

ARKANSAS RIVER CORRIDOR

Appendix E: Cost Analysis and Detailed Cost

Estimate 31 August 2016

ARKANSAS RIVER CORRIDOR, TULSA COUNTY, OKLAHOMA

Introduction

The Arkansas River is a water resource serving numerous nationally significant purposes. The river has historically served as a nationally significant resource for aquatic and terrestrial habitat of the nation's wildlife that live, breed, and migrate through the Arkansas River ecosystem. This includes federally endangered Interior Least Tern (Least Tern, *Sterna antillarum*), a nationally significant resource, and two federally threatened bird species, the Piping Plover (*Charadrius melodus*) and the Red Knot (*Calidris canutus rufa*) as well as a plethora of native species and migratory waterfowl that support a healthy and functional riverine ecosystem. Keystone Lake and its dam located along the Arkansas River also play vital roles in supporting the continued provision of many of those multi-purposes. In particular, the lake and dam provide flood risk management benefits, contribute to the eleven reservoir system operation of the McClellan-Kerr Arkansas River Navigation System, provide clean and efficient power through the associated hydropower plant, and provide a source of water for municipal and industrial uses. However, construction, operation, and maintenance of the Keystone Dam, lake, associated hydropower operations and other multi-purposes have significantly degraded the riverine ecosystem structure, function, and dynamic processes below Keystone Dam on the Arkansas River within Tulsa County, Oklahoma.

Stage of Planning Process

This is a feasibility study. A planning Charette was conducted in October 2013, and an Alternatives Milestone Meeting was completed in September 2015. The study is in the Alternative Formulation and Analysis Phase. Utilizing a reasonable level of detail, the PDT has analyzed, compared, and evaluated the array of alternatives to identify a Tentatively Selected Plan for consideration by the Vertical Team.

Study Authority

The Arkansas River Corridor study is authorized in the Water Resources Development Act (WRDA) of 2007, Section 3132.

Section 3132. Arkansas River Corridor.

- (a) IN GENERAL. – The Secretary is authorized to participate in the ecosystem restoration, recreation, and flood damage reduction components of the Arkansas River Corridor Master Plan dated October 2005. The Secretary shall coordinate with appropriate representatives in the vicinity of Tulsa, Oklahoma, including representatives of Tulsa County and surrounding communities and the Indian Nations Council of Governments.
- (b) AUTHORIZATION OF APPROPRIATIONS. – There is authorized to be appropriated \$50,000,000 to carry out this section.

Non-Federal Sponsor

Tulsa County is the non-federal sponsor for the Arkansas River Corridor feasibility study. An amended feasibility cost-sharing agreement was executed in May 2015.

Purpose

This study is in response to the Section 3132 authorization of the 2007 WRDA. The purpose of this study is to evaluate the aquatic ecosystem restoration components of the October 2005 Arkansas River Corridor Master Plan (ARC Master Plan) and determine if there is a Federal Interest that aligns with the Corps of Engineers ecosystem restoration mission.

COST ANALYSIS AND DETAILED COST ESTIMATE APPENDIX

PROJECT GOALS AND OBJECTIVES

The cost estimating goal was to provide a common format and consistent means of comparing the selected alternatives by projected cost. The alternatives chosen have not been vetted for complete design and the estimates do not necessarily represent final costs. Until they have a more detailed statements of work and/or design, the estimates provide a means of comparing the alternatives on an even scale and provide an expected magnitude of costs.

METHODOLOGY

Cost estimates were developed using MII V 4.3 software and the 2015 Cost Book. The effective date of costs was set at July 2016. Cost estimates for 10 alternatives were developed (designated as plans 4 through 13), using four basic alternatives combined with different combinations of plantings: Plan 4 Least Tern Island; Plan 5 Cherry Creek Riparian Planting; Plan 6 Prattville Creek Rock Riffle (RR) plus Longitudinal Peaked Stone Toe Protection (LPSTP); Plan 7 Prattville Creek RR + LPSTP plus Riparian Planting; Plan 8 Prattville Creek RR + LPSTP plus Wetland Planting; Plan 9 Prattville Creek RR + LPSTP plus Riparian Planting and Wetland Planting; Plan 10 I-44/Riverside Grade Controls (GC) plus Wing Deflectors (WD); Plan 11 I-44/Riverside GC + WD plus Riparian Planting; Plan 12 I-44/Riverside GC + WD plus Wetland Planting; Plan 13 I-44/Riverside GC + WD plus Riparian Planting and Wetland Planting.

For the 10 alternative estimates, design and annual O&M costs were added. Design costs were assumed to be approximately 6 percent of projected construction costs. Additionally, home office overhead (HOOH) was set at 12 percent, profit was set at 9 percent (applied to subcontractor work, only), sales tax set at 9 percent (applied to materials, only), productivity was set at 80 percent, and all work was assumed to be performed in 10-hour shifts on a 5-day work-week.

A cost estimate for an additional alternative was developed by CH2M HILL for placement at two alternate locations: the pool control structure. These were developed in April 2015 in MS Excel format. The estimates for the two sites were placed into the MII V 4.3 format and escalated to August 2016 using a total of 6 percent escalation rate for the 16 months. Because the MII estimate used a lump-sum carried over from the CH2M HILL estimate, no cost book was used. Additionally, home office overhead (HOOH) was set at 12 percent, profit was set at 9 percent, and sales tax set at 9 percent (applied to materials, only). Twenty percent contingency was applied to all alternative estimates.

ASSUMPTIONS AND CONSTRAINTS

Assumptions and constraints were set by the IPT.

RISKS

The Project Development Team assessed risks for this project, determining contingency for the 10 alternatives should be set at 20 percent for each. The higher risks come from the project growth, construction elements, quantities, and external project risks. Currently, the alternatives lack detailed design and costs could be significantly impacted once actual construction materials and methods are determined.

ALTERNATIVES

Down-selection is to be determined from the list of alternatives:

- A. Least Tern Island
- B. Cherry Creek Rip Rap and Plantings
- C. Prattville Creek Rock Riffle
- D. Prattville Creek Rock Riffle + Riparian Plantings
- E. Prattville Creek Rock Riffle + Wetland Plantings
- F. Prattville Creek Rock Riffle + Riparian Plantings + Wetland Plantings
- G. I-44/Riverside Wing Deflectors + Rock Riffle
- H. I-44/Riverside Wing Deflectors + Rock Riffle + Riparian Plantings
- I. I-44/Riverside Wing Deflectors + Rock Riffle + Wetland Plantings
- J. I-44/Riverside Wing Deflectors + Rock Riffle + Riparian Plantings + Wetland Plantings

A description of each alternative is included in the Civil Engineering Appendix.

RECOMMENDED PLAN

Recommendations will be made by the project team.

Ark River Corridor 2016 - 1 Pool Control Structure (Original Site)

Pulled estimate created by CH2MHILL as part of the study of alternatives ("Arkansas River Low Water Dams & Public Access/Recreational Improvements," April 30, 2015). The CH2MHILL estimate was created in MS Excel format. The MII estimate is a parametric estimate showing overall costs and overhead, as identified by CH2M.

Estimated by
Designed by
Prepared by Timothy Batson

Preparation Date 8/31/2016
Effective Date of Pricing 8/31/2016
Estimated Construction Time 400 Days

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Date	Author	Note
8/22/2016	T Batson	Applied 6 percent escalation to the estimate - April 2015 to August 2016
8/22/2016	T Batson	Because this estimate was taken from an existing estimate developed by CH2M HILL, I used overhead items shown on the CH2M HILL spreadsheet (P&S = 8 percent, engineering during construction = 8 percent, supervision & inspection = 8 percent). No contingency was added.
8/24/2016	T Batson	Pulled real estate costs out of construction costs and included as a separate line item - applied 6 percent escalation to it, as well the other sections of the estimate. Applied 20 percent contingency to construction and increased "supervision, inspection & overhead" (SIOH) from 8 percent to 12 percent.
8/31/2016	T Batson	All costs reflected in this estimate were provided by the Arkansas River Corridor IPT.

Description

Quantity UOM ProjectCost

Project Indirect Summary

Pool Control Structure Design Concept

Construct Pool Control Structure @ Original Reregulating Dam Site

1.0 JOB 74,016,300

Real Estate

1.0 EA 11,206,000

Design + Drawings

1.0 LS 4,706,400

Annual O&M Costs

1.0 EA 236,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectMatl</u>	<u>PrimeCMU</u>	<u>DirectSubBid</u>	<u>SIOH</u>	<u>Contingency</u>	<u>Escalation</u>	<u>ProjectCost</u>
Project Direct Summary									
Pool Control Structure Design Concept									
Construct Pool Control Structure @ Original Reregulating Dam Site	1.0	JOB	0	9,662,721	42,291,668	7,930,318	11,014,330	3,117,263	74,016,300
Pool Control Structure	1.0	EA	0	9,662,721	42,291,668	7,930,318	11,014,330	3,117,263	74,016,300
Pool Control Structure	1.0	EA	0	9,662,721	42,291,668	7,930,318	11,014,330	3,117,263	74,016,300
(Note: April 2015 dollars.)									
Real Estate	1.0	EA	11,206,000	0	0	0	0	0	11,206,000
(Note: Real estate information provided by the Arkansas River Corridor IPT)									
Real Estate	1.0	EA	11,206,000	0	0	0	0	0	11,206,000
Design + Drawings	1.0	LS	4,405,000	0	35,000	0	0	266,400	4,706,400
(Note: Design is lump sum cost of approximately 6 percent of construction costs)									
Design	1.0	EA	4,405,000	0	0	0	0	264,300	4,669,300
Design	1.0	LS	4,405,000	0	0	0	0	264,300	4,669,300
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)									
As-built Drawings	1.0	EA	0	0	35,000	0	0	2,100	37,100
As-Built Drawings	1.0	LS	0	0	35,000	0	0	2,100	37,100
Annual O&M Costs	1.0	EA	0	0	236,000	0	0	0	236,000
(Note: CH2M HILL provided "annualized implementation cost")									
Annual O&M Costs	1.0	EA	0	0	236,000	0	0	0	236,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	4,195.26
Storage & Tool Trailers	13.0000	MO	2,816.67
Toilet, portable, chemical, rent per month	13.0000	MO	2,816.67
Temporary Utilities	13.0000	MO	4,788.33
Office Supplies	13.0000	MO	7,041.67
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	13.0000	MO	8,450.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	13.0000	MO	8,450.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	13.0000	MO	28,166.67
QC Inspector	13.0000	MO	70,543.28
General Superintendent (P.M.)	13.0000	MO	130,114.19
Safety Monitor	13.0000	MO	102,973.04

Ark River Corridor 2016 - 2 Pool Control Structure (CH2M HILL Site)

Pulled estimate created by CH2MHILL as part of the study of alternatives ("Arkansas River Low Water Dams & Public Access/Recreational Improvements," Apri 30, 2015). The CH2MHILL estimate was created in MS Exel format. The MII estimate is a parametric estimate showing overall costs and overhead, as identified by CH2M HILL.

Estimated by
Designed by
Prepared by Timothy Batson

Preparation Date 8/31/2016
Effective Date of Pricing 8/31/2016
Estimated Construction Time 400 Days

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Date	Author	Note
8/22/2016	T Batson	Applied 6 percent escalation to the estimate - April 2015 to August 2016
8/22/2016	T Batson	Because this estimate was taken from an existing estimate developed by CH2M HILL, I used overhead items shown on the CH2M HILL spreadsheet (P&S = 8 percent, engineering during construction = 8 percent, supervision & inspection = 8 percent). No contingency was added.
8/24/2016	T Batson	Pulled real estate costs out of construction costs and included as a separate line item - applied 6 percent escalation to it, as well the other sections of the estimate. Applied 20 percent contingency to construction and increased "supervision, inspection & overhead" (SIOH) from 8 percent to 12 percent.
8/31/2016	T Batson	All costs reflected in this estimate were provided to me by the Arkansas River Corridor IPT.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
Pool Control Structure Design Concept			
Construct Pool Control Structure @ Original Reregulating Dam Site	1.0	JOB	85,077,412
Real Estate	1.0	EA	13,533,000
Design + Drawings	1.0	LS	4,997,900
Annual O&M Costs	1.0	EA	236,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectMatl</u>	<u>PrimeCMU</u>	<u>DirectSubBid</u>	<u>SIOH</u>	<u>Contingency</u>	<u>Escalation</u>	<u>ProjectCost</u>
Project Direct Summary									
Pool Control Structure Design Concept									
Construct Pool Control Structure @ Original Reregulating Dam Site	1.0	JOB	0	11,048,533	48,670,000	9,115,437	12,660,329	3,583,112	85,077,412
Pool Control Structure	1.0	EA	0	11,048,533	48,670,000	9,115,437	12,660,329	3,583,112	85,077,412
Pool Control Structure	1.0	EA	0	11,048,533	48,670,000	9,115,437	12,660,329	3,583,112	85,077,412
(Note: April 2015 dollars.)									
Real Estate	1.0	EA	13,533,000	0	0	0	0	0	13,533,000
(Note: Real estate information provided by the Arkansas River Corridor IPT)									
Real Estate	1.0	EA	13,533,000	0	0	0	0	0	13,533,000
Design + Drawings	1.0	LS	4,680,000	0	35,000	0	0	282,900	4,997,900
(Note: Design is lump sum cost of approximately 6 percent of construction costs)									
Design	1.0	EA	4,680,000	0	0	0	0	280,800	4,960,800
Design	1.0	LS	4,680,000	0	0	0	0	280,800	4,960,800
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)									
As-built Drawings	1.0	EA	0	0	35,000	0	0	2,100	37,100
As-Built Drawings	1.0	LS	0	0	35,000	0	0	2,100	37,100
Annual O&M Costs	1.0	EA	0	0	236,000	0	0	0	236,000
Annual O&M Costs	1.0	EA	0	0	236,000	0	0	0	236,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	4,195.26
Storage & Tool Trailers	13.0000	MO	2,816.67
Toilet, portable, chemical, rent per month	13.0000	MO	2,816.67
Temporary Utilities	13.0000	MO	4,788.33
Office Supplies	13.0000	MO	7,041.67
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	13.0000	MO	8,450.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	13.0000	MO	8,450.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	13.0000	MO	28,166.67
QC Inspector	13.0000	MO	70,543.28
General Superintendent (P.M.)	13.0000	MO	130,114.19
Safety Monitor	13.0000	MO	102,973.04

Ark River Corridor - Alternatives 2016
Evaluating various alternatives for river habitat restoration. Options being evaluated and priced include: Cherry Creek Confluence Restoration, Prattville Creek Confluence, Left Bank Slack Water Side Channels, and Least Tern Island Habitat.

Estimated by
Designed by TBD
Prepared by Timothy Batson

Preparation Date 6/23/2016
Effective Date of Pricing 6/23/2016
Estimated Construction Time 40 Days

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Date	Author	Note
6/30/2016	T Batson	Using overhead rates of: HOOH = 12 percent, profit = 9 percent, sales tax = 9 percent (material only), productivity = 80 percent, and that all work will be performed in 10-hour shifts, 5 days per week. Assuming QC, Safety and Superintendent positions will be required as separate, non-overlapping duties.
6/30/2016	T Batson	Contingency = 20 percent and SIOH (supervision, inspection & overhead) = 12 percent were added. Design costs = 6 percent of construction costs w/ contingency & SIOH added has also been added.
6/30/2016	T Batson	Project duration is for construction, only.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
Study Alternative			
4 Least Tern Islands	1.0	JOB	967,185
Design	1.0	LS	58,000
Annual O&M Costs	1.0	LS	34,500

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary II			
Study Alternative			
4 Least Tern Islands	1.0	JOB	967,185
Temporary Access Road	1,800.0	LF	52,798
Stone Placement in River Channel	5,400.0	CY	914,388
Design	1.0	LS	58,000
Annual O&M Costs	1.0	LS	34,500

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	DirectSubBid	SubCMU	SIOH	Contingency	ProjectCost
Project Direct Summary											
Study Alternative											
4 Least Tern Islands	1.0	JOB	109,214	53,439	262,153	117,919	172,736	4,172	103,627	143,926	967,185
(Note: Five acre island. The study provides the size for a "prototype" island, using dimensions for the structures that will create a prototype island. Structure dimensions are 43' x 10' x 3' (front) and 56' x 10' x 3' (back) (total of 110 CY). The study discusses an approximately \$50 per cubic yard to create an island, with a total cost of \$270K (2003), which equals 5,400 CY. It's not clear what size island either of these structures will create. For the purposes of this estimate, the larger size was used. Dimensions and volume of material were adjusted to account for the larger size.)											
Temporary Access Road	1,800.0	LF	10,395	7,730	10,050	6,437	501	4,172	5,657	7,857	52,798
(Note: Assuming access road will be needed to access placement areas on the river bed. Assuming approximately 1/3 mile needed.)											
Construct Access Road	1,800.0	LF	10,395	7,730	10,050	6,437	501	4,172	5,657	7,857	52,798
Clearing and Grubbing	1.0	LS	3,605	3,094	0	1,411	501	0	1,240	1,722	11,572
(Note: Assuming some clearing & grubbing required as part of road construction.)											
Clearing & grubbing, medium trees, to 12" diameter, cut and chip	0.3	ACR	464	350	0	160	0	0	140	195	1,309
(Note: Includes loading chipped material for haul. See folder detail for quantity information.)											
Clear and grub, light stumps, to 6" diameter, includes loading on site	2.0	ACR	1,464	1,322	0	546	0	0	480	666	4,477
Haul to Disposal Site	96.0	LCY	1,677	1,422	0	607	0	0	534	741	4,981
(Note: Crew Output based upon 12 CY dump bed, Assume 1 hr load time, 30 min haul, 30 min dump, 30 min return time. Total time = 2.5 hr. Crew Output = 12CY/2.5 hr = 4.8 CY/HR.. Assume that there are 15 truck loads per acre = 48 lcy/acre.)											
Landfill Fee	16.0	TON	0	0	0	98	501	0	86	120	805
(Note: Assuming haul to landfill in Mexico, at rate equal to that charged by landfill at Del Rio, TX. Disposal costs (construction waste) = \$31.29/ton. Haul distance is 25mi. Assume that there are 10 truck loads per acre = 48 lcy/acre and 1 ton/3CY)											
Excavate Fill & Place for Roadway	367.0	BCY	887	537	0	279	0	0	245	341	2,289
(Note: Assuming approximately 276 BCY hauled & dumped per hour. 2515 LF x 10' x 0.5' = 12,575 CF = 466 CY)											
Excavate, Load, Place for Road	367.0	ECY	887	537	0	279	0	0	245	341	2,289
6" Gravel Course	2,000.0	SY	5,301	3,543	10,050	4,520	0	4,172	3,972	5,517	37,076
(Note: Assuming 6" gravel course laid on full length of road. Total = 1800 LF x 10' wide = 18,000 SF / 9 SF/SY = 2000 SY)											
Place Stone	567.0	TON	5,301	3,543	10,050	4,520	0	4,172	3,972	5,517	37,076
(Note: #67 washed 3/4" limestone rock. Used 1.7 tons/CY)											
Base course drainage layers, aggregate base course for roadways and large paved areas, stone base, compacted, 3/4" stone base, to 6" deep	2,000.0	SY	799	1,092	10,050	2,857	0	2,637	2,510	3,487	23,431

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	DirectSubBid	SubCMU	SIOH	Contingency	ProjectCost
(Note: Delivery costs already included)											
Move gravel from stockpile & place	333.0	CY	4,503	2,451	0	1,664	0	1,535	1,462	2,030	13,645
(Note: Sand filter material stockpiled Use 2 CY FE loader to move FE loader Load time: 30 sec travel time: 2 mins dump time: 30 sec return time: 2 mins)											
LOADER, FRONT END, WHEEL, 2.20 CY BUCKET, ARTICULATED, 4X4	23.6	HR	0	1,038	0	248	0	229	218	303	2,037
(Note: Assuming 5 minutes per load/place = 12 loads per hour)											
Load Gravel Crew 1 FE loader + operator + laborer	23.6	HR	2,318	1,038	0	803	0	741	706	980	6,585
(Note: Second loader & operator)											
Compaction - Backfill, 6" layers, compaction in layers, roller compaction with operator walking, add to above	333.0	ECY	2,185	375	0	612	0	565	538	747	5,022
Grading With Dozers	367.0	BCY	602	556	0	227	0	0	199	277	1,861
Grading - Excavate and fill, 140 H.P. dozer, move 150', stockpile	367.0	BCY	602	556	0	227	0	0	199	277	1,861
(Note: see folder notes for details.)											
Stone Placement in River Channel	5,400.0	CY	98,819	45,709	252,103	111,482	172,235	0	97,970	136,070	914,388
(Note: The study includes a plan for two structures to create silt/sand/soil accumulation to create a least tern island. The study does not detail the size of island the structures will create, or the size rip-rap used to create the islands. Assuming that the prototype structure will not be of adequate size to create a 5-acre island. The larger size structure in the study was priced at \$270,000 at a cost of \$50 per CY, which equates to approximately 5,400 CY of stone - this is the size assumed to meet the structural requirements. Assumed 24-inch riprap will be used. Added 15 percent to volume to allow for settling. Placement rate for rip-rap assumed at 50 ton/hr with the crew shown. Assumes 1.8225 ton/CY Per the study, prototype structures are sized at: 43' x 10' x 3' (1290 CF = 47.8 CY) and 56' x 10' x 3' (1680 CF = 62.2 CY).)											
Stone (Material Cost)	6,210.0	CY	0	0	252,103	49,405	0	0	43,417	60,302	405,227
(Note: Used 24" rip-rap as assumed material. Added 15 percent for expansion)											
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	9,842.0	TON	0	0	252,103	49,405	0	0	43,417	60,302	405,227
(Note: Price is based on previous quarry price quotes & may vary.)											
Hauling/Delivery	1.0	LS	0	0	0	33,753	172,235	0	29,662	41,198	276,848
Hauling Cost	9,842.0	TON	0	0	0	33,753	172,235	0	29,662	41,198	276,848
Move stone from stockpile to placement area	6,210.0	CY	55,951	20,606	0	15,003	0	0	13,185	18,312	123,057
(Note: Sand filter material stockpiled Use 2 CY FE loader to move FE loader Load time: 30 sec travel time: 2 mins dump time: 30 sec return time: 2 mins)											
LOADER, FRONT END, WHEEL, 2.20 CY BUCKET, ARTICULATED, 4X4	155.0	HR	0	6,811	0	1,335	0	0	1,173	1,629	10,948
(Note: Assuming 5 minutes per load/place = 12 loads per hour)											

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectLabor</u>	<u>DirectEQ</u>	<u>DirectMatl</u>	<u>PrimeCMU</u>	<u>DirectSubBid</u>	<u>SubCMU</u>	<u>SIOH</u>	<u>Contingency</u>	<u>ProjectCost</u>
Load Gravel Crew 1 FE loader + operator + laborer	155.0	HR	15,206	6,811	0	4,315	0	0	3,792	5,266	35,390
(Note: Second loader & operator)											
Compaction - Backfill, 6" layers, compaction in layers, roller compaction with operator walking, add to above	6,210.0	ECY	40,744	6,984	0	9,354	0	0	8,220	11,416	76,718
Place Stone	1.0	TON	42,868	25,103	0	13,320	0	0	11,706	16,258	109,256
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	197.0	HR	0	13,386	0	2,623	0	0	2,305	3,202	21,516
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	197.0	HR	0	1,382	0	271	0	0	238	331	2,222
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	248.4	HR	0	10,334	0	2,025	0	0	1,780	2,472	16,611
Equip. Operators, Crane/Shovel	197.0	HR	13,813	0	0	2,707	0	0	2,379	3,304	22,204
Equip. Operators, Medium	248.4	HR	16,375	0	0	3,209	0	0	2,820	3,917	26,321
Laborers, (Semi-Skilled)	394.0	HR	12,680	0	0	2,485	0	0	2,184	3,033	20,381
Design	1.0	LS	0	0	58,000	0	0	0	0	0	58,000
(Note: Lump sum cost of approximately 6 percent of construction costs)											
Design	1.0	LS	0	0	58,000	0	0	0	0	0	58,000
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)											
Annual O&M Costs	1.0	LS	0	0	0	0	34,500	0	0	0	34,500
(Note: Full replacement of plants every 10 years and full replacement of riprap every 20 years. Annualized costs w/ no adjustment for inflation, no compounding or overhead applied.)											
Annual O&M Costs	1.0	EA	0	0	0	0	34,500	0	0	0	34,500
(Note: Assumes riprap/stone is fully replaced every 20 years and plantings are fully replaced every 10 years. These are simple annualized costs, only. No inflation or time-value-of-money calculations have been applied.)											

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	1,386.25
Storage & Tool Trailers	1.0000	WK	50.00
Toilet, portable, chemical, rent per month	1.0000	WK	50.00
Temporary Utilities	1.0000	WK	85.00
Office Supplies	1.0000	WK	125.00
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	1.0000	WK	150.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	1.0000	WK	150.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	1.0000	WK	500.00
QC Inspector	1.0000	MO	5,426.41
General Superintendent (P.M.)	1.0000	MO	10,008.78
Safety Monitor	1.0000	MO	7,921.00

Ark River Corridor - Alternatives 2016
Evaluating various alternatives for river habitat restoration. Options being evaluated and priced include: Cherry Creek Confluence Restoration, Prattville Creek Confluence, Left Bank Slack Water Side Channels, and Least Tern Island Habitat.

Estimated by
Designed by TBD
Prepared by Timothy Batson

Preparation Date 6/23/2016
Effective Date of Pricing 6/23/2016
Estimated Construction Time 90 Days

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Date	Author	Note
6/30/2016	T Batson	Using overhead rates of: HOOH = 12 percent, profit = 9 percent (sub work, only), sales tax = 9 percent (material only), productivity = 80 percent, and that all work will be performed in 10-hour shifts, 5 days per week. Assuming QC, Safety and Superintendent positions will be required as separate, non-overlapping duties.
6/30/2016	T Batson	Contingency = 20 percent and SIOH (supervision, inspection & overhead) = 12 percent were added. Design costs = 6 percent of construction costs w/ contingency & SIOH added has also been added.
6/30/2016	T Batson	Project duration is for construction, only.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
Study Alternative			
5 Cherry Creek Riparian Planting	1.0	JOB	626,898
Design + Drawings	1.0	LS	44,690
Annual O&M Costs	1.0	LS	52,800

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary II			
Study Alternative			
5 Cherry Creek Riparian Planting	1.0	JOB	626,898
Stone Structure	1.0	EA	198,854
Riparian Plantings	1.0	LS	428,043
Design + Drawings	1.0	LS	44,690
Design	1.0	EA	37,600
As-built Drawings	1.0	EA	7,090
Annual O&M Costs	1.0	LS	52,800

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	PrimeCMU	SIOH	Contingency	ProjectCost
Project Direct Summary										
Study Alternative										
5 Cherry Creek Riparian Planting	1.0	JOB	148,473	67,192	75,619	37,652	137,506	67,168	93,288	626,898
Stone Structure	1.0	EA	8,212	6,993	56,135	33,000	43,617	21,306	29,591	198,854
6" Bedding	274.0	CY	1,367	2,247	12,808	8,250	10,314	5,038	6,997	47,021
6-Inches Spall Stone	499.4	TON	1,367	2,247	12,808	8,250	10,314	5,038	6,997	47,021
6-Inch Bedding Stonel Material Price	500.0	TON	0	0	12,808	8,250	8,803	4,300	5,972	40,132
6" Bedding Stone Material Price	500.0	TON	0	0	12,808	0	5,354	2,615	3,632	24,409
Pick-up/Hauling/Delivery	500.0	TON	0	0	0	8,250	3,449	1,685	2,340	15,723
Hauling Cost	500.0	TON	0	0	0	8,250	3,449	1,685	2,340	15,723
6-Inch Bedding Stone Placement	274.0	CY	1,367	2,247	0	0	1,511	738	1,025	6,889
(Note: Production Rate; 3.5 cy bucket using 85% fill factor = 2.975 CY per load load time 9 sec maneuver time: 8 sec rotate 90 deg; 5 sec placement time; 20 sec maneuver time; 6 sec rotate 90 deg; 5 sec Total cycle time = 53 sec = 0883 min 50 min/hr production / 0.883 min = 56.6 loads/hr x 2.975 cy/load = 168.4 cy/hr production rate.)										
Placement - Rip-rap and rock lining, random, broken stone, machine placed for slope protection	274.0	LCY	1,367	2,247	0	0	1,511	738	1,025	6,889
24" Riprap	823.0	CY	6,845	4,745	43,328	24,750	33,304	16,268	22,594	151,833
(Note: Used 135 lbs per CF = 1.8225 tons per CY)										
24" Riprap	1,500.0	TON	6,845	4,745	43,328	24,750	33,304	16,268	22,594	151,833
(Note: 24-inch riprap. Place rip-rap at 37.5 ton/hr with the crew shown.)										
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	30.0	HR	0	2,038	0	0	852	416	578	3,885
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	30.0	HR	0	211	0	0	88	43	60	401
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	60.0	HR	0	2,496	0	0	1,044	510	708	4,757
Equip. Operators, Crane/Shovel	30.0	HR	1,809	0	0	0	756	369	513	3,448
Equip. Operators, Medium	60.0	HR	3,414	0	0	0	1,427	697	968	6,506
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	1,500.0	TON	0	0	43,328	0	18,112	8,847	12,288	82,575
Hauling Cost	1,500.0	TON	0	0	0	24,750	10,346	5,054	7,019	47,169
Laborers, (Semi-Skilled)	60.0	HR	1,622	0	0	0	678	331	460	3,091
Riparian Plantings	1.0	LS	140,261	60,199	19,484	4,652	93,888	45,862	63,697	428,043

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	DirectSubBid	PrimeCMU	SIOH	Contingency	ProjectCost
Native Species Planting	2,750.0	EA	140,261	60,199	19,484	0	91,944	44,912	62,378	419,177
(Note: 1440 on the north bank, 1310 on the south. Assumed 50 percent productivity, due to difficulty traversing rip-rap and accessing space to dig/drill holes for plantings.)										
Brush Willow	2,750.0	EA	140,261	60,199	19,484	0	91,944	44,912	62,378	419,177
(Note: Assuming five crews will be planing simultaneously. Total project duration will be decreased by one-fifth, though total number of man-hours & work-hour costs will not change. Inspectors, safety and superintendents will apply to the project duration.)										
Shrubs/small trees, willow, pole/stakes, 3' - 4', 1" caliper	2,750.0	EA	140,261	60,199	19,484	0	91,944	44,912	62,378	419,177
(Note: Bush willow & red-osier dogwood. Pole stakes/cuttings)										
Invasive Species Control	0.4	ACR	0	0	0	4,652	1,945	950	1,319	8,866
(Note: Cost is approximately \$13,370 per acre, minus 15 percent = \$11,626 per acre. Total area = 17,170 SF = 0.40 acres (43,560 SF per acre).)										
Invasive species control, per acre	0.4	ACR	0	0	0	4,652	1,945	950	1,319	8,866
Design + Drawings	1.0	LS	0	0	37,600	5,000	2,090	0	0	44,690
(Note: Design is lump sum cost of approximately 6 percent of construction costs)										
Design	1.0	EA	0	0	37,600	0	0	0	0	37,600
Design	1.0	LS	0	0	37,600	0	0	0	0	37,600
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)										
As-built Drawings	1.0	EA	0	0	0	5,000	2,090	0	0	7,090
As-built Drawings	1.0	LS	0	0	0	5,000	2,090	0	0	7,090
As-Built Drawings	1.0	LS	0	0	0	5,000	2,090	0	0	7,090
Annual O&M Costs	1.0	LS	0	0	0	52,800	0	0	0	52,800
(Note: Full replacement of plants every 10 years and full replacement of riprap every 20 years. Annualized costs w/ no adjustment for inflation, no compounding or overhead applied.)										
Annual O&M Costs	1.0	EA	0	0	0	52,800	0	0	0	52,800
(Note: Assumes riprap/stone is fully replaced every 20 years and plantings are fully replaced every 10 years. These are simple annualized costs, only. No inflation or time-value-of-money calculations have been applied.)										

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	2,769.04
Storage & Tool Trailers	3.0000	WK	150.00
Toilet, portable, chemical, rent per month	3.0000	WK	150.00
Temporary Utilities	3.0000	WK	255.00
Office Supplies	3.0000	WK	375.00
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	3.0000	WK	450.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	3.0000	WK	450.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	3.0000	WK	1,500.00
QC Inspector	3.0000	MO	16,279.22
General Superintendent (P.M.)	3.0000	MO	30,026.35
Safety Monitor	3.0000	MO	23,763.01

Ark River Corridor - Alternatives 2016
Evaluating various alternatives for river habitat restoration. Options being evaluated and priced include: Cherry Creek Confluence Restoration, Prattville Creek Confluence, Left Bank Slack Water Side Channels, and Least Tern Island Habitat.

Estimated by
Designed by TBD
Prepared by Timothy Batson

Preparation Date 6/23/2016
Effective Date of Pricing 6/23/2016
Estimated Construction Time 90 Days

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Date	Author	Note
6/30/2016	T Batson	Using overhead rates of: HOOH = 12 percent, profit = 9 percent (sub work, only), sales tax = 9 percent (material only), productivity = 80 percent, and that all work will be performed in 10-hour shifts, 5 days per week. Assuming QC, Safety and Superintendent positions will be required as separate, non-overlapping duties.
6/30/2016	T Batson	Contingency = 20 percent and SIOH (supervision, inspection & overhead) = 12 percent were added. Design costs = 6 percent of construction costs w/ contingency & SIOH added has also been added.
6/30/2016	T Batson	Project duration is for construction, only.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
Study Alternative			
6 Prattville Creek Rock Riffle + LPSTP	1.0	JOB	685,562
Design + Drawings	1.0	LS	48,115
Design	1.0	EA	41,200
As-built Drawings	1.0	EA	6,915
Annual O&M Costs	1.0	LS	35,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary II			
Study Alternative			
6 Prattville Creek Rock Riffle + LPSTP	1.0	JOB	685,562
6" Bedding	44.0	CY	10,609
24" Riprap	383.0	CY	62,761
12" Riprap	1,160.0	CY	175,274
Backfill	4,640.0	CY	436,919
Design + Drawings	1.0	LS	48,115
Design	1.0	EA	41,200
As-built Drawings	1.0	EA	6,915
Annual O&M Costs	1.0	LS	35,000

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	ProjectCost
Project Direct Summary									
Study Alternative									
6 Prattville Creek Rock Riffle + LPSTP	1.0	JOB	49,936	38,848	138,475	141,285	42,511	99,036	685,562
(Note: Rock riffle (RR) and longitudinal peaked stone toe protection (LPSTP))									
6" Bedding	44.0	CY	581	815	2,562	2,186	0	1,750	10,609
6-Inches Spall Stone	100.0	TON	581	815	2,562	2,186	0	1,750	10,609
(Note: Added 25 percent to account for expansion)									
6-Inch Bedding Stonel Material Price	100.0	TON	0	0	2,562	1,652	0	1,750	8,015
6" Bedding Stone Material Price	100.0	TON	0	0	2,562	981	0	0	4,761
Pick-up/Hauling/Delivery	100.0	TON	0	0	0	670	0	1,750	3,253
Hauling Cost	100.0	TON	0	0	0	670	0	1,750	3,253
6-Inch Bedding Stone Placement	44.0	CY	581	815	0	535	0	0	2,594
(Note: Production Rate; 3.5 cy bucket using 85% fill factor = 2.975 CY per load load time 9 sec manuever time: 8 sec rotate 90 deg; 5 sec placement time; 20 sec manuever time; 6 sec rotate 90 deg; 5 sec Total cycle time = 53 sec = 0883 min 50 min/hr production / 0.883 min = 56.6 loads/hr x 2.975 cy/load = 168.4 cy/hr production rate.)									
Placement - Rip-rap and rock lining, random, broken stone, machine placed for slope protection	44.0	LCY	581	815	0	535	0	0	2,594
24" Riprap	383.0	CY	3,734	2,198	17,331	12,934	0	10,500	62,761
(Note: Used 135 lbs per CF = 1.56 tons per CY)									
24" Riprap	600.0	TON	3,734	2,198	17,331	12,934	0	10,500	62,761
(Note: 24-inch riprap. Place rip-rap at 37.5 ton/hr with the crew shown.)									
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	16.0	HR	0	1,087	0	416	0	0	2,021
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	16.0	HR	0	112	0	43	0	0	209
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	24.0	HR	0	998	0	383	0	0	1,856
Equip. Operators, Crane/Shovel	16.0	HR	1,122	0	0	430	0	0	2,085
Equip. Operators, Medium	24.0	HR	1,582	0	0	606	0	0	2,941
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	600.0	TON	0	0	17,331	6,639	0	0	32,216
Hauling Cost	600.0	TON	0	0	0	4,022	0	10,500	19,518
Laborers, (Semi-Skilled)	32.0	HR	1,030	0	0	395	0	0	1,914
12" Riprap	1,160.0	CY	14,323	9,929	30,580	36,121	0	39,458	175,274
Place Rip Rap	1,810.0	TON	14,323	9,929	30,580	36,121	0	39,458	175,274

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	ProjectCost
(Note: 12" rip rap. Used 1.56 ton / CY)									
Move Rip Rap from stockpile	1,160.0	CY	4,709	4,218	0	3,420	0	0	16,595
(Note: Rip rap material stockpiled. Increased handling time & reduced productivity to 75 percent for rip rap handling, due to size & awkwardness of handling larger material Use 2 CY FE loader to move FE loader Load time: 1 min travel time: 2 mins dump time: 1 min return time: 2 mins)									
LOADER, FRONT END, WHEEL, 2.20 CY BUCKET, ARTICULATED, 4X4	48.0	HR	0	2,109	0	808	0	0	3,921
(Note: Assuming 6 minutes per load/place = 10 loads per hour)									
Load Gravel Crew 1 FE loader + operator + laborer	48.0	HR	4,709	2,109	0	2,612	0	0	12,674
(Note: Second loader & operator)									
12" Riprap	1,810.0	TON	9,614	5,711	30,580	32,701	0	39,458	158,679
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	36.0	HR	0	2,446	0	937	0	0	4,547
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	36.0	HR	0	253	0	97	0	0	470
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	72.4	HR	0	3,012	0	1,154	0	0	5,599
Equip. Operators, Crane/Shovel	36.0	HR	2,524	0	0	967	0	0	4,692
Equip. Operators, Medium	72.4	HR	4,773	0	0	1,828	0	0	8,872
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	1,810.0	TON	0	0	30,580	11,715	0	0	56,844
(Note: Price provided by Brandon Abla, Dolese, 20 NW 13th Street, Oklahoma City (405-235-2311). Price assumes acceptance & at the quarry. Quarry is Richards Spur Quarry, Elgin, OK.)									
Hauling Cost	1,810.0	TON	0	0	0	15,116	0	39,458	73,347
Laborers, (Semi-Skilled)	72.0	HR	2,317	0	0	888	0	0	4,307
Backfill	4,640.0	CY	31,298	25,906	88,002	90,043	42,511	47,328	436,919
(Note: Assuming backfill will be brought in from within 2 miles of the construction site)									
Place & Compact Soil for Slide Repair	4,640.0	CY	31,298	25,906	88,002	90,043	42,511	47,328	436,919
Place Soil	4,640.0	CY	22,165	24,340	88,002	62,905	29,699	0	305,238
Soils for earthwork, common borrow, spread with 200 H.P. dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	5,568.0	CY	22,165	24,340	88,002	62,905	29,699	0	305,238
(Note: Distance is assumed to be within 1 mile of the site. Increased volume 20 percent to account for compaction.)									
Compaction	4,640.0	LS	9,133	1,566	0	27,137	12,812	47,328	131,680
Compaction, 3 passes, 24" wide, 12" lifts, walk behind, vibrating roller	5,568.0	ECY	9,133	1,566	0	27,137	12,812	47,328	131,680
(Note: Added 20 percent volume to allow for compaction.)									

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectLabor</u>	<u>DirectEQ</u>	<u>DirectMatl</u>	<u>PrimeCMU</u>	<u>SubCMU</u>	<u>DirectSubBid</u>	<u>ProjectCost</u>
Design + Drawings	1.0	LS	0	0	41,200	1,915	0	5,000	48,115
(Note: Design is lump sum cost of approximately 6 percent of construction costs)									
Design	1.0	EA	0	0	41,200	0	0	0	41,200
Design	1.0	LS	0	0	41,200	0	0	0	41,200
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)									
As-built Drawings	1.0	EA	0	0	0	1,915	0	5,000	6,915
As-Built Drawings	1.0	LS	0	0	0	1,915	0	5,000	6,915
Annual O&M Costs	1.0	LS	0	0	0	0	0	35,000	35,000
(Note: Full replacement of plants every 10 years and full replacement of riprap every 20 years. Annualized costs w/ no adjustment for inflation, no compounding or overhead applied.)									
Annual O&M Costs	1.0	EA	0	0	0	0	0	35,000	35,000
(Note: Assumes riprap/stone is fully replaced every 20 years and plantings are fully replaced every 10 years. These are simple annualized costs, only. No inflation or time-value-of-money calculations have been applied.)									

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	1,159.71
Storage & Tool Trailers	3.0000	WK	150.00
Toilet, portable, chemical, rent per month	3.0000	WK	150.00
Temporary Utilities	3.0000	WK	255.00
Office Supplies	3.0000	WK	375.00
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	3.0000	WK	450.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	3.0000	WK	450.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	3.0000	WK	1,500.00
QC Inspector	3.0000	MO	16,279.22
General Superintendent (P.M.)	3.0000	MO	30,026.35
Safety Monitor	3.0000	MO	23,763.01

Ark River Corridor - Alternatives 2016
Evaluating various alternatives for river habitat restoration. Options being evaluated and priced include: Cherry Creek Confluence Restoration, Prattville Creek Confluence, Left Bank Slack Water Side Channels, and Least Tern Island Habitat.

Estimated by
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Prepared by Timothy Batson

Preparation Date 6/23/2016
Effective Date of Pricing 6/23/2016
Estimated Construction Time 160 Days

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Date	Author	Note
6/30/2016	T Batson	Using overhead rates of: HOOH = 12 percent, profit = 9 percent (sub work, only), sales tax = 9 percent (material only), productivity = 80 percent, and that all work will be performed in 10-hour shifts, 5 days per week. Assuming QC, Safety and Superintendent positions will be required as separate, non-overlapping duties.
6/30/2016	T Batson	Contingency = 20 percent and SIOH (supervision, inspection & overhead) = 12 percent were added. Design costs = 6 percent of construction costs w/ contingency & SIOH added has also been added.
6/30/2016	T Batson	Project duration is for construction, only.
6/30/2016	T Batson	Number of plantings was increased from previous estimate. When looking at design vs the IPT discussion, there was discrepancy in the method used to calculate the number of plantings required in the design, which differed from the IPT discussion on the area plantings. The design included spacing of approximately 22 feet on-center, which resulted in a much reduced number of plantings estimated. With the increase in the number of plantings and the addition of invasive species control, total duration was increased by 7 weeks.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
Study Alternative			
7 Prattville Creek Rock Riffle + LPSTP + Riparian Plantings	1.0	JOB	1,600,868
Design + Drawings	1.0	LS	102,661
Annual O&M Costs	1.0	LS	107,200

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary II			
Study Alternative			
7 Prattville Creek Rock Riffle + LPSTP + Riparian Plantings	1.0	JOB	1,600,868
Backfill	4,640.0	CY	420,853
Stone Structure	1.0	EA	223,266
Plantings	1,552.0	EA	956,749
Design + Drawings	1.0	LS	102,661
Design	1.0	EA	96,000
As-built Drawings	1.0	EA	6,661
Annual O&M Costs	1.0	LS	107,200

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Project Direct Summary											
Study Alternative											
7 Prattville Creek Rock Riffle + LPSTP + Riparian Plantings	1.0	JOB	286,105	124,950	223,495	297,042	134,443	125,087	171,522	238,224	1,600,868
(Note: Rock riffle (RR) and longitudinal peaked stone toe protection (LPSTP), plus riparian plantings)											
Backfill	4,640.0	CY	31,298	25,906	88,002	78,090	42,511	47,328	45,091	62,627	420,853
(Note: Assuming backfill will be brought in from within 2 miles of the construction site)											
Place & Compact Soil for Slide Repair	4,640.0	CY	31,298	25,906	88,002	78,090	42,511	47,328	45,091	62,627	420,853
Place Soil	4,640.0	CY	22,165	24,340	88,002	54,555	29,699	0	31,502	43,752	294,015
Soils for earthwork, common borrow, spread with 200 H.P. dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	5,568.0	CY	22,165	24,340	88,002	54,555	29,699	0	31,502	43,752	294,015
(Note: Distance is assumed to be within 1 mile of the site. Increased volume 20 percent to account for compaction.)											
Compaction	4,640.0	LS	9,133	1,566	0	23,535	12,812	47,328	13,590	18,875	126,838
Compaction, 3 passes, 24" wide, 12" lifts, walk behind, vibrating roller	5,568.0	ECY	9,133	1,566	0	23,535	12,812	47,328	13,590	18,875	126,838
(Note: Added 20 percent volume to allow for compaction.)											
Stone Structure	1.0	EA	12,399	10,114	50,472	41,427	0	51,708	23,921	33,224	223,266
6" Bedding	44.0	CY	397	652	2,562	1,781	0	1,750	1,028	1,428	9,597
6-Inches Spall Stone	100.0	TON	397	652	2,562	1,781	0	1,750	1,028	1,428	9,597
(Note: Added 25 percent to account for expansion)											
6-Inch Bedding Stonel Material Price	100.0	TON	0	0	2,562	1,432	0	1,750	827	1,149	7,720
6" Bedding Stone Material Price	100.0	TON	0	0	2,562	851	0	0	491	683	4,586
Pick-up/Hauling/Delivery	100.0	TON	0	0	0	581	0	1,750	336	466	3,133
Hauling Cost	100.0	TON	0	0	0	581	0	1,750	336	466	3,133
6-Inch Bedding Stone Placement	44.0	CY	397	652	0	348	0	0	201	279	1,878
(Note: Production Rate; 3.5 cy bucket using 85% fill factor = 2.975 CY per load load time 9 sec maneuver time: 8 sec rotate 90 deg; 5 sec placement time; 20 sec maneuver time; 6 sec rotate 90 deg; 5 sec Total cycle time = 53 sec = 0883 min 50 min/hr production / 0.883 min = 56.6 loads/hr x 2.975 cy/load = 168.4 cy/hr production rate.)											
Placement - Rip-rap and rock lining, random, broken stone, machine placed for slope protection	44.0	LCY	397	652	0	348	0	0	201	279	1,878
24" Riprap	383.0	CY	2,190	1,518	17,331	10,479	0	10,500	6,051	8,404	56,473

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
(Note: Used 135 lbs per CF = 1.56 tons per CY)											
24" Riprap	600.0	TON	2,190	1,518	17,331	10,479	0	10,500	6,051	8,404	56,473
(Note: 24-inch riprap. Place rip-rap at 37.5 ton/hr with the crew shown.)											
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	12.0	HR	0	652	0	217	0	0	125	174	1,168
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	12.0	HR	0	67	0	22	0	0	13	18	121
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	24.0	HR	0	799	0	265	0	0	153	213	1,430
Equip. Operators, Crane/Shovel	12.0	HR	579	0	0	192	0	0	111	154	1,037
Equip. Operators, Medium	24.0	HR	1,092	0	0	363	0	0	210	291	1,956
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	600.0	TON	0	0	17,331	5,758	0	0	3,325	4,618	31,031
Hauling Cost	600.0	TON	0	0	0	3,488	0	10,500	2,014	2,798	18,800
Laborers, (Semi-Skilled)	24.0	HR	519	0	0	172	0	0	100	138	929
12" Riprap	1,160.0	CY	9,812	7,944	30,580	29,168	0	39,458	16,842	23,392	157,196
Place Rip Rap	1,810.0	TON	9,812	7,944	30,580	29,168	0	39,458	16,842	23,392	157,196
(Note: 12" rip rap. Used 1.56 ton / CY)											
Move Rip Rap from stockpile	1,160.0	CY	3,223	3,375	0	2,192	0	0	1,266	1,758	11,813
(Note: Rip rap material stockpiled. Increased handling time & reduced productivity to 75 percent for rip rap handling, due to size & awkwardness of handling larger material Use 2 CY FE loader to move FE loader Load time: 1 min travel time: 2 mins dump time: 1 min return time: 2 mins)											
LOADER, FRONT END, WHEEL, 2.20 CY BUCKET, ARTICULATED, 4X4	48.0	HR	0	1,687	0	561	0	0	324	450	3,021
(Note: Assuming 6 minutes per load/place = 10 loads per hour)											
Load Gravel Crew 1 FE loader + operator + laborer	48.0	HR	3,223	1,687	0	1,631	0	0	942	1,308	8,792
(Note: Second loader & operator)											
12" Riprap	1,810.0	TON	6,589	4,569	30,580	26,976	0	39,458	15,577	21,634	145,383
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	36.0	HR	0	1,957	0	650	0	0	375	521	3,504
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	36.0	HR	0	202	0	67	0	0	39	54	362
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	72.4	HR	0	2,410	0	801	0	0	462	642	4,315

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Equip. Operators, Crane/Shovel	36.0	HR	1,737	0	0	577	0	0	333	463	3,110
Equip. Operators, Medium	72.4	HR	3,295	0	0	1,095	0	0	632	878	5,900
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	1,810.0	TON	0	0	30,580	10,160	0	0	5,867	8,148	54,754
(Note: Price provided by Brandon Abla, Dolese, 20 NW 13th Street, Oklahoma City (405-235-2311). Price assumes acceptance & at the quarry. Quarry is Richards Spur Quarry, Elgin, OK.)											
Hauling Cost	1,810.0	TON	0	0	0	13,109	0	39,458	7,570	10,513	70,650
Laborers, (Semi-Skilled)	72.0	HR	1,557	0	0	517	0	0	299	415	2,788
Plantings	1,552.0	EA	242,408	88,931	85,020	177,525	91,932	26,051	102,509	142,373	956,749
Riparian Plantings	15,600.0	EA	242,408	88,931	85,020	168,870	91,932	0	97,511	135,432	910,104
(Note: Per input from the IPT, total area to be planted = 2.24 acres in two sections (0.88 ac + 1.36 ac) = 97,574 SF. Using a ratio of 4 plantins per 25 SF, get 15,600 plantings (live-stake).)											
Red-Osier Dogwood & Brush Willow	15,600.0	EA	242,408	88,931	85,020	168,870	91,932	0	97,511	135,432	910,104
(Note: Live-staked. Shrub willows, sandbar willows, and red-osier dogwoods)											
Shrubs/small trees, willow, pole/live-stakes, 3' - 4', 1" caliper	15,600.0	EA	242,408	88,931	85,020	168,870	91,932	0	97,511	135,432	910,104
(Note: Bush willow & red-osier dogwood. Pole/live-stakes/cuttings)											
Invasive Species Control	2.2	ACR	0	0	0	8,655	0	26,051	4,998	6,941	46,645
(Note: Cost is approximately \$13,370 per acre, minus 15 percent = \$11,626 per acre. Total area = 17,170 SF = 0.40 acres (43,560 SF per acre).)											
Invasive species control, per acre	2.2	ACR	0	0	0	8,655	0	26,051	4,998	6,941	46,645
Design + Drawings	1.0	LS	0	0	96,000	1,661	0	5,000	0	0	102,661
(Note: Design is lump sum cost of approximately 6 percent of construction costs)											
Design	1.0	EA	0	0	96,000	0	0	0	0	0	96,000
Design	1.0	LS	0	0	96,000	0	0	0	0	0	96,000
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)											
As-built Drawings	1.0	EA	0	0	0	1,661	0	5,000	0	0	6,661
As-Built Drawings	1.0	LS	0	0	0	1,661	0	5,000	0	0	6,661
Annual O&M Costs	1.0	LS	0	0	0	0	0	107,200	0	0	107,200
(Note: Full replacement of plants every 10 years and full replacement of riprap every 20 years. Annualized costs w/ no adjustment for inflation, no compounding or overhead applied. Including 25 percent for backfill vs full replacement.)											
Annual O&M Costs	1.0	EA	0	0	0	0	0	107,200	0	0	107,200
(Note: Assumes riprap/stone is fully replaced every 20 years and plantings are fully replaced every 10 years. These are simple annualized costs, only. No inflation or time-value-of-money calculations have been applied.)											

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	1,861.51
Storage & Tool Trailers	23.0000	WK	1,150.00
Toilet, portable, chemical, rent per month	23.0000	WK	1,150.00
Temporary Utilities	23.0000	WK	1,955.00
Office Supplies	23.0000	WK	2,875.00
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	23.0000	WK	3,450.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	23.0000	WK	3,450.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	23.0000	WK	11,500.00
QC Inspector	23.0000	WK	28,801.69
General Superintendent (P.M.)	23.0000	WK	53,123.54
Safety Monitor	23.0000	WK	42,042.25

Ark River Corridor - Alternatives 2016
Evaluating various alternatives for river habitat restoration. Options being evaluated and priced include: Cherry Creek Confluence Restoration, Prattville Creek Confluence, Left Bank Slack Water Side Channels, and Least Tern Island Habitat.

Estimated by
Designed by TBD
Prepared by Timothy Batson

Preparation Date 6/23/2016
Effective Date of Pricing 6/23/2016
Estimated Construction Time 120 Days

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Date	Author	Note
6/30/2016	T Batson	Using overhead rates of: HOOH = 12 percent, profit = 9 percent (sub work, only), sales tax = 9 percent (material only), productivity = 80 percent, and that all work will be performed in 10-hour shifts, 5 days per week. Assuming QC, Safety and Superintendent positions will be required as separate, non-overlapping duties.
6/30/2016	T Batson	Contingency = 20 percent and SIOH (supervision, inspection & overhead) = 12 percent were added. Design costs = 6 percent of construction costs w/ contingency & SIOH added has also been added.
6/30/2016	T Batson	Project duration is for construction, only.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
Study Alternative			
8 Prattville Creek Rock Riffle + LPSTP + Wetland Plantings	1.0	JOB	990,362
Design + Drawings	1.0	LS	66,572
Annual O&M Costs	1.0	LS	43,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary II			
Study Alternative			
8 Prattville Creek Rock Riffle + LPSTP + Wetland Plantings	1.0	JOB	990,362
Backfill	4,640.0	CY	478,390
Stone Structure	1.0	EA	249,732
Plantings	6,960.0	EA	262,240
Design + Drawings	1.0	LS	66,572
Design	1.0	EA	59,000
As-built Drawings	1.0	EA	7,572
Annual O&M Costs	1.0	LS	43,000

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Project Direct Summary											
Study Alternative											
8 Prattville Creek Rock Riffle + LPSTP + Wetland Plantings	1.0	JOB	99,842	35,618	183,993	250,286	65,310	101,827	106,110	147,375	990,362
(Note: Rock riffle (RR) and longitudinal peaked stone toe protection (LPSTP), plus wetland plantings)											
Backfill	4,640.0	CY	31,298	25,906	88,002	120,899	42,511	47,328	51,256	71,189	478,390
(Note: Assuming backfill will be brought in from within 2 miles of the construction site)											
Place & Compact Soil for Slide Repair	4,640.0	CY	31,298	25,906	88,002	120,899	42,511	47,328	51,256	71,189	478,390
Place Soil	4,640.0	CY	22,165	24,340	88,002	84,462	29,699	0	35,808	49,734	334,211
Soils for earthwork, common borrow, spread with 200 H.P. dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	5,568.0	CY	22,165	24,340	88,002	84,462	29,699	0	35,808	49,734	334,211
(Note: Distance is assumed to be within 1 mile of the site. Increased volume 20 percent to account for compaction.)											
Compaction	4,640.0	LS	9,133	1,566	0	36,437	12,812	47,328	15,448	21,455	144,179
Compaction, 3 passes, 24" wide, 12" lifts, walk behind, vibrating roller	5,568.0	ECY	9,133	1,566	0	36,437	12,812	47,328	15,448	21,455	144,179
(Note: Added 20 percent volume to allow for compaction.)											
Stone Structure	1.0	EA	11,466	9,053	50,472	63,113	0	51,708	26,757	37,163	249,732
6" Bedding	44.0	CY	256	421	2,562	2,566	0	1,750	1,088	1,511	10,154
6-Inches Spall Stone	100.0	TON	256	421	2,562	2,566	0	1,750	1,088	1,511	10,154
(Note: Added 25 percent to account for expansion)											
6-Inch Bedding Stonel Material Price	100.0	TON	0	0	2,562	2,218	0	1,750	940	1,306	8,775
6" Bedding Stone Material Price	100.0	TON	0	0	2,562	1,318	0	0	559	776	5,213
Pick-up/Hauling/Delivery	100.0	TON	0	0	0	900	0	1,750	382	530	3,562
Hauling Cost	100.0	TON	0	0	0	900	0	1,750	382	530	3,562
6-Inch Bedding Stone Placement	44.0	CY	256	421	0	348	0	0	148	205	1,378
(Note: Production Rate; 3.5 cy bucket using 85% fill factor = 2.975 CY per load load time 9 sec maneuver time: 8 sec rotate 90 deg; 5 sec placement time; 20 sec maneuver time; 6 sec rotate 90 deg; 5 sec Total cycle time = 53 sec = 0883 min 50 min/hr production / 0.883 min = 56.6 loads/hr x 2.975 cy/load = 168.4 cy/hr production rate.)											
Placement - Rip-rap and rock lining, random, broken stone, machine placed for slope protection	44.0	LCY	256	421	0	348	0	0	148	205	1,378
24" Riprap	383.0	CY	2,190	1,518	17,331	16,223	0	10,500	6,878	9,553	64,193

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
(Note: Used 135 lbs per CF = 1.56 tons per CY)											
24" Riprap	600.0	TON	2,190	1,518	17,331	16,223	0	10,500	6,878	9,553	64,193
(Note: 24-inch riprap. Place rip-rap at 37.5 ton/hr with the crew shown.)											
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	12.0	HR	0	652	0	336	0	0	142	198	1,328
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	12.0	HR	0	67	0	35	0	0	15	20	137
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	24.0	HR	0	799	0	411	0	0	174	242	1,626
Equip. Operators, Crane/Shovel	12.0	HR	579	0	0	298	0	0	126	175	1,178
Equip. Operators, Medium	24.0	HR	1,092	0	0	562	0	0	238	331	2,223
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	600.0	TON	0	0	17,331	8,914	0	0	3,779	5,249	35,274
Hauling Cost	600.0	TON	0	0	0	5,401	0	10,500	2,290	3,180	21,371
Laborers, (Semi-Skilled)	24.0	HR	519	0	0	267	0	0	113	157	1,056
12" Riprap	1,160.0	CY	9,020	7,114	30,580	44,324	0	39,458	18,791	26,099	175,386
Place Rip Rap	1,810.0	TON	9,020	7,114	30,580	44,324	0	39,458	18,791	26,099	175,386
(Note: 12" rip rap. Used 1.56 ton / CY)											
Move Rip Rap from stockpile	1,160.0	CY	2,431	2,545	0	2,559	0	0	1,085	1,507	10,127
(Note: Rip rap material stockpiled. Increased handling time & reduced productivity to 75 percent for rip rap handling, due to size & awkwardness of handling larger material Use 2 CY FE loader to move FE loader Load time: 1 min travel time: 2 mins dump time: 1 min return time: 2 mins)											
LOADER, FRONT END, WHEEL, 2.20 CY BUCKET, ARTICULATED, 4X4	36.2	HR	0	1,273	0	655	0	0	278	385	2,590
(Note: Assuming 6 minutes per load/place = 10 loads per hour)											
Load Gravel Crew 1 FE loader + operator + laborer	36.2	HR	2,431	1,273	0	1,905	0	0	808	1,122	7,537
(Note: Second loader & operator)											
12" Riprap	1,810.0	TON	6,589	4,569	30,580	41,764	0	39,458	17,706	24,592	165,259
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	36.0	HR	0	1,957	0	1,007	0	0	427	593	3,983
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	36.0	HR	0	202	0	104	0	0	44	61	411
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	72.4	HR	0	2,410	0	1,239	0	0	525	730	4,905

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Equip. Operators, Crane/Shovel	36.0	HR	1,737	0	0	893	0	0	379	526	3,535
Equip. Operators, Medium	72.4	HR	3,295	0	0	1,695	0	0	719	998	6,707
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	1,810.0	TON	0	0	30,580	15,729	0	0	6,669	9,262	62,240
(Note: Price provided by Brandon Abla, Dolese, 20 NW 13th Street, Oklahoma City (405-235-2311). Price assumes acceptance & at the quarry. Quarry is Richards Spur Quarry, Elgin, OK.)											
Hauling Cost	1,810.0	TON	0	0	0	20,296	0	39,458	8,605	11,951	80,309
Laborers, (Semi-Skilled)	72.0	HR	1,557	0	0	801	0	0	340	472	3,169
Plantings	6,960.0	EA	57,077	659	45,518	66,274	22,799	2,791	28,097	39,024	262,240
Wetland Plantings	6,960.0	EA	57,077	659	45,518	64,838	22,799	0	27,488	38,178	256,559
(Note: Rushes, reeds, and bulrushes randomly planted and spaced approximately 1.5 feet on center)											
Rushes, Reeds and Bulrushes	6,960.0	EA	57,077	659	45,518	64,838	22,799	0	27,488	38,178	256,559
Ornamental grasses, juncus effusus spiralis, (Corkscrew Rush), container, zone 4, 1 quart	6,960.0	EA	57,077	659	45,518	64,838	22,799	0	27,488	38,178	256,559
(Note: Rushes, reeds and bulrushes. Used 3,480 LF as length of area to be planted by approximately 3 feet wide. Assuming planting on the outer edge and spacing at 1.5 feet, would have 3 rows of approximately 2,320 each, for a total of 6,960 plantings.)											
Invasive Species Control	0.2	ACR	0	0	0	1,436	0	2,791	609	845	5,681
(Note: Cost is approximately \$13,370 per acre, minus 15 percent = \$11,626 per acre. Total area = 10,440 SF = 0.24 acres (43,560 SF per acre).)											
Invasive species control, per acre	0.2	ACR	0	0	0	1,436	0	2,791	609	845	5,681
Design + Drawings	1.0	LS	0	0	59,000	2,572	0	5,000	0	0	66,572
(Note: Design is lump sum cost of approximately 6 percent of construction costs)											
Design	1.0	EA	0	0	59,000	0	0	0	0	0	59,000
Design	1.0	LS	0	0	59,000	0	0	0	0	0	59,000
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)											
As-built Drawings	1.0	EA	0	0	0	2,572	0	5,000	0	0	7,572
As-built Drawings	1.0	LS	0	0	0	2,572	0	5,000	0	0	7,572
As-Built Drawings	1.0	LS	0	0	0	2,572	0	5,000	0	0	7,572
Annual O&M Costs	1.0	LS	0	0	0	0	0	43,000	0	0	43,000
(Note: Full replacement of plants every 10 years and full replacement of riprap every 20 years. Annualized costs w/ no adjustment for inflation, no compounding or overhead applied.)											
Annual O&M Costs	1.0	EA	0	0	0	0	0	43,000	0	0	43,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectLabor</u>	<u>DirectEQ</u>	<u>DirectMatl</u>	<u>PrimeCMU</u>	<u>SubCMU</u>	<u>DirectSubBid</u>	<u>SIOH</u>	<u>Contingency</u>	<u>ProjectCost</u>
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(Note: Assumes riprap/stone is fully replaced every 20 years and plantings are fully replaced every 10 years. These are simple annualized costs, only. No inflation or time-value-of-money calculations have been applied.)

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	1,924.71
Small Tools	1.0000	EA	0.00
Storage & Tool Trailers	24.0000	WK	1,200.00
Toilet, portable, chemical, rent per month	24.0000	WK	1,200.00
Temporary Utilities	24.0000	WK	2,040.00
Office Supplies	24.0000	WK	3,000.00
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	24.0000	WK	3,600.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	24.0000	WK	3,600.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	24.0000	WK	12,000.00
QC Inspector	24.0000	WK	30,053.94
General Superintendent (P.M.)	24.0000	WK	55,433.26
Safety Monitor	24.0000	WK	43,870.17

Ark River Corridor - Alternatives 2016
Evaluating various alternatives for river habitat restoration. Options being evaluated and priced include: Cherry Creek Confluence Restoration, Prattville Creek Confluence, Left Bank Slack Water Side Channels, and Least Tern Island Habitat.

Estimated by
Designed by TBD
Prepared by Timothy Batson

Preparation Date 6/23/2016
Effective Date of Pricing 6/23/2016
Estimated Construction Time 210 Days

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Date	Author	Note
6/30/2016	T Batson	Using overhead rates of: HOOH = 12 percent, profit = 9 percent (sub work, only), sales tax = 9 percent (material only), productivity = 80 percent, and that all work will be performed in 10-hour shifts, 5 days per week. Assuming QC, Safety and Superintendent positions will be required as separate, non-overlapping duties.
6/30/2016	T Batson	Contingency = 20 percent and SIOH (supervision, inspection & overhead) = 12 percent were added. Design costs = 6 percent of construction costs w/ contingency & SIOH added has also been added.
6/30/2016	T Batson	Project duration is for construction, only.
6/30/2016	T Batson	Number of riparian plantings was increased from previous estimate. When looking at design vs the IPT discussion, there was discrepancy in the method used to calculate the number of plantings required in the design, which differed from the IPT discussion on the area plantings. The design included spacing of approximately 22 feet on-center, which resulted in a much reduced number of plantings estimated. With the increase in the number of plantings and the addition of invasive species control, total duration was increased by 7 weeks.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
Study Alternative			
9 Prattville Creek Rock Riffle + LPSTP + Wetland & Riparian Plantings	1.0	JOB	1,759,495
Design + Drawings	1.0	LS	112,412
Annual O&M Costs	1.0	LS	130,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary II			
Study Alternative			
9 Prattville Creek Rock Riffle + LPSTP + Wetland & Riparian Plantings	1.0	JOB	1,759,495
Backfill	4,640.0	CY	405,082
Stone Structure	1.0	EA	211,464
Plantings	6,960.0	EA	1,142,949
Design + Drawings	1.0	LS	112,412
Design	1.0	EA	106,000
As-built Drawings	1.0	EA	6,412
Annual O&M Costs	1.0	LS	130,000

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Project Direct Summary											
Study Alternative											
9 Prattville Creek Rock Riffle + LPSTP + Wetland & Riparian Plantings	1.0	JOB	342,249	124,549	269,013	288,216	157,242	127,878	188,517	261,830	1,759,495
(Note: Rock riffle (RR) and longitudinal peaked stone toe protection (LPSTP), plus wetland and riparian plantings)											
Backfill	4,640.0	CY	31,298	25,906	88,002	66,355	42,511	47,328	43,402	60,280	405,082
(Note: Assuming backfill will be brought in from within 2 miles of the construction site)											
Place & Compact Soil	4,640.0	CY	31,298	25,906	88,002	66,355	42,511	47,328	43,402	60,280	405,082
Place Soil	4,640.0	CY	22,165	24,340	88,002	46,357	29,699	0	30,321	42,113	282,997
Soils for earthwork, common borrow, spread with 200 H.P. dozer, includes load at pit and haul, 2 miles round trip, excludes compaction	5,568.0	CY	22,165	24,340	88,002	46,357	29,699	0	30,321	42,113	282,997
(Note: Distance is assumed to be within 1 mile of the site. Increased volume 20 percent to account for compaction.)											
Compaction	4,640.0	LS	9,133	1,566	0	19,998	12,812	47,328	13,081	18,167	122,085
Compaction, 3 passes, 24" wide, 12" lifts, walk behind, vibrating roller	5,568.0	ECY	9,133	1,566	0	19,998	12,812	47,328	13,081	18,167	122,085
(Note: Added 20 percent volume to allow for compaction.)											
Stone Structure	1.0	EA	11,466	9,053	50,472	34,639	0	51,708	22,657	31,468	211,464
6" Bedding	44.0	CY	256	421	2,562	1,408	0	1,750	921	1,279	8,598
6-Inches Spall Stone	100.0	TON	256	421	2,562	1,408	0	1,750	921	1,279	8,598
(Note: Added 25 percent to account for expansion)											
6-Inch Bedding Stonel Material Price	100.0	TON	0	0	2,562	1,217	0	1,750	796	1,106	7,431
6" Bedding Stone Material Price	100.0	TON	0	0	2,562	723	0	0	473	657	4,415
Pick-up/Hauling/Delivery	100.0	TON	0	0	0	494	0	1,750	323	449	3,016
Hauling Cost	100.0	TON	0	0	0	494	0	1,750	323	449	3,016
6-Inch Bedding Stone Placement	44.0	CY	256	421	0	191	0	0	125	174	1,167
(Note: Production Rate; 3.5 cy bucket using 85% fill factor = 2.975 CY per load load time 9 sec maneuver time: 8 sec rotate 90 deg; 5 sec placement time; 20 sec maneuver time; 6 sec rotate 90 deg; 5 sec Total cycle time = 53 sec = 0883 min 50 min/hr production / 0.883 min = 56.6 loads/hr x 2.975 cy/load = 168.4 cy/hr production rate.)											
Placement - Rip-rap and rock lining, random, broken stone, machine placed for slope protection	44.0	LCY	256	421	0	191	0	0	125	174	1,167
24" Riprap	383.0	CY	2,190	1,518	17,331	8,904	0	10,500	5,824	8,089	54,356

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
(Note: Used 135 lbs per CF = 1.56 tons per CY)											
24" Riprap	600.0	TON	2,190	1,518	17,331	8,904	0	10,500	5,824	8,089	54,356
(Note: 24-inch riprap. Place rip-rap at 37.5 ton/hr with the crew shown.)											
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	12.0	HR	0	652	0	184	0	0	120	167	1,124
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	12.0	HR	0	67	0	19	0	0	12	17	116
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	24.0	HR	0	799	0	226	0	0	148	205	1,377
Equip. Operators, Crane/Shovel	12.0	HR	579	0	0	163	0	0	107	148	998
Equip. Operators, Medium	24.0	HR	1,092	0	0	308	0	0	202	280	1,883
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	600.0	TON	0	0	17,331	4,893	0	0	3,200	4,445	29,869
Hauling Cost	600.0	TON	0	0	0	2,964	0	10,500	1,939	2,693	18,096
Laborers, (Semi-Skilled)	24.0	HR	519	0	0	147	0	0	96	133	895
12" Riprap	1,160.0	CY	9,020	7,114	30,580	24,327	0	39,458	15,912	22,100	148,510
Place Rip Rap	1,810.0	TON	9,020	7,114	30,580	24,327	0	39,458	15,912	22,100	148,510
(Note: 12" rip rap. Used 1.56 ton / CY)											
Move Rip Rap from stockpile	1,160.0	CY	2,431	2,545	0	1,405	0	0	919	1,276	8,575
(Note: Rip rap material stockpiled. Increased handling time & reduced productivity to 75 percent for rip rap handling, due to size & awkwardness of handling larger material Use 2 CY FE loader to move FE loader Load time: 1 min travel time: 2 mins dump time: 1 min return time: 2 mins)											
LOADER, FRONT END, WHEEL, 2.20 CY BUCKET, ARTICULATED, 4X4	36.2	HR	0	1,273	0	359	0	0	235	326	2,193
(Note: Assuming 6 minutes per load/place = 10 loads per hour)											
Load Gravel Crew 1 FE loader + operator + laborer	36.2	HR	2,431	1,273	0	1,045	0	0	684	950	6,382
(Note: Second loader & operator)											
12" Riprap	1,810.0	TON	6,589	4,569	30,580	22,922	0	39,458	14,993	20,824	139,935
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	36.0	HR	0	1,957	0	552	0	0	361	502	3,373
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	36.0	HR	0	202	0	57	0	0	37	52	348
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	72.4	HR	0	2,410	0	680	0	0	445	618	4,153

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Equip. Operators, Crane/Shovel	36.0	HR	1,737	0	0	490	0	0	321	445	2,993
Equip. Operators, Medium	72.4	HR	3,295	0	0	930	0	0	608	845	5,679
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	1,810.0	TON	0	0	30,580	8,633	0	0	5,647	7,843	52,702
(Note: Price provided by Brandon Abla, Dolese, 20 NW 13th Street, Oklahoma City (405-235-2311). Price assumes acceptance & at the quarry. Quarry is Richards Spur Quarry, Elgin, OK.)											
Hauling Cost	1,810.0	TON	0	0	0	11,139	0	39,458	7,286	10,119	68,003
Laborers, (Semi-Skilled)	72.0	HR	1,557	0	0	440	0	0	288	399	2,684
Plantings	6,960.0	EA	299,485	89,590	130,538	187,222	114,731	28,842	122,459	170,082	1,142,949
Wetland Plantings	6,960.0	EA	57,077	659	45,518	35,586	22,799	0	23,276	32,328	217,244
(Note: Rushes, reeds, and bulrushes randomly planted and spaced approximately 1.5 feet on center)											
Rushes, Reeds and Bulrushes	6,960.0	EA	57,077	659	45,518	35,586	22,799	0	23,276	32,328	217,244
Ornamental grasses, juncus effusus spiralis, (Corkscrew Rush), container, zone 4, 1 quart	6,960.0	EA	57,077	659	45,518	35,586	22,799	0	23,276	32,328	217,244
(Note: Rushes, reeds and bulrushes. Used 3,480 LF as length of area to be planted by approximately 3 feet wide. Assuming planting on the outer edge and spacing at 1.5 feet, would have 3 rows of approximately 2,320 each, for a total of 6,960 plantings.)											
Riparian Plantings	15,600.0	EA	242,408	88,931	85,020	143,494	91,932	0	93,857	130,357	875,998
(Note: Per input from the IPT, total area to be planted = 2.24 acres in two sections (0.88 ac + 1.36 ac) = 97,574 SF. Using a ratio of 4 plantings per 25 SF, get 15,600 plantings (live-stake).)											
Red-Osier Dogwood & Brush Willow	15,600.0	EA	242,408	88,931	85,020	143,494	91,932	0	93,857	130,357	875,998
(Note: Live-staked. Shrub willows, sandbar willows, and red-osier dogwoods)											
Shrubs/small trees, willow, pole/live-stakes, 3' - 4', 1" caliper	15,600.0	EA	242,408	88,931	85,020	143,494	91,932	0	93,857	130,357	875,998
(Note: Bush willow & red-osier dogwood. Pole/live-stakes/cuttings)											
Invasive Species Control	2.5	ACR	0	0	0	8,142	0	28,842	5,326	7,397	49,708
(Note: Cost is approximately \$13,370 per acre, minus 15 percent = \$11,626 per acre. Total area = 2.24 acres = 97,574 SF (43,560 SF per acre).)											
Invasive species control, per acre	2.5	ACR	0	0	0	8,142	0	28,842	5,326	7,397	49,708
Design + Drawings	1.0	LS	0	0	106,000	1,412	0	5,000	0	0	112,412
(Note: Design is lump sum cost of approximately 6 percent of construction costs)											
Design	1.0	EA	0	0	106,000	0	0	0	0	0	106,000
Design	1.0	LS	0	0	106,000	0	0	0	0	0	106,000
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)											

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectLabor</u>	<u>DirectEQ</u>	<u>DirectMatl</u>	<u>PrimeCMU</u>	<u>SubCMU</u>	<u>DirectSubBid</u>	<u>SIOH</u>	<u>Contingency</u>	<u>ProjectCost</u>
As-built Drawings	1.0	EA	0	0	0	1,412	0	5,000	0	0	6,412
As-Built Drawings	1.0	LS	0	0	0	1,412	0	5,000	0	0	6,412
Annual O&M Costs	1.0	LS	0	0	0	0	0	130,000	0	0	130,000
(Note: Full replacement of plants every 10 years and full replacement of riprap every 20 years. Annualized costs w/ no adjustment for inflation, no compounding or overhead applied.)											
Annual O&M Costs	1.0	EA	0	0	0	0	0	130,000	0	0	130,000

(Note: Assumes riprap/stone is fully replaced every 20 years and plantings are fully replaced every 10 years. These are simple annualized costs, only. No inflation or time-value-of-money calculations have been applied.)

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	1,650.43
Storage & Tool Trailers	31.0000	WK	1,550.00
Toilet, portable, chemical, rent per month	31.0000	WK	1,550.00
Temporary Utilities	31.0000	WK	2,635.00
Office Supplies	31.0000	WK	3,875.00
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	31.0000	WK	4,650.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	31.0000	WK	4,650.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	31.0000	WK	15,500.00
QC Inspector	31.0000	WK	42,843.21
General Superintendent (P.M.)	31.0000	WK	49,764.08

Ark River Corridor - Alternatives 2016
Evaluating various alternatives for river habitat restoration. Options being evaluated and priced include: Cherry Creek Confluence Restoration, Prattville Creek Confluence, Left Bank Slack Water Side Channels, and Least Tern Island Habitat.

Estimated by
Designed by TBD
Prepared by Timothy Batson

Preparation Date 6/23/2016
Effective Date of Pricing 6/23/2016
Estimated Construction Time 30 Days

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Date	Author	Note
6/30/2016	T Batson	Using overhead rates of: HOOH = 12 percent, profit = 9 percent (sub work, only), sales tax = 9 percent (material only), productivity = 80 percent, and that all work will be performed in 10-hour shifts, 5 days per week. Assuming QC, Safety and Superintendent positions will be required as separate, non-overlapping duties.
6/30/2016	T Batson	Contingency = 20 percent and SIOH (supervision, inspection & overhead) = 12 percent were added. Design costs = 6 percent of construction costs w/ contingency & SIOH added has also been added.
6/30/2016	T Batson	Project duration is for construction, only.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
Study Alternative			
10 I-44/Rivreside Grade Controls + Wing Deflectors	1.0	JOB	142,621
Design + Drawings	1.0	LS	15,758
Annual O&M Costs	1.0	EA	7,200

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary II			
Study Alternative			
10 I-44/Rivreside Grade Controls + Wing Deflectors	1.0	JOB	142,621
Slack Water Side Channels	1.0	LS	111,621
Rock Riffle	1.0	LS	31,000
Design + Drawings	1.0	LS	15,758
Design	1.0	EA	8,600
As-built Drawings	1.0	EA	7,158
Annual O&M Costs	1.0	EA	7,200

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	DirectSubBid	ProjectCost
Project Direct Summary								
Study Alternative								
10 I-44/Rivreside Grade Controls + Wing Deflectors	1.0	JOB	6,144	4,158	39,746	31,988	24,080	142,621
Slack Water Side Channels	1.0	LS	4,965	3,141	31,080	25,035	18,830	111,621
24" Riprap	690.0	CY	4,965	3,141	31,080	25,035	18,830	111,621
(Note: Used 135 lbs per CF = 1.56 tons per CY)								
24" Riprap	1,076.0	TON	4,965	3,141	31,080	25,035	18,830	111,621
(Note: 24-inch riprap. Place rip-rap at 50 ton/hr with the crew shown. Riprap to be placed in the river channel so no bedding material will be used.)								
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	22.0	HR	0	1,196	0	516	0	2,301
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	22.0	HR	0	154	0	67	0	297
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	43.0	HR	0	1,791	0	773	0	3,445
Equip. Operators, Crane/Shovel	22.0	HR	1,327	0	0	572	0	2,552
Equip. Operators, Medium	43.0	HR	2,449	0	0	1,057	0	4,711
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	1,076.0	TON	0	0	31,080	13,412	0	59,797
Hauling Cost	1,076.0	TON	0	0	0	8,126	18,830	36,228
Laborers, (Semi-Skilled)	44.0	HR	1,189	0	0	513	0	2,289
Rock Riffle	1.0	LS	1,180	1,017	8,666	6,953	5,250	31,000
6" Bedding	37.0	CY	215	354	2,080	1,687	1,260	7,521
6-Inches Spall Stone	72.0	TON	215	354	2,080	1,687	1,260	7,521
(Note: Added 25 percent to account for expansion)								
6-Inch Bedding Stonel Material Price	72.0	TON	0	0	2,080	1,441	1,260	6,426
6" Bedding Stone Material Price	72.0	TON	0	0	2,080	897	0	4,001
Pick-up/Hauling/Delivery	72.0	TON	0	0	0	544	1,260	2,424
Hauling Cost	72.0	TON	0	0	0	544	1,260	2,424
6-Inch Bedding Stone Placement	37.0	CY	215	354	0	246	0	1,096
(Note: Production Rate; 3.5 cy bucket using 85% fill factor = 2.975 CY per load load time 9 sec manuever time: 8 sec rotate 90 deg; 5 sec placement time; 20 sec manuever time; 6 sec rotate 90 deg; 5 sec Total cycle time = 53 sec = 0883 min 50 min/hr production / 0.883 min = 56.6 loads/hr x 2.975 cy/load = 168.4 cy/hr production rate.)								
Placement - Rip-rap and rock lining, random, broken stone, machine placed for slope protection	37.0	LCY	215	354	0	246	0	1,096
24" Riprap	125.0	CY	964	663	6,586	5,266	3,990	23,479

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	DirectSubBid	ProjectCost
(Note: Used 135 lbs per CF = 1.56 tons per CY)								
24" Riprap	228.0	TON	964	663	6,586	5,266	3,990	23,479
(Note: 24-inch riprap. Place rip-rap at 50 ton/hr with the crew shown.)								
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	6.0	HR	0	326	0	141	0	628
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	6.0	HR	0	34	0	15	0	65
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	9.1	HR	0	304	0	131	0	584
Equip. Operators, Crane/Shovel	6.0	HR	289	0	0	125	0	557
Equip. Operators, Medium	9.1	HR	415	0	0	179	0	799
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	228.0	TON	0	0	6,586	2,842	0	12,671
Hauling Cost	228.0	TON	0	0	0	1,722	3,990	7,677
Laborers, (Semi-Skilled)	12.0	HR	260	0	0	112	0	499
Design + Drawings	1.0	LS	0	0	8,600	2,158	5,000	15,758
(Note: Design is lump sum cost of approximately 6 percent of construction costs)								
Design	1.0	EA	0	0	8,600	0	0	8,600
Design	1.0	LS	0	0	8,600	0	0	8,600
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)								
As-built Drawings	1.0	EA	0	0	0	2,158	5,000	7,158
As-Built Drawings	1.0	LS	0	0	0	2,158	5,000	7,158
Annual O&M Costs	1.0	EA	0	0	0	0	7,200	7,200
(Note: Full replacement of plants every 10 years and full replacement of riprap every 20 years. Annualized costs w/ no adjustment for inflation, no compounding or overhead applied.)								
Annual O&M Costs	1.0	EA	0	0	0	0	7,200	7,200
(Note: Assumes riprap/stone is fully replaced every 20 years and plantings are fully replaced every 10 years. These are simple annualized costs, only. No inflation or time-value-of-money calculations have been applied.)								

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	222.55
Storage & Tool Trailers	3.0000	WK	150.00
Toilet, portable, chemical, rent per month	3.0000	WK	150.00
Temporary Utilities	3.0000	WK	255.00
Office Supplies	3.0000	WK	375.00
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	3.0000	WK	450.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	3.0000	WK	450.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	3.0000	WK	1,500.00
QC Inspector	2.0000	WK	2,504.50
General Superintendent (P.M.)	2.0000	WK	4,619.44
Safety Monitor	2.0000	WK	3,655.85

Ark River Corridor - Alternatives 2016
Evaluating various alternatives for river habitat restoration. Options being evaluated and priced include: Cherry Creek Confluence Restoration, Prattville Creek Confluence, Left Bank Slack Water Side Channels, and Least Tern Island Habitat.

Estimated by
Designed by TBD
Prepared by Timothy Batson

Preparation Date 6/23/2016
Effective Date of Pricing 6/23/2016
Estimated Construction Time 170 Days

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Date	Author	Note
6/30/2016	T Batson	Using overhead rates of: HOOH = 12 percent, profit = 9 percent (sub work, only), sales tax = 9 percent (material only), productivity = 80 percent, and that all work will be performed in 10-hour shifts, 5 days per week. Assuming QC, Safety and Superintendent positions will be required as separate, non-overlapping duties.
6/30/2016	T Batson	Contingency = 20 percent and SIOH (supervision, inspection & overhead) = 12 percent were added. Design costs = 6 percent of construction costs w/ contingency & SIOH added has also been added.
6/30/2016	T Batson	Project duration is for construction, only.
6/30/2016	T Batson	Added 4 weeks for invasion species control.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
Study Alternative			
11 I-44/Rivreside Grade Controls + Wing Deflectors + Riparian Planting	1.0	JOB	875,836
Design + Drawings	1.0	LS	59,194
Annual O&M Costs	1.0	LS	77,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary II			
Study Alternative			
11 I-44/Rivreside Grade Controls + Wing Deflectors + Riparian Planting	1.0	JOB	875,836
Stone Structure	1.0	EA	140,678
Plantings	1.0	LS	735,158
Design + Drawings	1.0	LS	59,194
Design	1.0	EA	52,000
As-built Drawings	1.0	EA	7,194
Annual O&M Costs	1.0	LS	77,000

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Project Direct Summary											
Study Alternative											
11 I-44/Rivreside Grade Controls + Wing Deflectors + Riparian Planting	1.0	JOB	177,634	67,047	100,241	198,757	65,413	42,572	93,840	130,333	875,836
Stone Structure	1.0	EA	5,151	3,769	39,746	31,925	0	24,080	15,073	20,934	140,678
Slack Water Side Channels	1.0	LS	3,972	2,752	31,080	24,854	0	18,830	11,734	16,298	109,520
24" Riprap	690.0	CY	3,972	2,752	31,080	24,854	0	18,830	11,734	16,298	109,520
(Note: Used 135 lbs per CF = 1.56 tons per CY)											
24" Riprap	1,076.0	TON	3,972	2,752	31,080	24,854	0	18,830	11,734	16,298	109,520
(Note: 24-inch riprap. Place rip-rap at 50 ton/hr with the crew shown. Riprap to be placed in the river channel so no bedding material will be used.)											
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	22.0	HR	0	1,196	0	525	0	0	248	344	2,313
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	22.0	HR	0	124	0	54	0	0	26	36	239
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	43.0	HR	0	1,433	0	629	0	0	297	412	2,770
Equip. Operators, Crane/Shovel	22.0	HR	1,061	0	0	466	0	0	220	305	2,052
Equip. Operators, Medium	43.0	HR	1,959	0	0	860	0	0	406	564	3,788
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	1,076.0	TON	0	0	31,080	13,640	0	0	6,440	8,944	60,103
Hauling Cost	1,076.0	TON	0	0	0	8,264	0	18,830	3,901	5,419	36,414
Laborers, (Semi-Skilled)	44.0	HR	952	0	0	418	0	0	197	274	1,840
Rock Riffle	1.0	LS	1,180	1,017	8,666	7,071	0	5,250	3,338	4,637	31,158
6" Bedding	37.0	CY	215	354	2,080	1,716	0	1,260	810	1,125	7,560
6-Inches Spall Stone	72.0	TON	215	354	2,080	1,716	0	1,260	810	1,125	7,560
(Note: Added 25 percent to account for expansion)											
6-Inch Bedding Stonel Material Price	72.0	TON	0	0	2,080	1,466	0	1,260	692	961	6,458
6" Bedding Stone Material Price	72.0	TON	0	0	2,080	913	0	0	431	598	4,022
Pick-up/Hauling/Delivery	72.0	TON	0	0	0	553	0	1,260	261	363	2,437
Hauling Cost	72.0	TON	0	0	0	553	0	1,260	261	363	2,437
6-Inch Bedding Stone Placement	37.0	CY	215	354	0	250	0	0	118	164	1,101

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
(Note: Production Rate; 3.5 cy bucket using 85% fill factor = 2.975 CY per load load time 9 sec maneuver time: 8 sec rotate 90 deg; 5 sec placement time; 20 sec maneuver time; 6 sec rotate 90 deg; 5 sec Total cycle time = 53 sec = 0883 min 50 min/hr production / 0.883 min = 56.6 loads/hr x 2.975 cy/load = 168.4 cy/hr production rate.)											
Placement - Rip-rap and rock lining, random, broken stone, machine placed for slope protection	37.0	LCY	215	354	0	250	0	0	118	164	1,101
24" Riprap	125.0	CY	964	663	6,586	5,355	0	3,990	2,528	3,512	23,599
(Note: Used 135 lbs per CF = 1.56 tons per CY)											
24" Riprap	228.0	TON	964	663	6,586	5,355	0	3,990	2,528	3,512	23,599
(Note: 24-inch riprap. Place rip-rap at 50 ton/hr with the crew shown.)											
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	6.0	HR	0	326	0	143	0	0	68	94	631
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	6.0	HR	0	34	0	15	0	0	7	10	65
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	9.1	HR	0	304	0	133	0	0	63	87	587
Equip. Operators, Crane/Shovel	6.0	HR	289	0	0	127	0	0	60	83	560
Equip. Operators, Medium	9.1	HR	415	0	0	182	0	0	86	119	803
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	228.0	TON	0	0	6,586	2,890	0	0	1,365	1,895	12,736
Hauling Cost	228.0	TON	0	0	0	1,751	0	3,990	827	1,148	7,716
Laborers, (Semi-Skilled)	12.0	HR	260	0	0	114	0	0	54	75	502
Plantings	1.0	LS	172,482	63,278	60,495	166,833	65,413	18,492	78,767	109,398	735,158
Riparian Plantings	11,100.0	EA	172,482	63,278	60,495	158,718	65,413	0	74,936	104,077	699,398
(Note: Three areas of riparian planting (0.67, 0.35, and 0.57 acres). - include live-stake plantings of brush willow, red-osier dogwood (5-feet on center). Total area = 69,260 SF (1.59 acres). Using a ratio of 4 plantings per 25 SF, estimated 11,100 plantings at 5-feet on center.)											
Red-Osier Dogwood & Brush Willow	11,100.0	EA	172,482	63,278	60,495	158,718	65,413	0	74,936	104,077	699,398
(Note: Live-staked.)											
Shrubs/small trees, willow, pole/live-stakes, 3' - 4', 1" caliper	11,100.0	EA	172,482	63,278	60,495	158,718	65,413	0	74,936	104,077	699,398
(Note: Bush willow & red-osier dogwood. Pole/live-stakes/cuttings)											
Invasive Species Control	1.6	ACR	0	0	0	8,115	0	18,492	3,831	5,321	35,759
(Note: Cost is approximately \$13,370 per acre, minus 15 percent = \$11,626 per acre. Total area = 1.59 acres (43,560 SF per acre).)											
Invasive species control, per acre	1.6	ACR	0	0	0	8,115	0	18,492	3,831	5,321	35,759

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Design + Drawings	1.0	LS	0	0	52,000	2,194	0	5,000	0	0	59,194
(Note: Design is lump sum cost of approximately 6 percent of construction costs)											
Design	1.0	EA	0	0	52,000	0	0	0	0	0	52,000
Design	1.0	LS	0	0	52,000	0	0	0	0	0	52,000
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)											
As-built Drawings	1.0	EA	0	0	0	2,194	0	5,000	0	0	7,194
As-Built Drawings	1.0	LS	0	0	0	2,194	0	5,000	0	0	7,194
Annual O&M Costs	1.0	LS	0	0	0	0	0	77,000	0	0	77,000
(Note: Full replacement of plants every 10 years and full replacement of riprap every 20 years. Annualized costs w/ no adjustment for inflation, no compounding or overhead applied.)											
Annual O&M Costs	1.0	EA	0	0	0	0	0	77,000	0	0	77,000
(Note: Assumes riprap/stone is fully replaced every 20 years and plantings are fully replaced every 10 years. These are simple annualized costs, only. No inflation or time-value-of-money calculations have been applied.)											

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	1,289.78
Storage & Tool Trailers	24.0000	WK	1,200.00
Toilet, portable, chemical, rent per month	24.0000	WK	1,200.00
Temporary Utilities	24.0000	WK	2,040.00
Office Supplies	24.0000	WK	3,000.00
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	24.0000	WK	3,600.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	24.0000	WK	3,600.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	24.0000	WK	12,000.00
QC Inspector	24.0000	WK	30,053.94
General Superintendent (P.M.)	14.0000	WK	32,336.07
Safety Monitor	14.0000	WK	25,590.93

Ark River Corridor - Alternatives 2016
Evaluating various alternatives for river habitat restoration. Options being evaluated and priced include: Cherry Creek Confluence Restoration, Prattville Creek Confluence, Left Bank Slack Water Side Channels, and Least Tern Island Habitat.

Estimated by
Designed by TBD
Prepared by Timothy Batson

Preparation Date 6/23/2016
Effective Date of Pricing 6/23/2016
Estimated Construction Time 110 Days

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Date	Author	Note
6/30/2016	T Batson	Using overhead rates of: HOOH = 12 percent, profit = 9 percent (sub work, only), sales tax = 9 percent (material only), productivity = 80 percent, and that all work will be performed in 10-hour shifts, 5 days per week. Assuming QC, Safety and Superintendent positions will be required as separate, non-overlapping duties.
6/30/2016	T Batson	Contingency = 20 percent and SIOH (supervision, inspection & overhead) = 12 percent were added. Design costs = 6 percent of construction costs w/ contingency & SIOH added has also been added.
6/30/2016	T Batson	Project duration is for construction, only.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
12 I-44/Riverside Grade Controls + Wing Deflectors + Wetland Plantings	1.0	JOB	472,071
Design + Drawings	1.0	LS	35,296
Annual O&M Costs	1.0	LS	40,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary II			
12 I-44/Riverside Grade Controls + Wing Deflectors + Wetland Plantings	1.0	JOB	472,071
Stone Structure	1.0	EA	142,664
Plantings	1.0	LS	329,407
Design + Drawings	1.0	LS	35,296
Design	1.0	EA	28,000
As-built Drawings	1.0	EA	7,296
Annual O&M Costs	1.0	LS	40,000

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Project Direct Summary											
12 I-44/Riverside Grade Controls + Wing Deflectors + Wetland Plantings	1.0	JOB	78,958	4,622	98,606	110,527	30,380	28,151	50,579	70,249	472,071
Stone Structure	1.0	EA	5,151	3,769	39,746	33,402	0	24,080	15,285	21,230	142,664
Rock Riffle	1.0	LS	1,180	1,017	8,666	7,398	0	5,250	3,386	4,702	31,598
6" Bedding	37.0	CY	215	354	2,080	1,795	0	1,260	821	1,141	7,666
6-Inches Spall Stone	72.0	TON	215	354	2,080	1,795	0	1,260	821	1,141	7,666
(Note: Added 25 percent to account for expansion)											
6-Inch Bedding Stonel Material Price	72.0	TON	0	0	2,080	1,533	0	1,260	702	975	6,550
6" Bedding Stone Material Price	72.0	TON	0	0	2,080	955	0	0	437	607	4,079
Pick-up/Hauling/Delivery	72.0	TON	0	0	0	579	0	1,260	265	368	2,471
Hauling Cost	72.0	TON	0	0	0	579	0	1,260	265	368	2,471
6-Inch Bedding Stone Placement	37.0	CY	215	354	0	261	0	0	120	166	1,117
(Note: Production Rate; 3.5 cy bucket using 85% fill factor = 2.975 CY per load load time 9 sec manuever time: 8 sec rotate 90 deg; 5 sec placement time; 20 sec manuever time; 6 sec rotate 90 deg; 5 sec Total cycle time = 53 sec = 0883 min 50 min/hr production / 0.883 min = 56.6 loads/hr x 2.975 cy/load = 168.4 cy/hr production rate.)											
Placement - Rip-rap and rock lining, random, broken stone, machine placed for slope protection	37.0	LCY	215	354	0	261	0	0	120	166	1,117
24" Riprap	125.0	CY	964	663	6,586	5,603	0	3,990	2,564	3,561	23,932
(Note: Used 135 lbs per CF = 1.56 tons per CY)											
24" Riprap	228.0	TON	964	663	6,586	5,603	0	3,990	2,564	3,561	23,932
(Note: 24-inch riprap. Place rip-rap at 50 ton/hr with the crew shown.)											
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	6.0	HR	0	326	0	150	0	0	69	95	640
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	6.0	HR	0	34	0	15	0	0	7	10	66
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	9.1	HR	0	304	0	139	0	0	64	89	595
Equip. Operators, Crane/Shovel	6.0	HR	289	0	0	133	0	0	61	84	568
Equip. Operators, Medium	9.1	HR	415	0	0	191	0	0	87	121	814
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	228.0	TON	0	0	6,586	3,024	0	0	1,384	1,922	12,915
Hauling Cost	228.0	TON	0	0	0	1,832	0	3,990	838	1,164	7,825

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Laborers, (Semi-Skilled)	12.0	HR	260	0	0	119	0	0	55	76	509
Slack Water Side Channels	1.0	LS	3,972	2,752	31,080	26,004	0	18,830	11,900	16,528	111,065
24" Riprap	690.0	CY	3,972	2,752	31,080	26,004	0	18,830	11,900	16,528	111,065
(Note: Used 135 lbs per CF = 1.56 tons per CY)											
24" Riprap	1,076.0	TON	3,972	2,752	31,080	26,004	0	18,830	11,900	16,528	111,065
(Note: 24-inch riprap. Place rip-rap at 50 ton/hr with the crew shown. Riprap to be placed in the river channel so no bedding material will be used.)											
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	22.0	HR	0	1,196	0	549	0	0	251	349	2,345
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	22.0	HR	0	124	0	57	0	0	26	36	242
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	43.0	HR	0	1,433	0	658	0	0	301	418	2,809
Equip. Operators, Crane/Shovel	22.0	HR	1,061	0	0	487	0	0	223	310	2,081
Equip. Operators, Medium	43.0	HR	1,959	0	0	899	0	0	412	572	3,842
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	1,076.0	TON	0	0	31,080	14,271	0	0	6,531	9,070	60,952
Hauling Cost	1,076.0	TON	0	0	0	8,646	0	18,830	3,957	5,495	36,928
Laborers, (Semi-Skilled)	44.0	HR	952	0	0	437	0	0	200	278	1,866
Plantings	1.0	LS	73,807	853	58,860	77,125	30,380	4,071	35,294	49,019	329,407
Wetland Plantings	9,000.0	EA	73,807	853	58,860	74,843	29,481	0	34,250	47,569	319,662
(Note: Rushes, reeds, and bulrushes randomly planted and spaced approximately 1.5 feet on center. Three areas of 0.07, 0.09 and 0.13 acres, plus two areas of 380 feet and 420 feet. Total area = 12,632 SF (0.29 acres). Using 1.5-foot on-center spacing, an estimated 9,000 plantings will be required.)											
Rushes, Reeds and Bulrushes	9,000.0	EA	73,807	853	58,860	74,843	29,481	0	34,250	47,569	319,662
Ornamental grasses, juncus effusus spiralis, (Corkscrew Rush), container, zone 4, 1 quart	9,000.0	EA	73,807	853	58,860	74,843	29,481	0	34,250	47,569	319,662
(Note: Rushes, reeds and bulrushes.)											
Invasive Species Control	0.4	ACR	0	0	0	2,282	899	4,071	1,044	1,450	9,745
(Note: Cost is approximately \$13,370 per acre, minus 15 percent = \$11,626 per acre. Total area = 0.35 acres (43,560 SF per acre).)											
Invasive species control, per acre	0.4	ACR	0	0	0	2,282	899	4,071	1,044	1,450	9,745
Design + Drawings	1.0	LS	0	0	28,000	2,296	0	5,000	0	0	35,296
(Note: Design is lump sum cost of approximately 6 percent of construction costs)											
Design	1.0	EA	0	0	28,000	0	0	0	0	0	28,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectLabor</u>	<u>DirectEQ</u>	<u>DirectMatl</u>	<u>PrimeCMU</u>	<u>SubCMU</u>	<u>DirectSubBid</u>	<u>SIOH</u>	<u>Contingency</u>	<u>ProjectCost</u>
Design	1.0	LS	0	0	28,000	0	0	0	0	0	28,000
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)											
As-built Drawings	1.0	EA	0	0	0	2,296	0	5,000	0	0	7,296
As-built Drawings	1.0	LS	0	0	0	2,296	0	5,000	0	0	7,296
As-Built Drawings	1.0	LS	0	0	0	2,296	0	5,000	0	0	7,296
Annual O&M Costs	1.0	LS	0	0	0	0	0	40,000	0	0	40,000
(Note: Full replacement of plants every 10 years and full replacement of riprap every 20 years. Annualized costs w/ no adjustment for inflation, no compounding or overhead applied.)											
Annual O&M Costs	1.0	EA	0	0	0	0	0	40,000	0	0	40,000
(Note: Assumes riprap/stone is fully replaced every 20 years and plantings are fully replaced every 10 years. These are simple annualized costs, only. No inflation or time-value-of-money calculations have been applied.)											

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	694.01
Storage & Tool Trailers	16.0000	WK	800.00
Toilet, portable, chemical, rent per month	16.0000	WK	800.00
Temporary Utilities	16.0000	WK	1,360.00
Office Supplies	16.0000	WK	2,000.00
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	16.0000	WK	2,400.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	16.0000	WK	2,400.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	16.0000	WK	8,000.00
QC Inspector	16.0000	WK	20,035.96
General Superintendent (P.M.)	6.0000	WK	13,858.32
Safety Monitor	6.0000	WK	10,967.54

Ark River Corridor - Alternatives 2016
Evaluating various alternatives for river habitat restoration. Options being evaluated and priced include: Cherry Creek Confluence Restoration, Prattville Creek Confluence, Left Bank Slack Water Side Channels, and Least Tern Island Habitat.

Estimated by
Designed by TBD
Prepared by Timothy Batson

Preparation Date 6/23/2016
Effective Date of Pricing 6/23/2016
Estimated Construction Time 250 Days

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Date	Author	Note
6/30/2016	T Batson	Using overhead rates of: HOOH = 12 percent, profit = 9 percent (sub work, only), sales tax = 9 percent (material only), productivity = 80 percent, and that all work will be performed in 10-hour shifts, 5 days per week. Assuming QC, Safety and Superintendent positions will be required as separate, non-overlapping duties.
6/30/2016	T Batson	Contingency = 20 percent and SIOH (supervision, inspection & overhead) = 12 percent were added. Design costs = 6 percent of construction costs w/ contingency & SIOH added has also been added.
6/30/2016	T Batson	Project duration is for construction, only.
6/30/2016	T Batson	Added 4 weeks to project duration to account for invasive species control.

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary			
Study Alternative			
13 I-44/Riverside Grade Controls + Wing Deflectors + Riparian Planting + Wetland Planting	1.0	JOB	1,256,808
Design + Drawings	1.0	LS	82,481
Annual O&M Costs	1.0	LS	118,000

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>ProjectCost</u>
Project Indirect Summary II			
Study Alternative			
13 I-44/Riverside Grade Controls + Wing Deflectors + Riparian Planting + Wetland Planting	1.0	JOB	1,256,808
Stone Structure	1.0	EA	146,295
Plantings	1.0	LS	1,110,513
Design + Drawings	1.0	LS	82,481
Design	1.0	EA	75,000
As-built Drawings	1.0	EA	7,481
Annual O&M Costs	1.0	LS	118,000

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
Project Direct Summary											
Study Alternative											
13 I-44/Riverside Grade Controls + Wing Deflectors + Riparian Planting + Wetland Planting	1.0	JOB	251,441	67,900	159,101	310,166	99,876	46,642	134,658	187,025	1,256,808
Stone Structure	1.0	EA	5,151	3,769	39,746	36,104	0	24,080	15,674	21,770	146,295
Slack Water Side Channels	1.0	LS	3,972	2,752	31,080	28,107	0	18,830	12,203	16,948	113,892
24" Riprap	690.0	CY	3,972	2,752	31,080	28,107	0	18,830	12,203	16,948	113,892
(Note: Used 135 lbs per CF = 1.56 tons per CY)											
24" Riprap	1,076.0	TON	3,972	2,752	31,080	28,107	0	18,830	12,203	16,948	113,892
(Note: 24-inch riprap. Place rip-rap at 50 ton/hr with the crew shown. Riprap to be placed in the river channel so no bedding material will be used.)											
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	22.0	HR	0	1,196	0	594	0	0	258	358	2,405
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	22.0	HR	0	124	0	61	0	0	27	37	248
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	43.0	HR	0	1,433	0	711	0	0	309	429	2,881
Equip. Operators, Crane/Shovel	22.0	HR	1,061	0	0	527	0	0	229	318	2,134
Equip. Operators, Medium	43.0	HR	1,959	0	0	972	0	0	422	586	3,940
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	1,076.0	TON	0	0	31,080	15,425	0	0	6,697	9,301	62,503
Hauling Cost	1,076.0	TON	0	0	0	9,345	0	18,830	4,057	5,635	37,868
Laborers, (Semi-Skilled)	44.0	HR	952	0	0	472	0	0	205	285	1,914
Rock Riffle	1.0	LS	1,180	1,017	8,666	7,997	0	5,250	3,472	4,822	32,403
6" Bedding	37.0	CY	215	354	2,080	1,940	0	1,260	842	1,170	7,862
6-Inches Spall Stone	72.0	TON	215	354	2,080	1,940	0	1,260	842	1,170	7,862
(Note: Added 25 percent to account for expansion)											
6-Inch Bedding Stonel Material Price	72.0	TON	0	0	2,080	1,657	0	1,260	720	999	6,716
6" Bedding Stone Material Price	72.0	TON	0	0	2,080	1,032	0	0	448	622	4,182
Pick-up/Hauling/Delivery	72.0	TON	0	0	0	625	0	1,260	271	377	2,534
Hauling Cost	72.0	TON	0	0	0	625	0	1,260	271	377	2,534
6-Inch Bedding Stone Placement	37.0	CY	215	354	0	283	0	0	123	170	1,145

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	PrimeCMU	SubCMU	DirectSubBid	SIOH	Contingency	ProjectCost
(Note: Production Rate; 3.5 cy bucket using 85% fill factor = 2.975 CY per load load time 9 sec maneuver time: 8 sec rotate 90 deg; 5 sec placement time; 20 sec maneuver time; 6 sec rotate 90 deg; 5 sec Total cycle time = 53 sec = 0883 min 50 min/hr production / 0.883 min = 56.6 loads/hr x 2.975 cy/load = 168.4 cy/hr production rate.)											
Placement - Rip-rap and rock lining, random, broken stone, machine placed for slope protection	37.0	LCY	215	354	0	283	0	0	123	170	1,145
24" Riprap	125.0	CY	964	663	6,586	6,056	0	3,990	2,629	3,652	24,541
(Note: Used 135 lbs per CF = 1.56 tons per CY)											
24" Riprap	228.0	TON	964	663	6,586	6,056	0	3,990	2,629	3,652	24,541
(Note: 24-inch riprap. Place rip-rap at 50 ton/hr with the crew shown.)											
CRANES, HYDRAULIC, TRUCK MTD, 30 TON, 80' BOOM, 6X4	6.0	HR	0	326	0	162	0	0	70	98	656
BUCKET, CLAMSHELL, 1.50 CY, SQUARE NOSE, STANDARD	6.0	HR	0	34	0	17	0	0	7	10	68
LOADER, FRONT END, CRAWLER, 1.50 CY BUCKET	9.1	HR	0	304	0	151	0	0	65	91	610
Equip. Operators, Crane/Shovel	6.0	HR	289	0	0	144	0	0	62	87	582
Equip. Operators, Medium	9.1	HR	415	0	0	206	0	0	89	124	835
Rip-rap and rock lining, random, broken stone, 50 lb. average, dumped	228.0	TON	0	0	6,586	3,269	0	0	1,419	1,971	13,244
Hauling Cost	228.0	TON	0	0	0	1,980	0	3,990	860	1,194	8,024
Laborers, (Semi-Skilled)	12.0	HR	260	0	0	129	0	0	56	78	522
Plantings	1.0	LS	246,289	64,130	119,355	274,062	99,876	22,562	118,984	165,255	1,110,513
Riparian Plantings	11,100.0	EA	172,482	63,278	60,495	179,495	65,413	0	77,927	108,233	727,323
(Note: Three areas of riparian planting (0.67, 0.35, and 0.57 acres). - include live-stake plantings of brush willow, red-osier dogwood (5-feet on center). Total area = 69,260 SF (1.59 acres). Using a ratio of 4 plantings per 25 SF, estimated 11,100 plantings at 5-feet on center.)											
Red-Osier Dogwood & Brush Willow	11,100.0	EA	172,482	63,278	60,495	179,495	65,413	0	77,927	108,233	727,323
(Note: Live-staked.)											
Shrubs/small trees, willow, pole/live-stakes, 3' - 4', 1" caliper	11,100.0	EA	172,482	63,278	60,495	179,495	65,413	0	77,927	108,233	727,323
(Note: Bush willow & red-osier dogwood. Pole/live-stakes/cuttings)											
Wetland Plantings	9,000.0	EA	73,807	853	58,860	80,897	29,481	0	35,121	48,780	327,799
(Note: Rushes, reeds, and bulrushes randomly planted and spaced approximately 1.5 feet on center. Three areas of 0.07, 0.09 and 0.13 acres, plus two areas of 380 feet and 420 feet. Total area = 12,632 SF (0.29 acres). Using 1.5-foot on-center spacing, an estimated 9,000 plantings will be required.)											

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectLabor</u>	<u>DirectEQ</u>	<u>DirectMatl</u>	<u>PrimeCMU</u>	<u>SubCMU</u>	<u>DirectSubBid</u>	<u>SIOH</u>	<u>Contingency</u>	<u>ProjectCost</u>
Rushes, Reeds and Bulrushes	9,000.0	EA	73,807	853	58,860	80,897	29,481	0	35,121	48,780	327,799
Ornamental grasses, juncus effusus spiralis, (Corkscrew Rush), container, zone 4, 1 quart	9,000.0	EA	73,807	853	58,860	80,897	29,481	0	35,121	48,780	327,799
(Note: Rushes, reeds and bulrushes.)											
Invasive Species Control	1.9	ACR	0	0	0	13,670	4,982	22,562	5,935	8,243	55,391
(Note: Cost is approximately \$13,370 per acre, minus 15 percent = \$11,626 per acre. Total area = 1.94 acres combined (43,560 SF per acre).)											
Invasive species control, per acre	1.9	ACR	0	0	0	13,670	4,982	22,562	5,935	8,243	55,391
Design + Drawings	1.0	LS	0	0	75,000	2,481	0	5,000	0	0	82,481
(Note: Design is lump sum cost of approximately 6 percent of construction costs)											
Design	1.0	EA	0	0	75,000	0	0	0	0	0	75,000
Design	1.0	LS	0	0	75,000	0	0	0	0	0	75,000
(Note: Equal to approximately 6 percent of projected construction costs, including all overhead and contingency applied.)											
As-built Drawings	1.0	EA	0	0	0	2,481	0	5,000	0	0	7,481
As-Built Drawings	1.0	LS	0	0	0	2,481	0	5,000	0	0	7,481
Annual O&M Costs	1.0	LS	0	0	0	0	0	118,000	0	0	118,000
(Note: Full replacement of plants every 10 years and full replacement of riprap every 20 years. Annualized costs w/ no adjustment for inflation, no compounding or overhead applied.)											
Annual O&M Costs	1.0	EA	0	0	0	0	0	118,000	0	0	118,000
(Note: Assumes riprap/stone is fully replaced every 20 years and plantings are fully replaced every 10 years. These are simple annualized costs, only. No inflation or time-value-of-money calculations have been applied.)											

<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>DirectCost</u>
General Conditions			
Prime			
Prime JOOH			
Small Tools	1.0000	EA	2,183.45
Storage & Tool Trailers	36.0000	WK	1,800.00
Toilet, portable, chemical, rent per month	36.0000	WK	1,800.00
Temporary Utilities	36.0000	WK	3,060.00
Office Supplies	36.0000	WK	4,500.00
Utility Hookups	1.0000	LS	800.00
Field Office Trailer	36.0000	WK	5,400.00
Project Signs & Bulletin Boards	1.0000	LS	800.00
Job Site Pickup	36.0000	WK	5,400.00
Quality Control Plans	1.0000	LS	2,000.00
Job Site Cleanup	1.0000	LS	2,500.00
Fall Protection	36.0000	WK	18,000.00
QC Inspector	36.0000	WK	45,080.91
General Superintendent (P.M.)	26.0000	WK	60,052.70
Safety Monitor	26.0000	WK	47,526.02