76	4.3%	\$63	\$16	\$79	2027Q1	9.9%	\$69	\$18	\$87
0.5%	Planning During Construction	\$30	\$8	26.0%	\$38	4.3%	\$31	\$8	\$39	2026Q1	6.6%	\$33	\$9	\$42
	Adaptive Management & Monitoring	\$334	\$87	26.0%	\$421	4.3%	\$349	\$91	\$439	2027Q1	9.9%	\$383	\$100	\$483
0.5%	Project Operations	\$30	\$8	26.0%	\$38	4.3%	\$31	\$8	\$40	2027Q1	9.9%	\$35	\$9	\$44
31 CONSTRUCTION MANAGEMENT														
6.0%	Construction Management	\$362	\$94	26.0%	\$456	4.3%	\$377	\$98	\$476	2027Q1	9.9%	\$415	\$108	\$523
1.0%	Project Operation:	\$60	\$16	26.0%	\$76	4.3%	\$63	\$16	\$79	2027Q1	9.9%	\$69	\$18	\$87
1.0%	Project Management	\$60	\$16	26.0%	\$76	4.3%	\$63	\$16	\$79	2027Q1	9.9%	\$69	\$18	\$87
CONTRACT COST TOTALS:		\$7,910	\$2,131		\$10,041		\$8,049	\$2,170	\$10,219			\$8,643	\$2,329	\$10,972

**** TOTAL PROJECT COST SUMMARY ****

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**** CONTRACT COST SUMMARY ****

PROJECT: Beneficial Use of Dredged Material (CAP Sec 204)
LOCATION: Gulf Intracoastal Waterway, Texas
This Estimate reflects the scope and schedule in report; Draft Report

DISTRICT: SWG - Galveston District
POC: CHIEF, COST ENGINEERING, Martin B. Regner, P.E., T.C.C.E.
PREPARED: 11/1/2022

WBS Structure		ESTIMATED COST				PROJECT FIRST COST Dollar Basis)				(Constant	TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: Estimate Price Level:		1-Nov-22 1-Oct-22		Program Year (Budget EC): Effective Price Level Date:		2024 1 -Oct-23							
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	ESC (%)	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	-\$2,514	-\$654	26.0%	-\$3,168	0.1%	-\$2,516	-\$654	-\$3,170	2027Q1	6.8%	-\$2,687	-\$699	-\$3,386	
CONSTRUCTION ESTIMATE TOTALS:		-\$2,514	-\$654		-\$3,168		-\$2,516	-\$654	-\$3,170			-\$2,687	-\$699	-\$3,386	
30	PLANNING, ENGINEERING & DESIGN														
0.8%	Project Management	-\$20	-\$5	26.0%	-\$25	4.3%	-\$21	-\$5	-\$26	2026Q1	6.6%	-\$22	-\$6	-\$28	
0.7%	Planning & Environmental Compliance	-\$18	-\$5	26.0%	-\$23	4.3%	-\$19	-\$5	-\$24	2026Q1	6.6%	-\$20	-\$5	-\$25	
2.0%	Engineering & Design	-\$50	-\$13	26.0%	-\$63	4.3%	-\$52	-\$14	-\$66	2026Q1	6.6%	-\$56	-\$14	-\$70	
0.8%	Reviews, ATRs, IEPRs, VE Life Cycle Updates (cost, schedule, risks)	-\$20	-\$5	26.0%	-\$25	4.3%	-\$21	-\$5	-\$26	2026Q1	6.6%	-\$22	-\$6	-\$28	
0.5%	Contracting & Reprographics	-\$13	-\$3	26.0%	-\$16	4.3%	-\$14	-\$4	-\$17	2026Q1	6.6%	-\$14	-\$4	-\$18	
0.4%	Engineering During Construction	-\$10	-\$3	26.0%	-\$13	4.3%	-\$10	-\$3	-\$13	2027Q1	9.9%	-\$11	-\$3	-\$14	
1.0%	Planning During Construction	-\$25	-\$7	26.0%	-\$32	4.3%	-\$26	-\$7	-\$33	2027Q1	9.9%	-\$29	-\$7	-\$36	
0.3%	Adaptive Management & Monitoring	-\$8	-\$2	26.0%	-\$10	4.3%	-\$8	-\$2	-\$11	2026Q1	6.6%	-\$9	-\$2	-\$11	
3.0%	Project Operations	-\$75	-\$20	26.0%	-\$95	2027Q1	9.9%	-\$75	-\$20	2027Q1	9.9%	-\$82	-\$21	-\$104	
0.5%		-\$13	-\$3	26.0%	-\$16	4.3%	-\$13	-\$3	-\$17	2027Q1	9.9%	-\$14	-\$4	-\$18	
31	CONSTRUCTION MANAGEMENT														
6.0%	Construction Management	-\$151	-\$39	26.0%	-\$190	4.3%	-\$157	-\$41	-\$198	2027Q1	9.9%	-\$173	-\$45	-\$218	
1.0%	Project Operation:	-\$25	-\$7	26.0%	-\$32	4.3%	-\$26	-\$7	-\$33	2027Q1	9.9%	-\$29	-\$7	-\$36	
1.0%	Project Management	-\$25	-\$7	26.0%	-\$32	4.3%	-\$26	-\$7	-\$33	2027Q1	9.9%	-\$29	-\$7	-\$36	
CONTRACT COST TOTALS:		-\$2,967	-\$771		-\$3,738		-\$2,985	-\$776	-\$3,761			-\$3,198	-\$831	-\$4,029	

Design Maturity Determination for Cost Certification

Date: 7/24/24

P2 Designation/Project Name: P2-455266 GIWW BUDM CAP 204

The Chief of Engineering is responsible for the technical content and engineering sufficiency for all engineering products produced by the command. As such, I have performed the Management Control Evaluation per Engineer Regulation (ER) 1110-2-1150, Engineering and Design for Civil Works Projects, Appendix H, Internal Management Control Review Checklist.

The current design DOES NOT require HQ approval (i.e., engineering waivers), requiring a deviation from mandatory requirements and mandatory standards, as defined in ERs, Engineering Manuals, Engineering Technical letters, and Engineering Circulars.

The current hydrology and hydraulics modeling is at 25 % design maturity, per reference (h) below.

The current geotechnical data and subsurface investigations are at 15 % design maturity, per reference (h) below. Subsurface investigations shall also include investigations of potential borrow and spoil areas.

The current survey data is at 5 % design maturity, per reference (h) below.

Other major technical and/or scope assumptions and risks include the following, which will be refined as the design progresses.

Due to budgetary limitations, existing and available data were used in design and analyses. For example, for the bathymetry, NOAA navigation charts were used. For reference marsh cell elevation, survey conducted by HDR contracted by TPWD in Sept 2007 were used. Historic geotechnical data from Aransas Bay was used which needs to be refined with new boring information for slope stability analyses for the living shorelines and containment dikes.

The aggregate for all features is 15 % design maturity. Therefore, per the CECW-EC memorandum dated 05-June-2023, I certify that the design deliverables used to generate the cost products for this project and the estimate meet the requirements for a CLASS 3 estimate, as per reference (a) below. Design risks, impacts and remaining efforts are summarized on page 2.

Considering risks and assumptions noted above, along with all other concerns documented in the Risk Register, the Cost and Schedule Risk Analysis has developed a contingency of 27 % at the 80 % confidence level for the defined project scope.

Chief of Engineering & Construction

Rob Thomas, P.E., BC.CE, BC.NE
Chief, Engineering & Construction
U.S. Army Corps of Engineers Galveston District

Printed Name

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62686924
Date: 2024.07.24 10:39:08 -05'00'

Signature

Design Maturity Determination for Cost Certification, Remaining Work

If an engineering waiver is required, list the risks and remaining design work needed to mitigate this issue in the current design. Identify remaining effort to complete the design required for 100% design.

Not Applicable

Identify remaining effort to complete geotechnical design effort required for 100% design. List the risks and cost and schedule impacts needed to mitigate this issue in the current design.

A geotechnical investigation was not performed. Limited analyses was conducted primarily on bearing capacity of the containment berm. Historic available GIWW sediment analysis data for the proposed marsh creation at Goose Island are taken from report from GIWW – Aransas Bay Sampling and Analysis Results. The concept design of containment berm will need to be analyzed with site specific geotechnical data investigation during PED to understand subsurface condition including reevaluation of bearing capacity, slope stability and settlement analysis.

Identify remaining effort required to complete H&H required for 100% design. List the risks and cost and schedule impacts needed to mitigate this issue in the current design.

Topographic surveys of project area including reference marsh elevations need to be collected in PED. Preferred alternative has living shorelines and containment dikes. Detailed design of these features including adaptation to future sea level changes and possible water quality/tidal flushing concerns will be conducted. Cost and schedule impact is likely if there are significant delays in acquiring survey and geotech.

Identify remaining effort needed to complete survey data required for 100% design. List the risks and cost and schedule impacts needed to mitigate this issue in the current design.

Detailed topographic and bathymetric surveys must be collected in PED for quantity validation and producing design templates. TSP level quantities are based on existing data. So, new topography and bathymetry would improve quantity confidence in PED. Cost and schedule may be impacted.

If the project is anticipated to be executed in parts, provide a design assessment (percent complete) of each part/phase below.

Not Applicable

References:

- a. ER 1110-2-1302 – Civil Works Cost Engineering
- b. CECW-EC memorandum dated 05-June-2023MFR, Guidance on Cost Engineering Products update for Civil Works Projects in accordance with Engineer Regulation 1110-2-1302 – Civil Works Cost Engineering
- c. ER 1165-2-217 – Civil Works Review Policy
- d. ER 1110-2-1150 – Engineering and Design for Civil Works Projects
- e. ER 1110-3-12 – Quality Management
- f. ER 1110-345-700 – Design Analysis, Drawings and Specifications
- g. EM 5-1-11 – Project Delivery Business Process (PDBP)
- h. Engineering and Construction Bulletin (ECB) 2023-9 – Civil Works Design Milestone Checklists

Design Maturity Determination for Cost Certification – Instructions

Paragraph 1 – Design Date: Use the drop-down menu to populate the date of the design.

Paragraph 1 – Project Information: Enter the P2 Project number and Project name.

Paragraph 3 – Engineering Waivers: Use the drop-down menu to populate this field with either “Does,” or “Does not.” If an engineering waiver is needed, or anticipated to be needed, provide the specific waiver required for the Project. A waiver is any deviation from current mandatory standards, as indicated.

Paragraph 4 – Hydrology and Hydraulics: Populate this field with the % design maturity.

Paragraph 5 – Geotechnical Information: Populate this field with the % design maturity.

Paragraph 6 – Survey Data: Populate this field with the % design maturity.

Paragraph 7 – Other Technical Assumptions and/or Scope: Enter any other major technical assumptions or scope assumptions here. Only include assumptions that pertain to design. Template discussion fields are provided as a courtesy. Please include additional pages as necessary.

Paragraph 8 – Signature: Print the name and title and provide the signature for the District’s Chief of Engineering. This authority cannot be delegated; however, the Deputy Chief of Engineering and Design may sign the form in the absence of the Chief of Engineering. All fillable fields must be populated (use N/A if not applicable) in order for the document to be signed.

Page 2 – Remaining Work: Identify the current baseline design assumptions and the remaining design effort and risks to complete 100% design for the authorized project. If the project is to be broken into parts or phases, provide details on the aggregate design level of each phase and anticipated timeline for completion.