

PUERTO RICO COASTAL

DRAFT INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

APPENDIX C

Cost Engineering and Risk Analysis



June 2023



**US Army Corps
of Engineers®**
Jacksonville District

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B. COST ESTIMATES

B.1. GENERAL INFORMATION

Corps of Engineers cost estimates for planning purposes are prepared in accordance with the following guidance:

- Engineer Technical Letter (ETL) 1110-2-573, Construction Cost Estimating Guide for Civil Works, 30 September 2008
- Engineer Regulation (ER) 1110-1-1300, Cost Engineering Policy and General Requirements, 26 March 1993
- ER 1110-2-1302, Civil Works Cost Engineering, 30 June 2016
- ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 August 1999
- ER 1105-2-100, Planning Guidance Notebook, 11 April 2000, as amended
- Engineer Manual (EM) 1110-2-1304, Civil Works Construction Cost Index System, 30 September 2019
- CECW-CP Memorandum for Distribution, Subject: Initiatives to Improve the Accuracy of Total Project Costs in Civil Works Feasibility Studies Requiring Congress Authorization, 19 September 2007
- CECW-CE Memorandum for Distribution, Subject: Application of Cost Risk Analysis Methods to Develop Contingencies for Civil Works Total Project Costs, 3 July 2007
- Methods to Develop Contingencies for Civil Works Total Project Costs, 3 July 2007
- Cost and Schedule Risk Analysis Process, March 2008

The goal of the cost estimate prepared for the Puerto Rico Coastal Study is to present a Total Project Cost (construction and non-construction costs) for the Tentatively Selected Plan (TSP) at the current price levels to be used for project justification/authorization and to escalate costs for budgeting purposes. In addition, the costing efforts are intended to produce a final product (cost estimate) that is reliable and accurate, and that supports the definition of the Federal and the Non-Federal Sponsor's obligations.

The cost estimating effort for the study produced a series of alternative plan formulation cost estimates for decision making and selection of the TSP. The final set of plan formulation cost estimates used for plan selection will rely on construction feature unit pricing and are prepared in Civil Works Work Breakdown Structure (CWWBS) format to the sub-feature level. The cost estimate supporting the National Economic Development (NED) plan (Recommended Plan) is prepared in Micro-computer Aided Cost Estimating System (MCACES) Second Generation (MII) to the CWWBS sub-feature level. This estimate is supported by the preferred labor, equipment, materials, and crew/production breakdown. A fully funded (escalated for inflation through project completion) cost estimate in the form of a Total Project Cost Summary has also been developed.

A contingency of 35% for Rincón and 38% for Ocean Park was applied to the estimate based upon development of an Abbreviated Risk Analysis (ARA) for each study reach; in accordance with ER 1110-2-1302.

B.2 PLAN FORMULATION COST ESTIMATES

B.2.1 Alternatives Description

For the plan formulation cost estimates alternatives, unit prices for the construction features were developed based on historical pricing data from previously studies and/or constructed projects in Puerto Rico and Florida and escalated to FY22 dollars using the current version of the Civil Works

Construction Cost Index System (CWCCIS). Below see a list of the reference projects and the respective features used for pricing.

- San Juan Back Bay Study 2021
 - Sheetpile Seawalls/Floodwalls
- Miami-Dade SPP's (Surfside 2019, Hot Sports 2019 and Sunny Isles 2021)
 - Beach Fill by Truck-Haul
- St Johns SPP Feasibility Study 2015
 - Breakwaters
- Loiza CAP Project 2019
 - Marine Mattresses
 - Armor Stone
- Rip Puerto Nuevo
 - Residential Demolition

The final alternatives considered for the project were:

Model Reach	Alt	Measure
Rincón	Alt 1	No Action
	Alt 2	Revetment (R11-R22)
	Alt 3a	Beach Nourishment (R11-R22) + Groins ***20' berm every 5 years
	Alt 3b	Beach Nourishment (R11-R22) + Groins ***10' berm every 5 years
	Alt 3c	Beach Nourishment (R11-R22) + Groins ***10' berm every 10 years
	Alt 4	Acquisition of Structures and Property (R11-R19)
Ocean Park	Alt 1	No Action
	Alt 2	Floodwall with Rock Armor (E13-E154, R14)
	Alt 3	Floodwall with Rock Armor (E13-E15, R14) + Beach Nourishment with Vegetated Dune (E10-E19)
	Alt 4	Floodwall with Rick Armor (E10-E19, R14)
	Alt 5	Floodwall with Rock Armor (E13-E15, R14) + Acquisition of Structures and Property

B.2.2 Tentatively Selected Plan (TSP)

The Engineering Appendix fully describes the plan selection. The scope of work for the TSP is found in Appendix A, Engineering. The MII cost estimate for this plan was based on that scope and were formatted based upon the CWWBS in accordance with Cost Engineering Regulations. For project justification purposes, the estimated costs are categorized under the appropriate CWWBS code and include both construction and non-construction costs. Table 1 below provides a breakdown of the TSP.

Model Reach	Measures
-------------	----------

Rincón	Alt. 4 - Acquisition of Structures and Property (R11-R19)
Ocean Park	Alt. 2 - Floodwall with Rock Armor (E13-E15, R14)

B.2.3 Estimating Methodology

The Micro-Computer Aided Cost Estimating System (MCACES) Second Generation (MII) Cost Estimate for this plan was based on the scope and was formatted based upon the Civil Works Work Breakdown Structure (CWWBS) in accordance with Cost Engineering Regulations. For project justification purposes, the estimated costs are categorized under the appropriate CWWBS code and include both construction and non-construction costs.

The construction costs fall under the following feature codes:

- 02 - Relocations
 - Structures/Residences Demolition
 - Utility Relocations
- 10 - Breakwaters and Seawalls
 - Cantilever Sheetpile Walls
- 19 – Building, Grounds and Utilities
 - Road/Sidewalk Demolition
 - Parking
 - Sidewalk
 - Landscaping
 - Park Accessories
 - Sand Fill

The non-construction costs fall under the following feature codes:

- 01 - Lands and Damages
- 30 - Planning, Engineering and Design
- 31 - Construction Management

B.2.4 Construction Cost

The direct costs for project features were developed in MCACES/MII. These costs include all major project components categorized under the appropriate CWWBS to the sub-feature level.

The Total Project Cost Summary (TPCS) contains contingencies as noted in the estimate (below) and were determined based on ER 1110-2-1302 from 30 June 2016. Based upon the total project cost magnitude a full Cost and Schedule Risk Analysis (CSRA) will be performed to establish the project contingency. Oracle Crystal Ball Software will be utilized to perform the CSRA. Risk assumptions will be based upon a PDT brainstorming meeting to be held later on in the study process taking into consideration subsequent information provided during the planning process.

B.2.5 Non-Construction Cost

Non-construction costs typically include Lands and Damages (Real Estate), Planning, Engineering and Design (PED), and Construction Management (S&A). These costs are provided by the PDT either as a lump sum cost or as a percentage of the total construction contract cost. Lands and Damages are provided by Real Estate and are best described in the Real Estate Appendix. PED costs are for the preparation of contract plans and specifications (P&S) and include itemized costs that were provided by the PDT, as well as costs for Post-Construction Monitoring costs and percentages for Engineering During Construction (EDC) that were provided by the project manager. Construction Management costs are for the supervision and administration of a contract and include Project Management and Contract Admin costs. These costs were provided by the project manager and are included as a percentage of the total construction contract cost.

The main report details both allocations and cost apportionment for the Federal Government and the non-Federal sponsor. Also included in the main report are the non-Federal sponsor's obligations (items of local cooperation).

B.2.6 Construction Schedule

The project schedule was prepared by the cost engineer in collaboration with Project Management. The construction duration and sequence were established based on Historical Data. The construction schedule will be changed as the design of the project proceeds into plans and specifications phase. Once the contract is awarded, the contractor will provide a construction schedule which may differ from this draft schedule based on Historical data.

B.2.7 Total Project Cost Summary

The cost estimate for the Tentative Selected Plan (TSP) is prepared with an identified price level date and inflation factors are used to adjust the pricing to the project schedule. This estimate is known as the Fully Funded Cost Estimate or Total Project Cost Summary. It includes all Federal and non-Federal costs: Lands, Easements, Rights of Way and Relocations, construction features, Planning Engineering and Design, Construction Management, Contingency, and Escalation.

B.3 RISK AND UNCERTAINTY ANALYSIS (to be completed in the following weeks)

The CSRA will be developed according to the procedures outlined in the following documents and sources:

- Cost and Schedule Risk Analysis Process guidance prepared by the USACE Cost Engineering MCX.
- Engineer Regulation (ER) 1110-2-1302 CIVIL WORKS COST ENGINEERING, dated June 30, 2016.
- Engineer Technical Letter (ETL) CONSTRUCTION COST ESTIMATING GUIDE FOR CIVIL WORKS, dated September 30, 2008.

B.3.1 Risk Analysis Methods

The risk analysis process for this study is intended to determine the probability of various cost outcomes and quantify the required contingency needed in the cost estimate to achieve the desired level of cost confidence.

The entire PDT will be engaged to participate in a risk analysis brainstorming session to identify risks associated with the Recommended Plan. The risks are to be documented on the risk register, which is a tool commonly used in project planning and risk analysis, and evaluated by the PDT. Assumptions are made as to the likelihood and impact of each risk item, as well as the probability of occurrence and magnitude of the

impact if it were to occur. A risk model is then developed to establish contingencies to be applied to the project cost. Risks to be evaluated for the following features of work:

- 02 - Relocations
- 10 - Breakwaters and Seawalls
- 19 – Building, Grounds and Utilities
- 30 - Planning, Engineering & Design
- 31 - Construction Management

The results will then be reviewed and all parameters re-evaluated by the PDT as a sanity check of assumptions and inputs. Adjustments will be made to the analysis accordingly and the final contingency will be established. The contingency is to be applied to the Recommended Plan Estimate in the Total Project Cost Summary (TPCS) in order to obtain the Fully Funded Cost.

B.3.2 Risk Analysis Results

Risk analysis results are intended to provide project leadership with contingency information for scheduling, budgeting, and project control purposes, as well as to provide tools to support decision making and risk management as projects progress through planning and implementation.

B.4 TOTAL PROJECT COST SUMMARY

The TPCS addresses inflation through project completion (accomplished by escalation to mid-point of construction per ER 1110-2-1302, Appendix C, Page C-2). It is based on the scope of the Recommended Plan and the official project schedule. The TPCS includes Federal and Non-Federal costs for Lands and Damages, all construction features, PED, S&A, along with the appropriate contingencies and escalation associated with each of these activities. The TPCS is formatted according to the CWWBS and uses CWCCIS factors for escalation (EM 1110-2-1304) of construction costs and Office of Management and Budget (EC 11-2-18X, 20 Feb 2008) factors for escalation of PED and S&A costs.

The Total Project Cost Summary was prepared using the MCACES/MII cost estimate on the Recommended Plan, as well as the contingencies set by the risk analysis and the official project schedule.

B.4.1 Total Project Cost Summary Spreadsheet

Refer to the Total Project Cost Summary Spreadsheet attached.

B.5 COST MCX TPCS CERTIFICATION

The Recommended Plan estimate, formal cost and schedule risk analysis and total project cost summary spreadsheet will be reviewed by the Walla Walla Mandatory Center of Expertise in conjunction with the Recommended Plan Draft Report Agency Technical Review. This review serves as Cost Agency Technical Review in order to obtain cost certification by the Cost MCX in support of this feasibility study in accordance with Cost Engineering Regulations and Smart Planning Guidelines.

ATTACHMENT A – COST & SCHEDULE RISK REGISTER (to be completed prior to Final Report)

ATTACHMENT B – TOTAL PROJECT COST SUMMARY (attached)

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

Printed:1/27/2023
Page 1 of 5

PROJECT: PUERTO RICO COASTAL STUDY
PROJECT NO: P2 469423
LOCATION: San Juan / Rincón, Puerto Rico

DISTRICT: SAJ Jacksonville
POC: CHIEF, COST ENGINEERING, Matthew Cunningham
PREPARED: 1/27/2023

This Estimate reflects the scope and schedule in report;

TSP Draft Report

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): Effective Price Level Date: 2023 1 OCT 22				Spent Thru: 1 OCT 22 (\$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						
19	RINCON - Acquisition of Structures and Property (R11-R19) BUILDINGS, GROUNDS & UTILITIES	\$9,432	\$3,301	35.0%	\$12,734	0.0%	\$9,432	\$3,301	\$12,734	\$0	\$12,734	13.3%	\$10,685	\$3,740	\$14,425
	CONSTRUCTION ESTIMATE TOTALS:	\$9,432	\$3,301		\$12,734	0.0%	\$9,432	\$3,301	\$12,734	\$0	\$12,734		\$10,685	\$3,740	\$14,425
01	LANDS AND DAMAGES	\$58,096	\$23,238	40.0%	\$81,334	0.0%	\$58,096	\$23,238	\$81,334	\$0	\$81,334	9.0%	\$63,317	\$25,327	\$88,644
	RE Admin Costs (Non-Fed)	\$6,900	\$2,760	40.0%	\$9,660	0.0%	\$6,900	\$2,760	\$9,660	\$0	\$9,660	9.0%	\$7,520	\$3,008	\$10,528
	RE Admin Costs (Fed)	\$3,163	\$1,265	40.0%	\$4,428	0.0%	\$3,163	\$1,265	\$4,428	\$0	\$4,428	9.0%	\$3,447	\$1,379	\$4,825
30	PLANNING, ENGINEERING & DESIGN	\$1,132	\$396	35.0%	\$1,528	0.0%	\$1,132	\$396	\$1,528	\$0	\$1,528	9.5%	\$1,239	\$434	\$1,673
31	CONSTRUCTION MANAGEMENT	\$849	\$297	35.0%	\$1,146	0.0%	\$849	\$297	\$1,146	\$0	\$1,146	11.6%	\$947	\$332	\$1,279
PROJECT COST TOTALS:		\$79,571	\$31,257	39.3%	\$110,829		\$79,571	\$31,258	\$110,829	\$0	\$110,829	9.5%	\$87,155	\$34,219	\$121,374

CHIEF, COST ENGINEERING, Matthew Cunningham

PROJECT MANAGER, Ashleigh Fountain

CHIEF, REAL ESTATE, Timothy McQuillen

CHIEF, PLANNING, Angela Dunn

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CHIEF, OPERATIONS, Carol Bernstein

CHIEF, CONSTRUCTION, Jim Jeffords

CHIEF, CONTRACTING, Aldone Graham

CHIEF, PM-PB, Sheila Hint

CHIEF, DPM, Howard Gonzales

ESTIMATED TOTAL PROJECT COST: \$121,374

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

Printed:1/27/2023
Page 2 of 5

**** CONTRACT COST SUMMARY ****

PROJECT: PUERTO RICO COASTAL STUDY
LOCATION: San Juan / Rincón, Puerto Rico
This Estimate reflects the scope and schedule in report;

TSP Draft Report

DISTRICT: SAJ Jacksonville
POC: CHIEF, COST ENGINEERING, Matthew Cunningham

PREPARED: 1/27/2023

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: Effective Price Level:		15-Dec-22 1-Oct-22		Program Year (Budget EC): Effective Price Level Date:		2023 1 OCT 22						
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	Mid-Point Date P	INFLATED (%) L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
RINCON														
02	RELOCATIONS - Demolition	\$6,900	\$2,415	35.0%	\$9,315	0.0%	\$6,900	\$2,415	\$9,315	2027Q4	13.3%	\$7,816	\$2,736	\$10,552
19	BUILDINGS, GROUNDS & UTILITIES - Site Work	\$1,879	\$658	35.0%	\$2,536	0.0%	\$1,879	\$658	\$2,536	2027Q4	13.3%	\$2,128	\$745	\$2,873
ALL	COMPOSITE INDEX (WEIGHTED AVERAGE) - Mob/Demob and Assoc. General Items	\$654	\$229	35.0%	\$882	0.0%	\$654	\$229	\$882	2027Q4	13.3%	\$740	\$259	\$999
CONSTRUCTION ESTIMATE TOTALS:		\$9,432	\$2,415	-1.2%	\$9,315		\$6,900	\$2,415	\$9,315			\$10,685	\$3,740	\$14,425
01	LANDS AND DAMAGES	\$58,096	\$23,238	40.0%	\$81,334	0.0%	\$58,096	\$23,238	\$81,334	2026Q2	9.0%	\$63,317	\$25,327	\$88,644
	RE Admin Costs (Non-Fed)	\$6,900	\$2,760	40.0%	\$9,660	0.0%	\$6,900	\$2,760	\$9,660	2026Q2	9.0%	\$7,520	\$3,008	\$10,528
	RE Admin Costs (Fed)	\$3,163	\$1,265	40.0%	\$4,428	0.0%	\$3,163	\$1,265	\$4,428	2026Q2	9.0%	\$3,447	\$1,379	\$4,825
30	PLANNING, ENGINEERING & DESIGN													
0.5%	Project Management	\$47	\$17	35.0%	\$64	0.0%	\$47	\$17	\$64	2026Q2	8.0%	\$51	\$18	\$69
0.6%	Planning & Environmental Compliance	\$57	\$20	35.0%	\$76	0.0%	\$57	\$20	\$76	2026Q2	8.0%	\$61	\$21	\$83
4.0%	Engineering & Design	\$377	\$132	35.0%	\$509	0.0%	\$377	\$132	\$509	2026Q2	8.0%	\$407	\$143	\$550
1.0%	Reviews, ATRs, IEPs, VE	\$94	\$33	35.0%	\$127	0.0%	\$94	\$33	\$127	2026Q2	8.0%	\$102	\$36	\$138
0.3%	Life Cycle Updates (cost, schedule, risks)	\$28	\$10	35.0%	\$38	0.0%	\$28	\$10	\$38	2026Q2	8.0%	\$31	\$11	\$41
0.3%	Contracting & Reprographics	\$28	\$10	35.0%	\$38	0.0%	\$28	\$10	\$38	2026Q2	8.0%	\$31	\$11	\$41
4.0%	Engineering During Construction	\$377	\$132	35.0%	\$509	0.0%	\$377	\$132	\$509	2027Q4	11.6%	\$421	\$147	\$568
1.0%	Planning During Construction	\$94	\$33	35.0%	\$127	0.0%	\$94	\$33	\$127	2027Q4	11.6%	\$105	\$37	\$142
0.0%	Adaptive Management & Monitoring	\$0	\$0	35.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
0.3%	Project Operations	\$28	\$10	35.0%	\$38	0.0%	\$28	\$10	\$38	2026Q2	8.0%	\$31	\$11	\$41
31	CONSTRUCTION MANAGEMENT													
9.0%	Construction Management	\$849	\$297	35.0%	\$1,146	0.0%	\$849	\$297	\$1,146	2027Q4	11.6%	\$947	\$332	\$1,279
CONTRACT COST TOTALS:		\$79,571	\$30,372		\$107,411		\$77,039	\$30,372	\$107,411			\$87,155	\$34,219	\$121,374

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

Printed: 1/27/2023
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PROJECT: PUERTO RICO COASTAL STUDY
PROJECT NO: P2 469423
LOCATION: San Juan / Rincón, Puerto Rico

DISTRICT: SAJ Jacksonville
POC: CHIEF, COST ENGINEERING, Matthew Cunningham
PREPARED: 1/27/2023

This Estimate reflects the scope and schedule in report;

TSP Draft Report

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): Effective Price Level Date:				2023 1 OCT 22	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	Spent Thru: 1 OCT 22 (\$K)					
OCEAN PARK - Floodwall with Rock Armor (E13-E15, R14)															
02	RELOCATIONS	\$1,075	\$398	37.0%	\$1,473	0.0%	\$1,075	\$398	\$1,473	\$0	\$1,473	16.2%	\$1,250	\$462	\$1,712
10	BREAKWATER & SEAWALLS	\$24,510	\$9,069	37.0%	\$33,578	0.0%	\$24,510	\$9,069	\$33,578	\$0	\$33,578	15.1%	\$28,219	\$10,441	\$38,660
19	BUILDINGS, GROUNDS & UTILITIES	\$1,419	\$525	37.0%	\$1,945	0.0%	\$1,419	\$525	\$1,945	\$0	\$1,945	16.2%	\$1,650	\$610	\$2,260
ALL	COMPOSITE INDEX (WEIGHTED AVERAGE)	\$2,863	\$1,059	37.0%	\$3,922	0.0%	\$2,863	\$1,059	\$3,922	\$0	\$3,922	15.4%	\$3,304	\$1,223	\$4,527
CONSTRUCTION ESTIMATE TOTALS:		\$29,867	\$11,051		\$40,918	0.0%	\$29,867	\$11,051	\$40,918	\$0	\$40,918	15.3%	\$34,422	\$12,736	\$47,159
01	LANDS AND DAMAGES	\$9,382	\$3,753	40.0%	\$13,134	0.0%	\$9,382	\$3,753	\$13,134	\$0	\$13,134	9.0%	\$10,225	\$4,090	\$14,315
	RE Admin Costs (Non-Fed)	\$768	\$307	40.0%	\$1,075	0.0%	\$768	\$307	\$1,075	\$0	1075.2	9.0%	\$837	\$335	\$1,172
	RE Admin Costs (Fed)	\$336	\$134	40.0%	\$470	0.0%	\$336	\$134	\$470	\$0	470.4	9.0%	\$366	\$146	\$513
30	PLANNING, ENGINEERING & DESIGN	\$3,584	\$1,326	37.0%	\$4,910	0.0%	\$3,584	\$1,326	\$4,910	\$0	\$4,910	10.2%	\$3,948	\$1,461	\$5,409
31	CONSTRUCTION MANAGEMENT	\$2,688	\$995	37.0%	\$3,683	0.0%	\$2,688	\$995	\$3,683	\$0	\$3,683	13.2%	\$3,044	\$1,126	\$4,170
PROJECT COST TOTALS:		\$46,625	\$17,565	37.7%	\$64,191		\$46,625	\$17,566	\$64,191	\$0	\$64,191	13.3%	\$52,842	\$19,895	\$72,737

CHIEF, COST ENGINEERING, Matthew Cunningham

PROJECT MANAGER, Ashleigh Fountain

CHIEF, REAL ESTATE, Timothy McQuillen

CHIEF, PLANNING, Angela Dunn

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CHIEF, OPERATIONS, Carol Bernstein

CHIEF, CONSTRUCTION, Jim Jeffords

CHIEF, CONTRACTING, Aldone Graham

CHIEF, PM-PB, Sheila Hint

CHIEF, DPM, Howard Gonzales

ESTIMATED TOTAL PROJECT COST: **\$72,737**

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

Printed:1/27/2023
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**** CONTRACT COST SUMMARY ****

PROJECT: PUERTO RICO COASTAL STUDY
LOCATION: San Juan / Rincón, Puerto Rico
This Estimate reflects the scope and schedule in report;

TSP Draft Report

DISTRICT: SAJ Jacksonville
POC: CHIEF, COST ENGINEERING, Matthew Cunningham

PREPARED: 1/27/2023

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: Effective Price Level:		15-Dec-22 1-Oct-22		Program Year (Budget EC): Effective Price Level Date:		2023 1 OCT 22						
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	Mid-Point Date P	INFLATED (%) L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
OCEAN PARK - BARBOSA PARK														
02	RELOCATIONS - Demolition / Utilities	\$1,075	\$398	37.0%	\$1,473	0.0%	\$1,075	\$398	\$1,473	2028Q4	16.2%	\$1,250	\$462	\$1,712
10	BREAKWATERS & SEAWALLS - Seawall	\$12,609	\$4,665	37.0%	\$17,274	0.0%	\$12,609	\$4,665	\$17,274	2028Q4	16.2%	\$14,654	\$5,422	\$20,077
19	BUILDINGS, GROUNDS & UTILITIES - Site Work	\$1,419	\$525	37.0%	\$1,945	0.0%	\$1,419	\$525	\$1,945	2028Q4	16.2%	\$1,650	\$610	\$2,260
ALL	COMPOSITE INDEX (WEIGHTED AVERAGE) - Mob/Demob and Assoc. General Items	\$1,819	\$673	37.0%	\$2,492	0.0%	\$1,819	\$673	\$2,492	2028Q4	16.2%	\$2,114	\$782	\$2,896
CONSTRUCTION ESTIMATE TOTALS:		\$16,922	\$6,261	37.0%	\$23,184		\$16,922	\$6,261	\$23,184			\$19,668	\$7,277	\$26,945
01	LANDS AND DAMAGES	\$5,213	\$2,085	40.0%	\$7,299	0.0%	\$5,213	\$2,085	\$7,299	2026Q2	9.0%	\$5,682	\$2,273	\$7,955
	RE Admin Costs (Non-Fed)	\$468	\$187	40.0%	\$655	0.0%	\$468	\$187	\$655	2026Q2	9.0%	\$510	\$204	\$714
	RE Admin Costs (Fed)	\$168	\$67	40.0%	\$235	0.0%	\$168	\$67	\$235	2026Q2	9.0%	\$183	\$73	\$256
30	PLANNING, ENGINEERING & DESIGN													
0.5%	Project Management	\$85	\$31	37.0%	\$116	0.0%	\$85	\$31	\$116	2026Q2	8.0%	\$91	\$34	\$125
0.6%	Planning & Environmental Compliance	\$102	\$38	37.0%	\$139	0.0%	\$102	\$38	\$139	2026Q2	8.0%	\$110	\$41	\$150
4.0%	Engineering & Design	\$677	\$250	37.0%	\$927	0.0%	\$677	\$250	\$927	2026Q2	8.0%	\$731	\$270	\$1,001
1.0%	Reviews, ATRs, IEPs, VE	\$169	\$63	37.0%	\$232	0.0%	\$169	\$63	\$232	2026Q2	8.0%	\$183	\$68	\$250
0.3%	Life Cycle Updates (cost, schedule, risks)	\$51	\$19	37.0%	\$70	0.0%	\$51	\$19	\$70	2026Q2	8.0%	\$55	\$20	\$75
0.3%	Contracting & Reprographics	\$51	\$19	37.0%	\$70	0.0%	\$51	\$19	\$70	2026Q2	8.0%	\$55	\$20	\$75
4.0%	Engineering During Construction	\$677	\$250	37.0%	\$927	0.0%	\$677	\$250	\$927	2028Q4	14.0%	\$772	\$286	\$1,057
1.0%	Planning During Construction	\$169	\$63	37.0%	\$232	0.0%	\$169	\$63	\$232	2028Q4	14.0%	\$193	\$71	\$264
0.0%	Adaptive Management & Monitoring	\$0	\$0	37.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
0.3%	Project Operations	\$51	\$19	37.0%	\$70	0.0%	\$51	\$19	\$70	2026Q2	8.0%	\$55	\$20	\$75
31	CONSTRUCTION MANAGEMENT													
9.0%	Construction Management	\$1,523	\$564	37.0%	\$2,087	0.0%	\$1,523	\$564	\$2,087	2028Q4	14.0%	\$1,737	\$643	\$2,379
CONTRACT COST TOTALS:		\$26,325	\$9,916		\$36,241		\$26,325	\$9,916	\$36,241			\$30,023	\$11,300	\$41,323

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

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**** CONTRACT COST SUMMARY ****

PROJECT: PUERTO RICO COASTAL STUDY
LOCATION: San Juan / Rincón, Puerto Rico
This Estimate reflects the scope and schedule in report;

TSP Draft Report

DISTRICT: SAJ Jacksonville
POC: CHIEF, COST ENGINEERING, Matthew Cunningham

PREPARED: 1/27/2023

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: Effective Price Level:		15-Dec-22 1-Oct-22		Program Year (Budget EC): Effective Price Level Date:		2023 1 OCT 22						
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
OCEAN PARK - SKATE PARK														
10	BREAKWATERS & SEAWALLS - Seawall	\$11,901	\$4,403	37.0%	\$16,304	0.0%	\$11,901	\$4,403	\$16,304	2028Q1	14.0%	\$13,564	\$5,019	\$18,583
ALL	COMPOSITE INDEX (WEIGHTED AVERAGE) - Mob/Demob and Assoc. General Items	\$1,044	\$386	37.0%	\$1,430	0.0%	\$1,044	\$386	\$1,430	2028Q1	14.0%	\$1,190	\$440	\$1,630
CONSTRUCTION ESTIMATE TOTALS:		\$12,945	\$4,790	37.0%	\$17,735		\$12,945	\$4,790	\$17,735			\$14,755	\$5,459	\$20,214
01	LANDS AND DAMAGES	\$4,168	\$1,667	40.0%	\$5,836	0.0%	\$4,168	\$1,667	\$5,836	2026Q2	9.0%	\$4,543	\$1,817	\$6,360
	RE Admin Costs (Non-Fed)	\$300	\$120	40.0%	\$420	0.0%	\$300	\$120	\$420	2026Q2	9.0%	\$327	\$131	\$458
	RE Admin Costs (Fed)	\$168	\$67	40.0%	\$235	0.0%	\$168	\$67	\$235	2026Q2	9.0%	\$183	\$73	\$256
30	PLANNING, ENGINEERING & DESIGN													
0.5%	Project Management	\$65	\$24	37.0%	\$89	0.0%	\$65	\$24	\$89	2026Q2	8.0%	\$70	\$26	\$96
0.6%	Planning & Environmental Compliance	\$78	\$29	37.0%	\$106	0.0%	\$78	\$29	\$106	2026Q2	8.0%	\$84	\$31	\$115
4.0%	Engineering & Design	\$518	\$192	37.0%	\$709	0.0%	\$518	\$192	\$709	2026Q2	8.0%	\$559	\$207	\$766
1.0%	Reviews, ATRs, IEPs, VE	\$129	\$48	37.0%	\$177	0.0%	\$129	\$48	\$177	2026Q2	8.0%	\$140	\$52	\$192
0.3%	Life Cycle Updates (cost, schedule, risks)	\$39	\$14	37.0%	\$53	0.0%	\$39	\$14	\$53	2026Q2	8.0%	\$42	\$16	\$57
0.3%	Contracting & Reprographics	\$39	\$14	37.0%	\$53	0.0%	\$39	\$14	\$53	2026Q2	8.0%	\$42	\$16	\$57
4.0%	Engineering During Construction	\$518	\$192	37.0%	\$709	0.0%	\$518	\$192	\$709	2028Q1	12.2%	\$581	\$215	\$796
1.0%	Planning During Construction	\$129	\$48	37.0%	\$177	0.0%	\$129	\$48	\$177	2028Q1	12.2%	\$145	\$54	\$199
0.0%	Adaptive Management & Monitoring	\$0	\$0	37.0%	\$0	0.0%	\$0	\$0	\$0	0	0.0%	\$0	\$0	\$0
0.3%	Project Operations	\$39	\$14	37.0%	\$53	0.0%	\$39	\$14	\$53	2026Q2	8.0%	\$42	\$16	\$57
31	CONSTRUCTION MANAGEMENT													
9.0%	Construction Management	\$1,165	\$431	37.0%	\$1,596	0.0%	\$1,165	\$431	\$1,596	2028Q1	12.2%	\$1,307	\$484	\$1,791
CONTRACT COST TOTALS:		\$20,300	\$7,650		\$27,949		\$20,300	\$7,650	\$27,949			\$22,819	\$8,595	\$31,413