



# HONEY CREEK AQUATIC ECOSYSTEM RESTORATION – SECTION 206 WRDA 1996

Appendix C - Cost Engineering



USACE, Chicago and  
Detroit Districts

**WALLA WALLA COST ENGINEERING  
MANDATORY CENTER OF EXPERTISE**

**COST AGENCY TECHNICAL REVIEW  
CERTIFICATION STATEMENT**

For Project No. 404209

**LRE – Honey Creek Section 206  
Aquatic Ecosystem Restoration**

The Honey Creek Aquatic Ecosystem Restoration Section 206 as presented by Detroit 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 8, 2020, the Cost MCX certifies the estimated total project cost:

FY21 Project First Cost:	\$13,424,000
Fully Funded Total Project Cost:	\$14,332,000
Federal Cost of Project:	\$9,989,000

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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**Michael P. Jacobs, PE, CCE  
Chief, Cost Engineering MCX  
Walla Walla District**

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

PROJECT: Honey Creek Section 206  
PROJECT NO: P2 # 404209  
LOCATION: Milwaukee, WI

DISTRICT: LRC-Chicago District

PREPARED: 10/7/2020

POC: CHIEF, COST ENGINEERING, Rana Mishra

This Estimate reflects the scope and schedule in report; Honey Creek Feasibility Report

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)					TOTAL PROJECT COST (FULLY FUNDED)				
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	REMAINING COST (\$K)	2021 1-Oct-20 Spent Thru: (\$K)	TOTAL FIRST COST (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
15	FLOODWAY CONTROL & DIVERSION STRU	\$7,740	\$2,399	31%	\$10,139	3.1%	\$7,978	\$2,473	\$10,451		\$10,451	6.9%	\$8,528	\$2,644	\$11,171
06	FISH & WILDLIFE FACILITIES		-			-						-			
06	ESTABLISHMENT ACTIVITIES		-			-						-			
	<b>CONSTRUCTION ESTIMATE TOTALS:</b>	\$7,740	\$2,399		\$10,139	3.1%	\$7,978	\$2,473	\$10,451		\$10,451	6.9%	\$8,528	\$2,644	\$11,171
01	LANDS AND DAMAGES	\$353	\$35	10%	\$388	3.1%	\$364	\$36	\$400		\$400	3.8%	\$378	\$38	\$415
30	PLANNING, ENGINEERING & DESIGN	\$1,393	\$404	29%	\$1,797	3.8%	\$1,446	\$419	\$1,866		\$1,866	4.4%	\$1,509	\$438	\$1,947
31	CONSTRUCTION MANAGEMENT	\$619	\$62	10%	\$681	3.8%	\$643	\$64	\$707		\$707	13.0%	\$726	\$73	\$799
	<b>PROJECT COST TOTALS:</b>	\$10,105	\$2,901	29%	\$13,006		\$10,430	\$2,993	\$13,424		\$13,424	6.8%	\$11,141	\$3,192	\$14,332

CHIEF, COST ENGINEERING, Rana Mishra

PROJECT MANAGER, XXX

CHIEF, REAL ESTATE, Mike Rohde

CHIEF, PLANNING, Sue Davis

CHIEF, ENGINEERING, John Groboski

CHIEF, OPERATIONS, Tim Kroll

CHIEF, CONSTRUCTION, Phil Stavrides

CHIEF, CONTRACTING, Regina Blair

CHIEF, PM-PB, F Kirksey

CHIEF, DPM, Steve Fisher

**ESTIMATED TOTAL PROJECT COST: \$14,332**  
ESTIMATED FEDERAL COST: 65% \$9,316  
ESTIMATED NON-FEDERAL COST: 35% \$5,016

**22 - FEASIBILITY STUDY (CAP studies): \$1,246**  
ESTIMATED FEDERAL COST: 50% \$673  
ESTIMATED NON-FEDERAL COST: 50% \$673

**ESTIMATED FEDERAL COST OF PROJECT \$9,989**

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

\*\*\*\* CONTRACT COST SUMMARY \*\*\*\*

PROJECT: Honey Creek Section 206  
LOCATION: Milwaukee, WI  
This Estimate reflects the scope and schedule in report; Honey Creek Feasibility Report

DISTRICT: LRC-Chicago District  
POC: CHIEF, COST ENGINEERING, Rana Mishra

PREPARED: 10/7/2020

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: <b>22-Jan-20</b> Estimate Price Level: 22-Jan-20				Program Year (Budget EC): 2021 Effective Price Level Date: 1-Oct-20								
		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
<b>PHASE 1 or CONTRACT 1</b>														
06	FISH & WILDLIFE FACILITIES	\$7,740	\$2,399	31.0%	\$10,139	3.1%	\$7,978	\$2,473	\$10,451	2023Q2	6.9%	\$8,528	\$2,644	\$11,171
06	FISH & WILDLIFE FACILITIES													
06	ESTABLISHMENT ACTIVITIES													
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$7,740	\$2,399	31.0%	\$10,139		\$7,978	\$2,473	\$10,451			\$8,528	\$2,644	\$11,171
01	LANDS AND DAMAGES	\$353	\$35	10.0%	\$388	3.1%	\$364	\$36	\$400	2022Q2	3.8%	\$378	\$38	\$415
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	\$194	\$56	29.0%	\$250	3.8%	\$201	\$58	\$260	2021Q3	1.9%	\$205	\$60	\$265
0.5%	Planning & Environmental Compliance	\$39	\$11	29.0%	\$50	3.8%	\$40	\$12	\$52	2021Q3	1.9%	\$41	\$12	\$53
8.0%	Engineering & Design	\$619	\$180	29.0%	\$799	3.8%	\$643	\$186	\$829	2021Q3	1.9%	\$655	\$190	\$845
2.0%	Reviews, ATRs, IEPRs, VE	\$155	\$45	29.0%	\$200	3.8%	\$161	\$47	\$208	2021Q3	1.9%	\$164	\$48	\$212
	Life Cycle Updates (cost, schedule, risks)			29.0%										
1.0%	Contracting & Reprographics	\$77	\$22	29.0%	\$99	3.8%	\$80	\$23	\$103	2024Q2	13.0%	\$90	\$26	\$117
3.0%	Engineering During Construction	\$232	\$67	29.0%	\$299	3.8%	\$241	\$70	\$311	2024Q2	13.0%	\$272	\$79	\$351
1.0%	Planning During Construction	\$77	\$22	29.0%	\$99	3.8%	\$80	\$23	\$103	2021Q3	1.9%	\$81	\$24	\$105
1.0%	Adaptive Management & Monitoring Project Operations			29.0%										
31	CONSTRUCTION MANAGEMENT													
7.0%	Construction Management	\$542	\$54	10.0%	\$596	3.8%	\$563	\$56	\$619	2024Q2	13.0%	\$636	\$64	\$699
	Project Operation:			10.0%										
1.0%	Project Management	\$77	\$8	10.0%	\$85	3.8%	\$80	\$8	\$88	2024Q2	13.0%	\$90	\$9	\$99
<b>CONTRACT COST TOTALS:</b>		\$10,105	\$2,901		\$13,006		\$10,430	\$2,993	\$13,424			\$11,141	\$3,192	\$14,332

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## **1.0 Project Description**

The Honey Creek study area extends from the outlet of Honey Creek to the Menomonee River upstream to the utility crossing near the Wisconsin Lutheran High School (approximately 1,600 feet downstream of the culverts north of Interstate 94 at 84th Street and O’Connor Avenue). The majority of this reach, approximately 6,700 linear feet, consists of a concrete channel that was installed as part of a flood reduction project built by the MMSD and Milwaukee County in the 1960’s. The remainder of the study area, approximately 2,600 linear feet, consists of natural substrates that provides some habitat value, but is experiencing bank erosion.

To address the listed problems above, six (6) measures, including the No Action measure, were developed and input into the IWR-Planning Suite in terms of costs and benefits (stream and riparian plant community habitat outputs). Based on these inputs and criteria, the IWR Planning software generated 20 alternative combinations for ecosystem restoration. A cost effectiveness analysis was used to ensure that certain options would be screened out if they produced the same amount or less output at a greater cost than other options with a lesser cost. Of the 20 alternative combinations, eight (8) cost effective combinations were identified, with a subset of four (4) plans being identified as “Best Buys”. The No Action plan is always deemed cost effective and a “best buy”. Twelve (12) alternative combinations were screened out as non-cost effective. Alternative 8 was selected from the four (4) “best buy” plans as the National Ecosystem Restoration plan (synonymous with the Preferred Plan and Tentatively Selected Plan) and consists of the following measures:

- Site Preparation
- Concrete Channel Removal
- Grade Creek banks
- Creek Channel Restoration
- Invasive Species Eradication
- Native Plant Community Establishment
- Recreation Trail Repairs

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## 2.0 Basis of Estimate

### 2.1 Basis of Design

30% Drawings were used to obtain takeoffs and prepare cost estimate.

Reference the class of estimate. Due to the level of design for this design (approximately 15% level) the estimate falls into a Class 4 category, based on ER 1110-2-1302. All costs were derived using corollary data from similar projects completed recently and scaled up or down to the projected design. For the corollary cost data, recent projects in close geographic proximity with similar scope were used when possible to give the most reasonable similar costs.

### 2.2 Basis of Quantities

The quantity takeoff was developed by the technical team. The items were independently verified by Cost Engineer. Additional assumptions made by Cost Engineering that was not addressed in the quantity takeoff.

Productivity Markup – 90% due to unknown condition of the water level during construction. The productivity markup for concrete removal was changed to 100% since the contingency factor was applied instead.

Cost Book Escalation Factor – 5.6%

Contingency – 30% for this level of design.

Please see the attached quantity takeoff.

## 3.0 Construction Estimate

Mobilization/Demobilization – Assumed the contractor will be located about 20 miles from the job site, however at this stage, a plug number was used **3%** from the total cost.

Stream Channel Restoration (SC) – The quantities for concrete removal was verified using OST software, the cost was based on the unit cost from similar project awarded in FY18 River Riparian. The unit cost includes demolition and off site removal. The unit cost also includes temporary measures for temporary bypass of the river during construction. The unit cost was also obtained from the contract cost proposal (River Riparian Project). All components associated with geomorphic contouring were developed using quantities provided by the Civil Engineer and cost book RMS for equipment. Cobbles, riffles, J-hooks, and large woody revetments were estimated based on civil quantity takeoffs, RMS equipment rates, and material cost based on River Riparian project from FY18. Cost for installation of Plugs was based on bid abstract unit prices from just awarded contracts: River Riparian and Jersey Park. Unit price for material for plug \$2.80 was used, the total quantity for plugs was obtained from the biologist 110,000 plugs. RMS library was used to determine the cost for 3ft mulch trail installation, the crew output was changed to 2 based on site visit investigation on current contract: River Riparian.

Meadow Transitional – includes cost items for Invasive Species Removal, prescribed burns, seeding and plugs installation. LRC is specializing in ecosystem restorations projects, RMS library for equipment was used, for labor and material cost was based on recent awarded contracts, one of them was River Riparian. The seeding cost was updated showing current rates for 2020.

Marsh Persistent - includes cost items for Invasive Species Removal, prescribed burns, seeding and plugs installation. LRC is specializing in ecosystem restorations projects, RMS library for equipment was used, for labor and material cost was based on recent awarded contracts, one of them was River Riparian. The plug material cost was updated showing current rates for 2020.

Riparian Woodland (RW) – the cost was developed for 46 acres of area and includes cost items for Invasive Species Removal, prescribed burns, seeding and plugs installation. LRC is specializing in ecosystem restorations projects, RMS library for equipment was used, for labor and material cost was based on recent awarded contracts, one of them was River Riparian. The seeding, plugs, trees, shrubs material cost was updated showing current rates for 2020. Selective tree removal cost was developed based on the quote from Clean Cut Tree Service, however they

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are not working in the project area. At 50% or 100% P&S, local tree cutting company will be contacted to provide a quote.

Limestone Wall System – since the wall is considered as a historic landmark, the cost was developed with extra effort to protect the wall during construction to avoid damages. Therefore during concrete channel demolition, extra time was added and different equipment assigned to reduce the vibration. Also, with the slope contouring, extra time was added for the crew working nearby the wall. The cost for extra fencing to keep the machinery away from the wall was included in the project total. Extra contingency was added to cover documentation and reporting with permitting agencies. The project cost estimate does not include any repairs to the wall and/or wall foundation.

#### **4.0 Construction Schedule**

The construction schedule for this project is based on the project features contained in the MII estimate. The construction schedule was coordinated with CELRC Construction Department.

It was assumed no environmental/fish and wild life permitting window to complete construction are required.

Critical Path			
Activity	Start	Duration	Notes
NA			
NA			

Please see the attached gantt chart for a detailed construction schedule.

#### **5.0 Acquisition Plan**

It was assumed that contract will be awarded based on open bid to the lowest cost proposal.

#### **6.0 Risk Assessment**

No unusual conditions (soil, water, weather, traffic) where noted. There is work scheduled to be done to the existing bridge and footings, the cost estimate includes scour protection, however it might not be needed after the work is done by WIDOT.

#### **7.0 Operation and Maintenance Cost**

Identify OM cost for service life of the facility or project. Include cost for both USACE and LS.

#### **8.0 Alternative Analysis**

Document any features that you estimated, but were eliminated from the scope. Include any alternative analysis that you completed.

#### **9.0 References**

U.S. Army Corps of Engineers, 1993, *Engineering and Design Cost Engineering Policy and General Requirements, Engineering Regulation 1110-1-1300*, Department of the Army, Washington D.C., 26 March 1993.

U.S. Army Corps of Engineers, 1999, *Engineering and Design for Civil Works Projects*,

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*Engineering Regulation 1110-2-1150*, Department of the Army, Washington D.C., 31 August 1999.

U.S. Army Corps of Engineers, 2008a, *Civil Works Cost Engineering, Engineering Regulation 1110-2-1302*, Department of the Army, Washington D.C., 15 September 2008.

U.S. Army Corps of Engineers, 2008b, *Construction Cost Estimating Guide For Civil Works, Engineering Technical Letter 1110-2-573*, Department of the Army, Washington D.C., 30 September 2008.

## **10.0 Attachments**

### **10.1 Quantity Takeoff**

### **10.2 Vendor, Subcontractor Emails and Phone Logs**

### **10.3 Construction Schedule**

### **10.4 Bid Schedule**

### **10.5 MCASES Estimate**

### **10.6 Quality Control Checklist**

### **10.7 Project Scope – Cost Analysis FEAS to RTA MFR**