

**US Army Corps
of Engineers**

Rock Island District
St. Louis District
St. Paul District

**INDEPENDENT REVIEW OF CONCEPT DESIGN
CONSTRUCTION COSTS**

FOR

***UPPER MISSISSIPPI RIVER & ILLINOIS
WATERWAY SYSTEM NAVIGATION STUDY***

**LARGE SCALE MEASURES FOR REDUCING
TRAFFIC CONGESTION**

DOCUMENTATION REPORT

June 2003

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FOR
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DOCUMENTATION REPORT

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DOCUMENTATION REPORT

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DOCUMENTATION REPORT

PURPOSE OF DOCUMENTATION REPORT. The primary purpose of this report is to address concerns about the construction costs stated in the committee's (Water Science and Technology Board, Transportation Research Board, and National Research Council) review of the Upper Mississippi River –Illinois Waterway Navigation System Feasibility Report. More specifically, the committee states that there is value in an independent review, particularly for studies of this magnitude. This documentation report compares construction cost estimates developed by the Corps of Engineers (COE) to that of an independent Architect-Engineering firm. It serves to validate COE cost estimates for Large-scale measures.

REFERENCES:

1. Internal Review Draft, Upper Mississippi River Illinois Waterway System Navigation Study, Engineering Appendix, July 2000
2. UMR-IWW System Navigation Study, Interim Revised Lock Extensions Design Concepts, Interim Report, 18 July 2000
3. Upper Mississippi River – Illinois Waterway System Navigation Study, Large Scale Measures of Reducing Traffic Congestion, Conceptual Lock Designs, February 1996 (Revised July 1996), prepared by Rock Island District, St. Louis District and Rock Island District
4. Melvin Price Locks and Dam, US Army Corps of Engineers, EP-1110-1-14, "Report of the USACE Task Force on Design and Construction Innovations for Locks and Dams", 30 April 1994

5. Ben C Gerwick Inc, titled "Upper Mississippi River- Illinois Waterway System, Navigation Study, Innovative Lock Concept Review: 1200' Lock Capacity, Alternate Construction Techniques and Constructibility Review", December 1994

PREVIOUS CORPS CONSTRUCTION COST ESTIMATES: The construction cost estimates that were included in the above references were developed by the US Army Corps of Engineers, Rock Island District, St Louis District and St Paul District. These estimates were developed based on conceptual designs. Due to the level of design effort, the cost estimates were based on unit costs primarily from the historical cost data from references 4 and 5. It should be noted that the Engineering Work Group (EWG) of the Navigation Study received a waiver from HQUSACE stating that a detailed Micro Computer Aided Cost Estimate System (MCACES) was not required.

It was determined by the EWG to develop cost estimates for two sites, Lock and Dam 22 and Lock and Dam 25. These sites were selected because the sites are representative of other Locks and Dams included in the Navigation Study. Lock and Dam 22 has a rock founded foundation and Lock and Dam 25 has a pile founded foundation. In addition, these two locks are located in the down river reach that would be most likely to have such improvements undertaken. There were numerous alternatives developed for each of these sites. Cost estimates for the other sites included in the Navigation Study were extrapolated, based on differences in physical features, from the Lock and Dam 22 and 25 construction cost estimates. The alternatives selected that were the most feasible were the Location 2, type R (2R) and Location 3, type C (3C). These alternatives are a representative sample of cost estimating activities as well as possible outcomes of economic analyses. Definitions of these lock locations and types can be found in References 3 and 2, respectively. The estimates for Locks and Dams 22 and 25, Location 3C were developed as part of Reference 3. The estimates for Locks and Dams 22 and 25 Location 2R were developed in Reference 2. These cost estimates for Locks and Dams 22 and 25, Locations 2R and 3C estimates are included in **Appendix A** of this report.

METHODOLOGY

General. An Architect-Engineering (AE) firm was selected to prepare an independent cost estimate for Locks and Dams 22 and 25, 2R and 3C Locations. A comparison of the Corps estimate and the AE's estimates were made at the January 1996 price level. Since the total construction cost is input into the economic analysis for a potential project, the primary focus of this effort was to provide a bottom line comparison of the Corps estimates with the AE's estimates. The steps taken to achieve these comparisons were as follows.

TASK ORDER FOR AE TO PREPARE CONSTRUCTION COST ESTIMATES

A task order for the preparation of independent Concept Design cost estimates for large scale alternatives was issued to Jacobs Civil Inc., formerly Sverdrup of St. Louis,

Missouri in February 2002. Jacobs was chosen due to their firm's past navigation lock and dam construction experience and their knowledge level of innovative "float-in" and "in-the-wet" construction techniques that are being proposed in the Upper Mississippi River (UMR) and the Illinois Waterway (IWW). Jacob's effort was completed on July 26, 2002. The scope of work for this task order is included in **Appendix B**. The AE was to develop construction cost estimates for Locations 2R and 3C at Locks and Dams 22 and 25. The AE's work was to determine at a conceptual level: the construction sequencing and crew, labor and equipment required to perform the work. In order to allow for a cost estimate comparison, it was suggested that the AE use the Corps of Engineer's work item break-out as a general guide. It was agreed upon by the Corps and the AE that work items such as lock equipment, miscellaneous metal, electrical and mechanical would not be included as costs that the AE would develop. The basis for this decision was that for a conceptual level design that the Corps would be the primary source of cost information for these specialized components and thus not an independent source. These component costs have been established by recent actual construction bids on such type of equipment at UMR major rehabilitation sites. As such, for those items, the AE would use the Corps' estimated construction costs. These items that the AE would not develop estimates for constitute about 20%-25% for the 3C locations and about 35% for the 2R locations of the construction costs. The AE developed quantities for the work items based on the conceptual designs and the AE's expertise. A contingency factor for each work item was assigned by the AE. The scope of work stated that the AE's estimates be at the July 2000 price level.

The Scope of Work required the AE to make 30%, 75%, 95% and 100% submittals. The submittals allowed the Corps to review the progress of the AE's work and consistency with the Scope of Work. During the review process there was no effort to reconcile differences in unit costs between the Corps' estimates and the AE's estimates.

AE CONSTRUCTION COST ESTIMATES

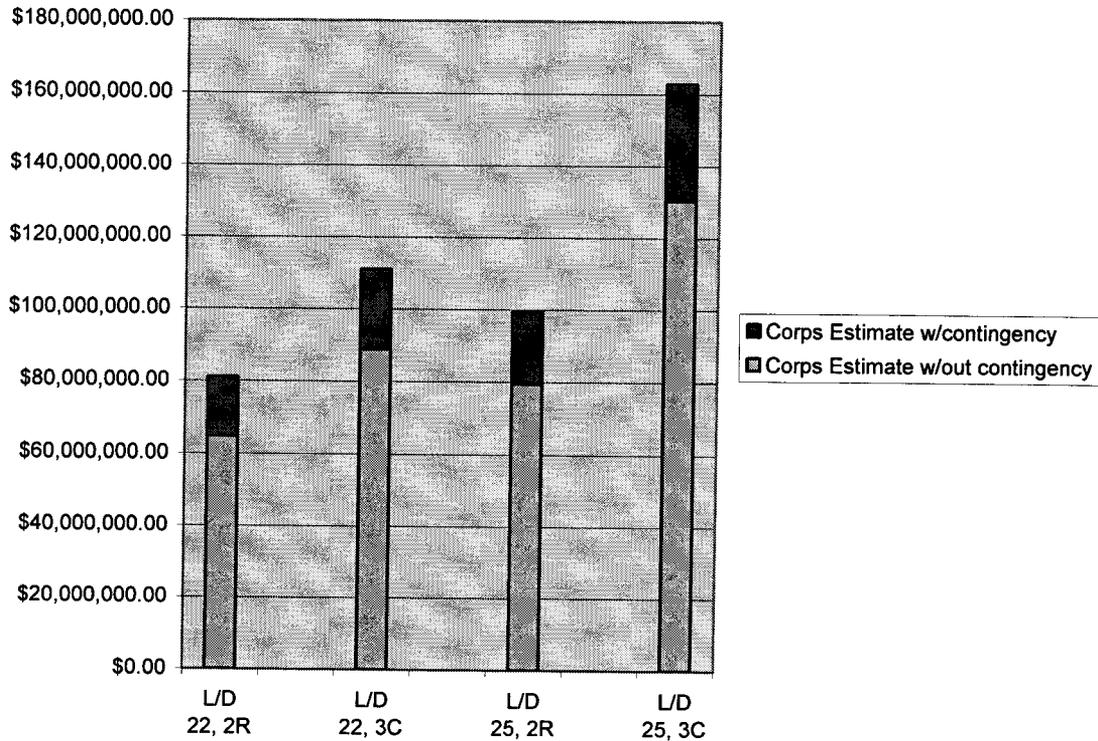
The construction cost estimates for Locks and Dams 22 and 25, Locations 2R and 3C that were developed by the AE, consistent with the AE's 100% submittal are included in **Appendix C**.

ADJUSTMENTS TO COST ESTIMATES:

Corps of Engineers: During the review process of the AE's estimate for Lock and Dam 22, Location 3C it was apparent that there was an error in the subtotal shown for the guidewall. The spreadsheet included in Appendix A in the Interim Report had a subtotal of \$17 million for the guidewall work. This subtotal should have been \$21 million. It appears that there was an error in the formula and that one of the line items was not included in the formula for the subtotal. The formula for the subtotal has been changed to include all the line items for the guidewall in the spreadsheet for the Lock and Dam 22, Location 3C included in Appendix E. The cost estimates developed by the Corps are shown in Table 1.

Table 1 - Corps of Engineers Cost Estimates for Locks and Dams 22, Locations 2R and 3C and Lock and Dam 25, Locations 2R and 3C

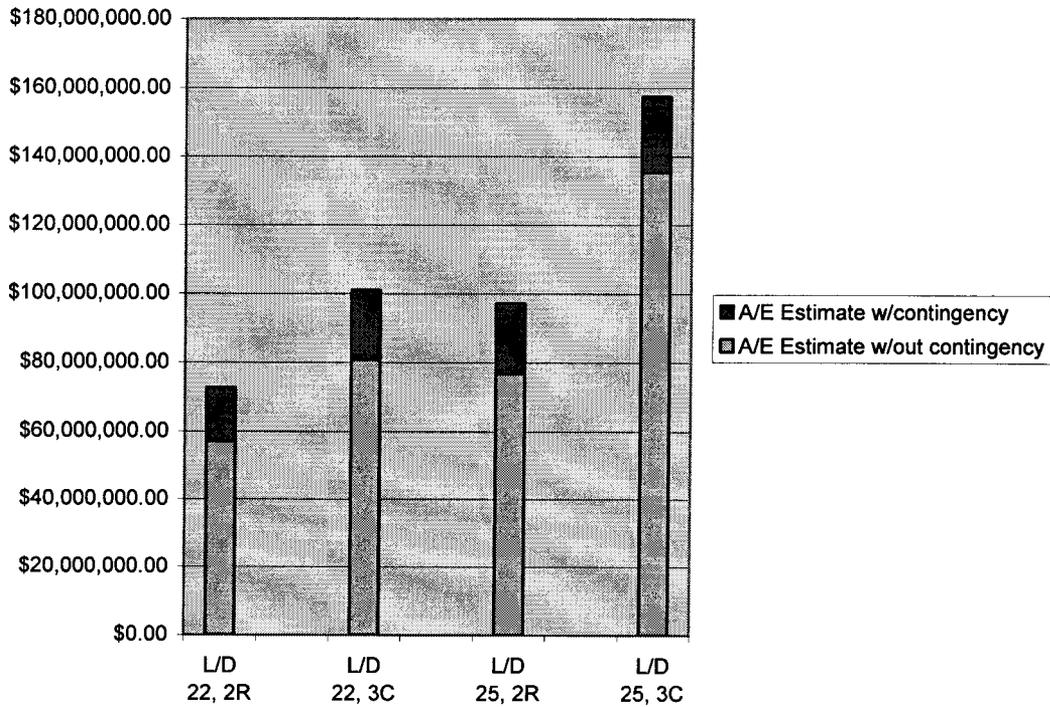
(Construction Costs only, no Engineering Design & Construction Management)



AE: After the Scope of Work had been negotiated, it was noted that to be consistent with the price level of the Corp's previous estimates that the AE's estimates should also be at the January 1996 price level, rather than the July 2000 price level that was included in the Scope of Work. Therefore, the AE's final cost estimates were adjusted from the July 2000 price level to the January 1996 price level using the Engineering News Record (ENR) index. This adjustment to the unit costs is shown in **Appendix D** and was the only adjustment made to the AE's final cost submittals. The cost estimates developed by the AE are shown in Table 2.

Table 2 - Jacob's Cost Estimates for Locks and Dams 22, Locations 2R and 3C and Lock and Dam 25, Locations 2R and 3C

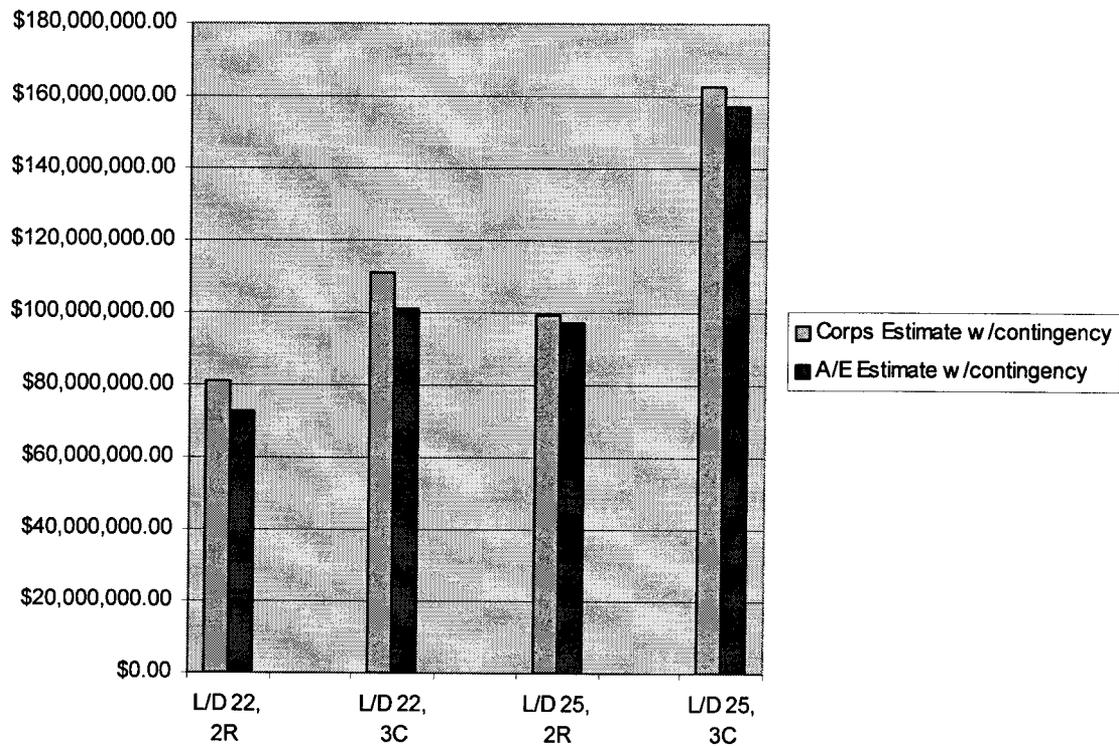
(Construction Costs only, no Engineering Design & Construction Management)



COMPARISON BETWEEN CORPS OF ENGINEERS' AND AE'S COST ESTIMATES:

A comparison of the Corps estimates and the AE's estimates with and without contingency for the Locks and Dams 22 and 25, 2R and 3C locations are shown in **Appendix E**. Table 3 shows the bottom line comparison between the Corps' and the AE's estimates with and without contingency for each of the four estimates.

**Table 3 - Cost Comparison Between Corps of Engineers' and Jacob's Estimates
(Construction Costs only, no Engineering Design & Construction Management)**



As previously stated, the AE assigned a contingency factor to each line item. The Corps' estimates were developed using an overall 25% contingency factor. It should be noted that although the approach used to assign a contingency factor to the cost estimates were different for the Corps and the AE, the overall contingency factors for the Corps' estimates and the AE's estimate compare within a range of 2% for the Lock and Dam 22, Location 2R and the Lock and Dam 25, Locations 2R and 3C. The overall contingency factor determined by the AE's estimator for the Lock and Dam 22, 3C location was 16% versus the Corps' 25%. The AE's project manager stated that the estimator that prepared the Lock and Dam 22, 3C estimate had been conservative when developing some of the unit costs. For this reason, the estimator felt it appropriate to assign what appears to be a "lesser" contingency factor to line items for the Lock and Dam 22, 3C location estimate.

It should be noted that there might be considerable differences in unit costs and quantities between the Corps' estimates and the AE's estimates for a particular line item. This is largely attributed to the fact that the estimates are based on conceptual designs and the

scope of individual work items may vary depending on the estimator's interpretation as to the scope of work associated with a particular work item. For instance, the quantities of pre-cast concrete and cast-in-place concrete may be different by the pure definition of what constitutes cast-in-place concrete. One estimator makes the determination that cast in place concrete includes the concrete that is cast by the contractor off-site and then transported to the job site, another estimator determines that the same concrete is pre-cast because it arrives to the job site as pre-cast. Add to that, the subsidiary items that don't necessarily fit any certain work item that have cost associated with them that need to be reflected somewhere in the estimate. One estimator may choose to include those costs with a different line item than another estimator would choose. The important thing is that regardless of how the line items are constructed is that there are costs included somewhere in the estimate to cover all the work that it is anticipated that the contractor will need to perform. For these reasons, it is imperative that the bottom line comparisons between the Corps' estimate and the AE's estimates be considered to be more significant than the line-by-line comparisons of the estimates.

CONCLUSIONS: The differences in the bottom lines between the Corps' estimates and the AE's estimates are typically between 2.3% and 10.4%. The independent development of Jacob's cost estimates substantiates the Corps' previous estimates. Thus, the Corps' large scale cost estimates developed for the feasibility study process are reasonable and accurate and shall remain as reported. It is recommended that the information from previous Corps' estimates and Jacob's estimates will be utilized to help develop future construction cost estimates for site-specific feasibility studies and for future plans and specifications estimates.

U.S. Army Corps of Engineers
Rock Island District
St. Louis District
St. Paul District

Independent Review of Concept Design Construction Costs
for
Upper Mississippi River-Illinois Waterway System Navigation Study

Large Scale Measures for Reducing Traffic Congestion

Documentation Report

A

CORPS OF ENGINEER'S CONSTRUCTION COST ESTIMATES

**LOCK AND DAM NO. 25, LOCATION 2, TYPE R
1200' LOCK ALTERNATIVE (SAND-FOUNDED)**

ACCOUNT CODE	ITEM	QUANTITY	UNIT	UNIT PRICE (\$'s)	AMOUNT (\$1,000's)
01.	LANDS AND DAMAGES				
	REAL ESTATE	1	JOB	SUM	150
04.	DAMS				
	04 DAMS SUBTOTAL				0
05.	LOCKS				
	SITWORK				
	MOBILIZATION	1	JOB	SUM	8,650
	DEMOLITION	1	JOB	SUM	500
	EXCAVATION	16,600	CY	4.5	75
	SCOUR PROTECTION	15,625	TN	20	313
	FOUNDATION/LOCK DEWATERING	1	JOB	SUM	3,000
	MARINE FACILITIES, TEMP MOORING STRUCTURE	1	JOB	SUM	950
	CONCRETE				
	UNDERBASE GROUTING	2,200	CY	200	440
	CAST IN PLACE REINFORCED CONCRETE	12,568	CY	280	3,519
	LIGHTWEIGHT CONCRETE	6,030	CY	325	1,960
	PRECAST CONCRETE	7,015	CY	400	2,806
	TREMIE CONCRETE	9,178	CY	165	1,514
	STONE FILL FOR IWALL CELLS	47,535	TN	20	951
	GROUT FOR STONE FILLED CELLS	5,212	CY	200	1,042
	SAND FILL FOR LANDWALL CELLS	23,300	CY	10.00	233
	FURNISH AND SET LANDING PADS	6	EA	19000	114
	FLOAT IN AND SET MITER GATE SILL	1	JOB	SUM	140
	36" DIA PIPE PILES, QTY 56 PILES	4,200	LF	350	1,470
	SET PRECAST WALL PANELS	48	EA	8000	384
	SET PRECAST BEAMS	50	EA	3000	150
	ARTICULATED CONCRETE MAT FOR FLOOR	70,000	SF	10	700
	BEDDING UNDER FLOOR MAT	7,000	TN	20	140
	METALS				
	RIVER WALL SHEET PILING (PS-31)	114,282	SF	22.04	2,519
	STAY IN PLACE TEMPLATES	14	EA	50,000	700
	LANDWALL SHEET PILING (PS-31)	137,295	SF	19.64	2,696
	Z-PILE CRADLE FOR FOAT-IN MONOLITH	29,700	SF	21.74	646
	FOUNDATION PILING AND TESTING	1	JOB	SUM	1,000
	H-PILING HP 12X53	5,472	VLF	33.50	183
	STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS)	1	JOB	SUM	11,613
	STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC.)	1	JOB	SUM	3,040
	ROCK BOLTS & SUPPORTS FOR PRECAST BEAMS	140	EA	350	49
	FASTNERS FOR PRECAST PANELS	336	EA	100	34
	ELECTRICAL				
	ELECTRICAL SYSTEM	1	JOB	SUM	4,700
	INSTRUMENTATION	1	JOB	SUM	1,250
	MECHANICAL				
	GATE AND VALVE OPERATING MACHINERY	1	JOB	SUM	2,750
	MECHANICAL SYSTEMS	1	JOB	SUM	3,200
	MISCELLANEOUS				
	05 LOCKS SUBTOTAL				65,380
05.60.	GUIDEWALLS				
	SITWORK				
	EXCAVATION	118490	CY	4.50	533
	BACKFILL	73640	CY	10	736
	SCOUR PROTECTION	18900	TN	20	378
	CONCRETE				
	48" DIAMETER PILES	1068	VLF	370	395
	CAST IN PLACE CONCRETE	195	CY	180	35
	PRESTRESSED BOX BEAMS	1	JOB	SUM	5,067
	PRECAST BEAM SEATS	6	EA	22,500	135
	TREMIE CONCRETE	90	CY	165	15
	PERMANENT CELL FILL(CONCRETE)	3,302	CY	200	660
	GROUT AND BLADDERS	5,328	CF	29.40	157
	STEEL REINFORCEMENT	155,000	LB	1	155
	STONE FILL FOR WALL CELLS	8,975	CY	20	180
	METALS				
	STEEL SHEET PILING FOR CELLS (PS-31)	62,040	SF	22.04	1,367
	STEEL SHEET PILING FOR SKIRT	29,160	SF	18.35	535
	STEEL H-PILING (FOR 57 FT DIA CELL)	4,080	VLF	52.50	214
	ANCHOR BARS FOR BEAMS	2,160	LF	87.60	189
	WALL ARMOR (14 STRIPS)	369,600	LB	4.20	1,552
	STEEL RUB PLATE AND ACCESSORIES	63,600	LB	6.00	382
	LADDERS AND MISC METALS	100,000	LB	3.00	300
	HANDRAILLING (ALUM.)	1,400	LF	125.40	176
	CHECKPOST	30	EA	1,546	46
	ACCESS HATCHES	1	JOB	SUM	33
	ELECTRICAL				
	ELECTRICAL SYSTEM	1	JOB	SUM	78
	05.60 GUIDEWALLS SUBTOTAL				13,319
09.	CHANNEL WORK	1	JOB	SUM	680
	PROJECT SUBTOTAL				79,529
	CONTINGENCIES 25%				19,882
	PROJECT SUBTOTAL WITH CONTINGENCIES				99,412
30.	PLANNING, ENGINEERING, AND DESIGN (10%)				9,941
31.	CONSTRUCTION MANAGEMENT (10%)				9,941
	PROJECT TOTAL				\$ 119,294

TOTAL BASIC LOCK COST (04., 05., 05.60.) WITH CONTINGENCIES, PED, & CM*

\$ 119,000

*(EXCLUDES REAL ESTATE, RELOCATION, AND CHANNEL WORK WHICH ARE MORE SITE-SPECIFIC.)

LOCK AND DAM NO. 25, LOCATION 3, TYPE C
1200' LOCK ALTERNATIVE (PILE FOUNDED)

ACCOUNT CODE	ITEM	L/D 25	QUANTITY	UNIT	UNIT PRICE (\$'s)	AMOUNT (\$1,000's)
01.	LANDS AND DAMAGES					
	REAL ESTATE		1	JOB	SUM	150
04.	DAMS					
	REMOVAL OF EXISTING STRUCTURES		1	JOB	SUM	150
	04 DAMS SUBTOTAL					150
05.	LOCKS					
	SITework					
	MOBILIZATION		1	JOB	SUM	10,650
	DEMOLITION		1	JOB	SUM	1,910
	EXCAVATION		48,960	CY	6.25	306
	FOUNDATION FILL AT SCOUR HOLE		125,000	CY	18.75	2,344
	WALL FILL		15,760	CY	10.00	158
	CAPSTONE		52,660	TN	25.00	1,317
	RIPRAP		33,380	TN	20.00	668
	LEVELING STONE IN LOCK FLOOR		4,580	TN	15.00	69
	GRAVEL FILTER IN LOCK FLOOR		16,606	TN	15.00	249
	GEOTEXTILE		13,740	SY	6.00	82
	FOUNDATION/LOCK DEWATERING		1	JOB	SUM	3,000
	MARINE FACILITIES, TEMP. MOORING STR.		1	JOB	SUM	3,900
	CONCRETE					
	STRUCTURAL GROUTING		450	CY	200	90
	CAST IN PLACE REINFORCED CONCRETE		64,790	CY	217	14,059
	CAST IN PLACE CONNECTIONS		964	CY	725	699
	PRECAST CONCRETE		2,904	CY	400	1,162
	TREMIE CONCRETE		10,340	CY	165	1,706
	PRECAST FLOOR PAVERS AND STRUTS		15,450	CY	286	4,419
	SET PRECAST FLOOR BEAMS		31	EA	16000	496
	SET FLOOR PANELS		62	EA	10000	620
	STEEL REINFORCEMENT		7,268,000	LB	0.75	5,451
	METALS					
	SHEET PILING		272,800	SF	35.80	9,766
	SHEET PILE BRACING		1	JOB	SUM	350
	FOUNDATION PILING AND TESTING		209,190	LF	39.75	8,315
	STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS, BULKHEADS)		1	JOB	SUM	11,613
	STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC.)		1	JOB	SUM	3,040
	ELECTRICAL					
	ELECTRICAL SYSTEM		1	JOB	SUM	4,700
	INSTRUMENTATION		1	JOB	SUM	1,250
	MECHANICAL					
	GATE AND VALVE OPERATING MACHINERY		1	JOB	SUM	2,750
	MECHANICAL SYSTEMS		1	JOB	SUM	3,200
	MISCELLANEOUS		1	JOB	SUM	1,950
	05 LOCKS SUBTOTAL					100,288
05.60.	GUIDEWALLS					
	SITework					
	EXCAVATION		95,384	CY	4.5	429
	BACKFILL		59,280	CY	10	593
	SCOUR PROTECTION		37,312	TON	15	560
	CONCRETE					
	42" DIAMETER PILES		5,120	LF	400	2,048
	CAST IN PLACE REINFORCED CONCRETE		2,013	CY	150	302
	PRECAST BEAMS		13,947	CY	500	6,973
	PRECAST BEAM SEATS		211	CY	1000	211
	TREMIE CONCRETE		168	CY	500	84
	PERMANENT CELL FILL (CONCRETE)		8,372	CY	200	1,674
	GROUT FOR BEAMS		626	CY	1000	626
	STEEL REINFORCEMENT		2,351,969	LB	0.75	1,764
	GRAVEL FILL		42,263	CY	10	423
	METALS					
	SHEET PILING		1	JOB	SUM	6,131
	FOUNDATION PILING		1	JOB	SUM	256
	POST TENSIONING		1,634	LF	30	49
	STRUCTURAL STEEL		1	JOB	SUM	3,268
	FLOATING GUIDEWALL		1	JOB	SUM	3,750
	05.60 GUIDEWALLS SUBTOTAL					29,141
09.	CHANNEL WORK		1	JOB	SUM	680
	PROJECT SUBTOTAL					130,409
	CONTINGENCIES 25%					32,591
	PROJECT SUBTOTAL WITH CONTINGENCIES					163,000
30.	PLANNING, ENGINEERING, AND DESIGN (10%)					16,500
31.	CONSTRUCTION MANAGEMENT (10%)					16,500
	PROJECT TOTAL					\$ 196,000

TOTAL BASIC LOCK COST (04., 05., 05.60.) WITH CONTINGENCIES, PED, & CM*

\$ 194,000

*(EXCLUDES REAL ESTATE, RELOCATION, AND CHANNEL WORK WHICH ARE MORE SITE-SPECIFIC.)

**LOCK AND DAM NO. 22, LOCATION 2, TYPE R
1200' LOCK ALTERNATIVE (ROCK-FOUNDED)**

ACCOUNT CODE	ITEM	QUANTITY	UNIT	UNIT PRICE (\$'s)	AMOUNT (\$1,000's)
01.	LANDS AND DAMAGES				
	REAL ESTATE	1	JOB	SUM	150
04.	DAMS				
	04 DAMS SUBTOTAL				0
05.	LOCKS				
	SITWORK				
	MOBILIZATION	1	JOB	SUM	8,000
	DEMOLITION	1	JOB	SUM	500
	ROCK EXCAVATION	8,247	CY	45	371
	OVERBURDEN EXCAVATION	40,900	CY	4.5	184
	BACKFILL	16,700	CY	10	167
	LOCK DEWATERING	1	JOB	SUM	1,250
	MARINE FACILITIES, TEMP MOORING STRUCTURE	1	JOB	SUM	3,900
	CONCRETE				
	UNDERBASE GROUTING	460	CY	200	92
	CAST IN PLACE REINFORCED CONCRETE	15,415	CY	280	4,316
	PRECAST CONCRETE	5,019	CY	400	2,008
	GATE MONOLITH TREMIE CONCRETE	1,650	CY	210	347
	CONCRETE CELL FILL	29,510	CY	200	5,902
	FURNISH AND SET LANDING PADS	16	EA	19000	304
	FLOAT IN AND SET MITER GATE SILL	4	EA	100000	400
	SET PRECAST WALL PANELS	48	EA	8000	384
	SET PRECAST BEAMS	50	EA	3000	150
	ANCHOR FOR LANDWALL	1,875	EA	50	94
	METALS				
	RIVER WALL SHEET PILING (PS-31)	100,200	SF	22.04	2,208
	STAY IN PLACE TEMPLATES	20	EA	50,000	1,000
	STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS)	1	JOB	SUM	3,250
	STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC.)	1	JOB	SUM	3,040
	ROCK BOLTS & SUPPORTS FOR PRECAST BEAMS	140	EA	350	49
	FASTNERS FOR PRECAST PANELS	336	EA	100	34
	HIGH CAPACITY ROCK ANCHORS	53	EA	8700	461
	ELECTRICAL				
	ELECTRICAL SYSTEM	1	JOB	SUM	4,700
	MECHANICAL				
	GATE AND VALVE OPERATING MACHINERY	1	JOB	SUM	2,750
	MECHANICAL SYSTEMS	1	JOB	SUM	3,200
	MISCELLANEOUS				
	MISCELLANEOUS	1	JOB	SUM	1,950
	05 LOCKS SUBTOTAL				51,010
05.60.	GUIDEWALLS				
	SITWORK				
	ROCK EXCAVATION	210	CY	45.00	9
	OVERBURDEN EXCAVATION	3060	CY	4.50	14
	CONCRETE				
	CAST IN PLACE REINFORCED CONCRETE	500	CY	280	140
	PRECAST CONCRETE BEAMS (PRESTRESSED)	2,025	LF	2,000	4,050
	TREMIE CONCRETE (WITH REINFORCEMENT)	2,515	CY	210	528
	METALS				
	STEEL CYLINDERS FOR CELLS (FILLED W CONCRETE)	5	EA	450,000	2,250
	NOSE STELL CYLINDER (FILLED WITH CONCRETE)	1	EA	900,000	900
	ANCHOR BARS FOR BEAMS	2,010	LF	87.60	176
	WALL ARMOR (14 STRIPS)	369,600	LB	4.20	1,552
	STEEL RUB PLATE AND ACCESSORIES	63,600	LB	6.00	382
	LADDERS AND MISC METALS	100,000	LB	3.00	300
	HANDRAILLING (ALUM.)	1,400	LF	125.40	176
	CHECKPOST	30	EA	1,546.00	46
	ACCESS HATCH	1	JOB	SUM	33
	ELECTRICAL				
	ELECTRICAL SYSTEM	1	JOB	SUM	78
	05.60 GUIDEWALLS SUBTOTAL				10,634
09.	CHANNEL WORK	1	JOB	SUM	3,200
	PROJECT SUBTOTAL				64,995
	CONTINGENCIES 25%				16,249
	PROJECT SUBTOTAL WITH CONTINGENCIES				81,243
30.	PLANNING, ENGINEERING, AND DESIGN (10%)				8,124
31.	CONSTRUCTION MANAGEMENT (10%)				8,124
	PROJECT TOTAL				\$ 97,492

TOTAL BASIC LOCK COST (04., 05., 05.60.) WITH CONTINGENCIES, PED, & CM*

\$ 97,000

*(EXCLUDES REAL ESTATE, RELOCATION, AND CHANNEL WORK WHICH ARE MORE SITE-SPECIFIC.)

**LOCK AND DAM NO. 22, LOCATION 3, TYPE C
1200' LOCK ALTERNATIVE (ROCK-FOUNDED)**

ACCOUNT CODE	ITEM	QUANTITY	UNIT	UNIT PRICE (\$'s)	AMOUNT (\$1,000's)
01.	LANDS AND DAMAGES				
	REAL ESTATE	1	JOB	SUM	150
04.	DAMS				
	04 DAMS SUBTOTAL				0
05.	LOCKS				
	SITWORK				
	MOBILIZATION	1	JOB	SUM	8,000
	DEMOLITION	1	JOB	SUM	1,800
	DREDGING	43,131	CY	4.50	194
	ROCK EXCAVATION	39,194	CY	45	1,764
	EXTENSION OF EXISTING DOWNSTREAM GUIDEWALL	1	JOB	SUM	7,700
	COFFERDAM FILL (DOWNSTREAM CLOSURE)	9,720	CY	14.5	141
	EXISTING LOCK DEWATERING	1	JOB	SUM	440
	NEW LOCK DEWATERING	1	JOB	SUM	440
	CONCRETE				
	CAST IN PLACE REINFORCED CONCRETE	26,283	CY	280	7,359
	PRECAST CONCRETE (W/REINFORCEMENT)	2,325	CY	400	930
	TREMIE CONCRETE	4,114	CY	210	864
	PERMANENT CELL FILL -GRAVEL** (RIVERWALL)	33,650	CY	15	505
	PERMANENT CELL FILL -CONCRETE (I-WALL)	16,140	CY	280	4,519
	OTHER GRAVEL FILL	2,900	CY	15	44
	PRECAST PANELS FOR CELLULAR WALL (RIVERWALL)	2,370	CY	600	1,422
	PRECAST PANELS FOR CELLULAR WALL (I-WALL)	2,270	CY	800	1,816
	METALS				
	SHEETPILING (DOWNSTREAM CLOSURE, PSA23)	15,920	SF	25.00	398
	SHEETPILING - PERMANENT PSA23 (LOCKWALLS)	189,560	SF	25.00	4,739
	STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS)	1	JOB	SUM	3,250
	STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC)	1	JOB	SUM	2,500
	ELECTRICAL				
	ELECTRICAL SYSTEM	1	JOB	SUM	4,700
	MECHANICAL				
	GATE AND VALVE OPERATING MACHINERY	1	JOB	SUM	2,053
	MECHANICAL SYSTEMS	1	JOB	SUM	2,900
	MISCELLANEOUS				
	05 LOCKS SUBTOTAL				5,848
					64,325
05.60.	GUIDEWALLS				
	CONCRETE				
	CAST IN PLACE REINFORCED CONCRETE	2,316	CY	280.00	648
	PRECAST CONCRETE BEAMS (PRESTRESSED)	6,000	LF	1,170.00	7,020
	PRECAST CONCRETE (W/REINFORCEMENT)	2,960	CY	400.00	1,184
	TREMIE CONCRETE	15,186	CY	210	3,189
	GRAVEL FILL	29,582	CY	15	444
	METALS				
	SHEETPILING FOR CELLS (PS31)	152602	SF	25	3,815
	SHEETPILE CUTOFF WALL	32,775	SF	30.00	983
	STRUCTURAL STEEL	1	JOB	SUM	3,811
	05.60 GUIDEWALLS SUBTOTAL				21,095
09.	CHANNEL WORK	1	JOB	SUM	3,200
	PROJECT SUBTOTAL				88,770
	CONTINGENCIES 25%				22,192
	PROJECT SUBTOTAL WITH CONTINGENCIES				110,962
30.	PLANNING, ENGINEERING, AND DESIGN (10%)				11,096
31.	CONSTRUCTION MANAGEMENT (10%)				11,096
	PROJECT TOTAL				\$ 133,155

TOTAL BASIC LOCK COST (04., 05., 05.60.) WITH CONTINGENCIES, PED, & CM*

\$ 133,000

*(EXCLUDES REAL ESTATE, RELOCATION, AND CHANNEL WORK WHICH ARE MORE SITE-SPECIFIC.)

U.S. Army Corps of Engineers
Rock Island District
St. Louis District
St. Paul District

Independent Review of Concept Design Construction Costs
for
Upper Mississippi River-Illinois Waterway System Navigation Study
Large Scale Measures for Reducing Traffic Congestion

Documentation Report

B

TASK ORDER FOR AE TO PREPARE CONSTRUCTION COST
ESTIMATES

**SCOPE OF WORK
ARCHITECT-ENGINEER SERVICES FOR
PREPARATION OF CONCEPT DESIGN COST ESTIMATES FOR
MISSISSIPPI RIVER-ILLINOIS WATERWAY NAVIGATION STUDY
LARGE SCALE MEASURES
FOR REDUCING TRAFFIC CONGESTION**

1. **REFERENCES.** This task order is for the preparation of independent Concept Design cost estimates for the large-scale alternatives as specified below and will be issued under Contract DACW25-01-D-0009.
 - a. Internal Review Draft, Upper Mississippi River-Illinois Waterway System Navigation Study, Engineering Appendix, July 2000.
 - b. UMR-IWW System Navigation Study, Interim Revised Lock Extensions Design Concepts, Interim Report, 18 July 2000.
 - c. Upper Mississippi River-Illinois Waterway System Navigation Study, Large Scale Measures of Reducing Traffic Congestion, Conceptual Lock Designs, February 1996.

2. **PRECEDENCE.** This Scope of Work (SOW) provides specific instructions for performing the required services described herein for this project and, in case of conflicts, takes precedence over the requirements of Section C of the Firm Fixed Price Contract indicated above.

3. **PROJECT BACKGROUND.** The Upper Mississippi River-Illinois Waterway System Navigation Study is a feasibility study addressing navigation planning for the Upper Mississippi River and Illinois Waterway (UMR-IWW) system for the years 2000-2050. The study assesses the need for navigation improvements on the UMR-IWW and the impacts of providing these improvements. The large scale measures for reducing traffic congestion that have been considered for the future with-project condition include several alternatives for providing a 1200 foot lock chamber at 14 locksites on the Mississippi River (11-25) and two locksites on the Illinois Waterway (Peoria and Lagrange). The primary benefit of the large-scale measures comes from providing a lock chamber large enough to eliminate the need for double lockages. An extensive screening process was conducted to determine the most feasible and cost effective alternatives at the existing sites. The alternatives selected for the Mississippi River locks are the extension of the existing lock (Location 2) and construction of a new lock in the auxiliary chamber (Location 3). The alternatives selected for Peoria and Lagrange on the Illinois Waterway are extension of the existing lock (Location 2) and construction of a landward lock (Location 1). Two sites were used as models to develop the concepts. Lock and Dam 25 was used to develop conceptual pile founded designs. Lock and Dam 22 was used to develop rock founded designs.

4. REQUIRED A-E SERVICES.

4.1 GENERAL. The A-E shall perform the services indicated in this Scope of Work and Section C of the Contract and deliver the final product in one final package.

4.2 WORK DESCRIPTION. The A-E firm shall furnish all materials, equipment, supplies, personnel and other services required to perform the cost engineering services required in this scope of work. The A-E shall become familiar with the concept design drawings and documents provided by the District, review the construction sequencing such as the wintertime construction work as presented in Addendum A to reference a., develop quantity take-offs, determine equipment and crews to be used and associated production rates, prepare calculations as necessary, obtain current pricing data for specified materials, supplies, plant & equipment, and labor in order to prepare comprehensive conceptual construction cost estimates for the rock founded and pile founded concepts for locations 2 and 3 at Locks 22 and 25. The costs shall include the costs for the lock structures as well as associated guidewalls. A total of four cost estimates will be developed. For the rock founded Locks, estimates shall be developed for Location 2 Type R and Location 3 Type C. At the pile founded sites estimates for Location 2 Type R, and Location 3 Type C shall be developed. The current costs shall be developed and adjusted to the July 2000 price level by using the ENR indexes or some other acceptable method. This is to match the latest price level which the Corps has developed. The A-E shall consider the level of accuracy and detail of the cost estimates specified herein and recommend and apply a reasonable contingency factor for each work item to cover the inherent uncertainties at this stage. It is the intent to use the cost estimates for the model sites and apply them to the other locksites in the system.

4.3 NARRATIVE REPORT. The A-E firm shall submit a written narrative report along with the cost estimate format that includes a description of the work plan considered (construction sequencing), logistics, breakout of major work that may be sub-contracted, the assumptions, calculations, pricing including premiums paid for wintertime construction, etc. on which the cost estimates are based. Overhead markups for the contractors are to include field, home, insurance, profit, and bond. Cost items that have a high degree of uncertainty because of the level of detail shall be emphasized in the narrative with a discussion of the related features and rationale for the uncertainty and considerations for the final design.

4.4 ESTIMATE FORMAT AND DETAILS. The cost estimates shall be presented in the format as shown in Attachment A using the units of measure indicated. Lump Sum units of measure should be avoided. The cost estimates shall include but not be limited the work items indicated. The A-E firm shall provide all backup calculations, price quotations obtained, drawings, sketches, etc. in hard copy with the narrative report, in typed legible and easy to read 8 ½ by 11 inch paper copies in 3-ring binder. The text and spreadsheets shall be in MS WORD 2000 or

EXCEL 2000 or later. Along with the hard copies, an electronic copy of the final narrative report and final cost estimates shall be provided either on 3.5 " floppy disc or CD. Interim submittals of the narrative and cost estimate shall be emailed.

4.5 A-E MEETINGS, CONFERENCES, & DISCUSSIONS. The A-E shall attend a pre-proposal meeting to discuss the work items and receive clarifications and comments from the Corps. The A-E cost estimator shall attend. Intermediate meetings are not expected however review discussions may be held by teleconference. The A-E firm shall take notes and prepare minutes for meetings and teleconferences conducted. The A-E shall provide an agenda prior to the site visits or each meeting. Minutes shall be prepared in typed form, signed by the A-E Project Manager, and furnished to the Rock Island District's Project Engineer within five calendar days after the meeting/conference for concurrence. These minutes shall include the following items, as a minimum:

- a). The date and place the meeting/conference was held with a list of attendees, the organizations they represent, and their position titles and phone numbers.
- b). A summary of issues raised, decisions made, and conclusions reached during the meeting/conference.

The A-E shall provide a written record of all significant discussions and telephone conversations that the firm's representatives participate in, on matters relative to this project.

4.6 DELIVERY OF THE COST ESTIMATE. Four copies of the final product including the narrative reports and the floppy disk or CD shall be delivered to the following address:

Rock Island District Corps of Engineers
ATTN: Mr. Dan Johnson / CEMVR-ED-C
Clock Tower Building
P.O. Box 2004
Rock Island, IL 61204-2004
Email: daniel.j.johnson@usace.army.mil

5. GOVERNMENT FURNISHED ITEMS: Copies of the referenced reports listed in Section 1. will be provided. Geotechnical data (borings) is available if needed. All current Guide Specifications, EM's, ER's, EP's, and other guidance can be found on the internet at www.hnd.usace.army.mil/techinfo.

(a) ER 1110-1-1300 Cost Engineering Policy and General Requirements (26 Mar 93)

(b) ER 1110-2-1302 Civil Works Cost Engineering (31 Mar 94)

6. REVIEW AND COORDINATION WITH THE CORPS OF ENGINEERS.

(a) Mr. Dan Johnson at 309-794-5857 of the Rock Island District will be the point of contact regarding contracting and cost estimating issues.

(b) Mr. Tom Mack at 563-386-0572 of the Rock Island District will be the point of contact for technical issues.

7. SCHEDULE.

<u>Percent Complete</u>	<u>Time from NTP (Calendar Days)</u>
30% Clarification Conference	4 Weeks
75% Submittal	7 Weeks
95% Submittal	10 Weeks
100% Final Submittal	11 Weeks

NTP – Notice to Proceed

Written review comments from the Corps will be provided approximately 10 working days after the 75% submittal and approximately 5 working days after the 95% submittal. Review teleconferences will be scheduled after the A-E has had a chance to evaluate the comments.

8. CONFIDENTIALITY. All information pertaining to the cost estimates shall be kept confidential during and after the preparation of the estimates, until the project is successfully awarded. All pages containing total or sub-total costs of any one of the bid items shall be labeled "FOR OFFICIAL USE ONLY". Neither the Contractor nor his representative shall release any partial or total results of the estimates prepared without the specific written approval of the Contracting Officer or his designee.

9. AUTHORIZED CHANGES. The A-E firm shall accept instructions only from the Contracting Officer or his/her duly appointed representative.

10. PROPOSAL COST FORMAT. The following format will be used in submitting the proposal for the estimated A-E cost:

APPENDIX A COST ESTIMATE FORMATS

Lock and Dam 25, Location 2, Type R, Sand Founded

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	CONT.	CONTINGENCY NOTES
Real Estate		JOB				
Locks						
Sitework						
Mobilization		JOB				
Demobilization		JOB				
Excavation		CY				
Scour Protection		TN				
Foundation/Lock Dewatering		JOB				
Marine Facilities, Temp Mooring Structure		JOB				
Concrete						
Underbase Grouting		CY				
Cast in Place Reinforced Concrete		CY				
Lightweight Concrete		CY				
Precast Concrete		CY				
Tremie Concrete		CY				
Stone Fill for I-wall Cells		TN				
Grout for Stone Filled Cells		CY				
Sand Fill for Landwall Cells		CY				
Furnish and Set Landing Pads		EA				
Float in and Set Miter Gate Sill		JOB				
36" Dia. Pipe Piles, QTY 56 Piles		LF				
Set Precast Wall Panels		EA				
Set Precast Beams		EA				
Articulated Concrete mat for Floor		SF				
Bedding Under Floor mat		TN				
Metals						
River Wall Sheet Piling (PS-31)		SF				
Stay in Place Templates		EA				
Landwall Sheet piling (PS-31)		SF				
Z-pile Cradle for Float-in Monolith		SF				
Foundation Piling and Testing		SUM				
H-Piling HP 12X53		VLF				
Structural Steel (Gates, Valves, Trashracks)		JOB				
Structural Steel (Miscellaneous- Ladders, Etc.)		JOB				
Rock Bolts & Supports for Precast Beams		EA				
Fasteners for Precast Panels		EA				
Electrical						
Electrical System		JOB				
Instrumentation		JOB				
Mechanical						
Gate and Valve Operating Machinery		JOB				
Mechanical Systems		JOB				
Miscellaneous						
		JOB				
Guidewalls						
Sitework						
Excavation		CY				
Backfill		CY				
Scour Protection		TN				
Concrete						
48" Diameter piles		VLF				
Cast in Place Concrete		CY				
Prestressed Box Beams		JOB				
Precast Beam Seats		EA				
Tremie Concrete		CY				
Permanent Cell-Fill (Concrete)		CY				
Grout and Bladders		CF				
Steel Reinforcement		LB				
Stone Fill for Walls Cells		CY				

Metals	
Steel Sheet Piling for Cells (PS-31)	SF
Steel Sheet Piling for Skirt	SF
Steel H-Piling (for 57 ft Diameter cell)	VLF
Anchor Bars for Beams	LF
Wall Armor (14 Strips)	LB
Steel Rub Plate and Accessories	LB
Ladders and Miscellaneous Metals	LB
Handrailing (Aluminum)	LF
Checkpoint	EA
Access Hatches	JOB
Electrical	
Electrical System	JOB
Miscellaneous	JOB
Channel Work	JOB
Project Total	

Lock and Dam 25, Location 3, Type C, Pile Founded

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	CONT.	CONTINGENCY NOTES
Real Estate		JOB				
Dam						
Removal of Existing Structures		JOB				
Locks						
Sitework						
Mobilization		JOB				
Demolition		JOB				
Excavation		CY				
Foundation Fill at Scour Hole		CY				
Wall Fill		FILL				
Capstone		TN				
Riprap		TN				
Leveling Stone in Lock Floor		TN				
Gravel Filter in Lock Floor		CY				
Foundation/Lock Dewatering		JOB				
Marine Facilities, Temp Mooring Structure		JOB				
Concrete						
Structural Grouting		CY				
Cast in Place Reinforced Concrete		CY				
Cast in Place Connections		CY				
Precast Concrete		CY				
Tremie Concrete		CY				
Precast Floor Pavers and Struts		CY				
Set Precast Floor Panels		EA				
Set Floor Panels		EA				
Steel Reinforcement		LB				
Metals						
Sheet Piling		SF				
Sheet Pile Bracing		JOB				
Foundation Piling and Testing		JOB				
Structural Steel (Gates, Valves, Trashracks)		JOB				
Structural Steel (Miscellaneous- Ladders, Etc.)		JOB				
Electrical						
Electrical System		JOB				
Instrumentation		JOB				
Mechanical						
Gate and Valve Operating Machinery		JOB				
Mechanical Systems		JOB				
Miscellaneous		JOB				
Guidewalls						
Sitework						
Excavation		CY				
Backfill		CY				
Scour Protection		TN				
Concrete						
42" Diameter Piles		LF				
Cast in Place Reinforced Concrete		CY				
Precast Beams		LF				
Precast Beam Seats		CY				
Tremie Concrete		CY				
Permanent Cell Fill (Concrete)		CY				
Grout for Beams		CY				
Steel Reinforcement		LB				
Gravel Fill		CY				
Metals						
Sheet Piling		EA				
Foundation Piling		LF				
Post Tensioning		JOB				
Structural Steel		JOB				
Floating Guidewall		JOB				
Channel Work		JOB				
Project Total						

Lock and Dam 22, Location 2, Type R, Rock Founded

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	CONT.	CONTINGENCY NOTES
Real Estate		JOB				
Locks						
Sitework						
Mobilization		JOB				
Demobilization		JOB				
Rock Excavation		CY				
Overburden Excavation		CY				
Backfill		CY				
Lock Dewatering		JOB				
Marine Facilities, Temp Mooring Structure		JOB				
Concrete						
Underbase Grouting		CY				
Cast in Place Reinforced Concrete		CY				
Precast Concrete		CY				
Gate Monolith Tremie Concrete		CY				
Concrete Cell Fill		CY				
Furnish and Set Landing Pads		EA				
Float in and Set Miter Gate Sill		EA				
Set Precast Wall Panels		EA				
Set Precast Beams		EA				
Anchor for Landwall		EA				
Metals						
River Wall Sheet Piling (PS-31)		SF				
Stay in Place Templates		EA				
Structural Steel (Gates, Valves, Trashracks)		JOB				
Structural Steel (Miscellaneous- Ladders, Etc.)		JOB				
Rock Bolts & Supports for Precast Beams		EA				
Fasteners for Precast Panels		EA				
High Capacity Rock Anchors		EA				
Electrical						
Electrical System		JOB				
Mechanical						
Gate and Valve Operating Machinery		JOB				
Mechanical Systems		JOB				
Miscellaneous		JOB				
Guidewalls						
Sitework						
Rock Excavation		CY				
Overburden Excavation		CY				
Concrete						
Cast in Place Reinforced Concrete		CY				
Precast Concrete Beams (Prestressed)		LF				
Tremie Concrete with reinforcement		CY				
Metals						
Steel Cylinders for Cells (filled with Concrete)		EA				
Nose Steel Cylinder (filled with Concrete)		EA				
Anchor Bars for Beams		LF				
Wall Armor (14 Strips)		LB				
Steel Rub Plate and Accessories		LB				
Ladders and Miscellaneous Metals		LB				
Handrailing (Aluminum)		LF				
Checkpost		EA				
Access Hatches		JOB				
Electrical						
Electrical System		JOB				
Miscellaneous		JOB				
Channel Work		JOB				
Project Total						

Lock and Dam 22, Location 3, Type C, Rock Founded

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	CONT.	CONTINGENCY NOTES
Real Estate		JOB				
Locks						
Sitework						
Mobilization		JOB				
Demobilization		JOB				
Dredging		CY				
Rock Excavation		CY				
Extension of Existing Downstream Guidewall		JOB				
Cofferdam Fill (Downstream Closure)		CY				
Existing Lock Dewatering		JOB				
New Lock Dewatering		JOB				
Concrete						
Cast in Place Reinforced Concrete		CY				
Precast Concrete		CY				
Tremie Concrete		CY				
Permanent Cell Fill –Gravel (Riverwall)		CY				
Permanent Cell Fill –Concrete (I-Wall)		CY				
Other Gravel Fill		CY				
Precast Panels for Cellular Wall (Riverwall)		CY				
Precast Panels for Cellular Wall (I-Wall)		CY				
Metals						
Sheetpiling (Downstream Closure , PSA23)		SF				
Sheetpiling – Permanent PSA 23 (Lockwalls)		SF				
Structural Steel (Gates, Valves, Trashracks)		JOB				
Structural Steel (Miscellaneous- Ladders, Etc.)		JOB				
Electrical						
Electrical System		JOB				
Mechanical						
Gate and Valve Operating Machinery		JOB				
Mechanical Systems		JOB				
Miscellaneous		JOB				
Guidewalls						
Concrete						
Cast in Place Reinforced Concrete		CY				
Precast Concrete Beams (Prestressed)		LF				
Precast Concrete (W/Reinforcement)		CY				
Tremie Concrete		CY				
Gravel Fill		CY				
Metals						
Sheet Piling For Cells (PS 31)		SF				
Sheet Pile Cutoff Wall (PZ35)		SF				
Structural Steel		JOB				
Miscellaneous		JOB				
Channel Work		JOB				
Project Total						

**CLARIFICATIONS TO SCOPE OF WORK
ARCHITECT-ENGINEER SERVICES FOR
PREPARATION OF CONCEPT DESIGN COST ESTIMATES FOR
MISSISSIPPI RIVER-ILLINOIS WATERWAY NAVIGATION STUDY
LARGE SCALE MEASURES
FOR REDUCING TRAFFIC CONGESTION**

The Jacobs/Sverdrup Civil proposal is based on the following:

1. During the pre-proposal meeting and subsequent telephone calls, the following items were discussed. These items clarify or modify the Scope of Work (SOW).
 - a. There is a misprint in the Scope of Work in paragraph 4.2 in the naming of the alternatives to be addressed in this effort. The four alternatives for which cost estimates are to be developed are:
 1. Rock-founded, location 2, type R (R2R)
 2. Rock-founded, location 3, type C (R3C)
 3. Pile-founded, location 2, type R (P2R)
 4. Pile-founded, location 3, type C (P3C)
 - b. Sverdrup will not be involved in reconciling our estimate with the COE version. We will flag any significant differences if they are identified.
 - c. We will not produce any large-format descriptive drawings.
 - d. We will not reschedule construction, nor will we produce any construction schedules.
 - e. We will not include real estate costs.
 - f. We will not include impact to navigation costs.
2. During our review of the data provided by the COE, we found reference to approach channel modifications, possibly as a substitute for guide wall improvements, and to instrumentation. However, no description or quantification of these items was found. Accordingly, no effort for estimating these items is included in this proposal.
3. We have not included effort for reviewing ER 1110-1-1300 Cost Engineering Policy and General Requirements and ER 1110-2-1302 Civil Works Cost Engineering. Should the COE feel that these documents contain information critical to the deliverables which Sverdrup will develop for this task, we will add effort to our proposal and adjust the price to review these documents.

4. We have based our proposal on descriptions of alternatives P3C and R3C in SOW reference c (July 1996) and on descriptions of alternatives P2R and R2R in SOW reference b (18 July 2000). Paragraph 4.2 of the SOW references the "wintertime construction work as presented in Addendum A to reference a. (Engineering Appendix)". If certain of the tasks described in references b and c on which this proposal is based are identified as being performed during wintertime closures, we will adjust productivity for the difficulties of wintertime construction. However, we have not included any effort in this proposal to address revisions to the descriptions in references b and c which may be found in reference a.
5. While developing our proposal, we were not able to match all the items in the cost estimate formats in Appendix A of the SOW to the descriptions of the alternatives in SOW references b and c. Without the descriptions, we have no basis for estimating our effort. Therefore, based on the descriptions of alternatives in SOW references b and c, we generated the list of items to be estimated, which is shown in our proposal breakdown. The breakdown lists items which are common to all alternatives and items which are specific to the pile-founded, location 3, type C (P3C) alternative. Similar lists for the other three alternatives (R3C, P2R, R2R) will be generated during the effort. Effort and cost for estimating items not on our lists is not included in this proposal.

For each item on our list, we will assign an identifying number which references a heading from the COE cost estimates in Appendix A of the SOW. Our estimate (spreadsheet) can be sorted to group costs under the COE estimate headings.

6. In a telephone conversation, Dan Johnson of the COE-Rock Island district indicated the possibility of extending the schedule for this effort. We suggest an approximate 11-week effort, commencing on February 11, 2002. We will work with the COE to determine interim submittal/review dates.

During the pre-proposal meeting, a 30% review telecon was suggested to allow the A/E to present to the COE a list of items/tasks to be included in the estimates for the alternatives. We would like to see this retained in the final project schedule.

7. We may seek cost data and construction expertise from third parties while generating estimates for the four alternatives. If the information sought requires more effort than the third party is willing to provide for marketing purposes, the A/E may reimburse the third party for their effort. While certain details of the four alternatives may be shared with third parties, the final cost estimates will be kept confidential.

8. When data for labor and equipment productivity or cost data for labor, equipment or material is not readily available from published sources or inquiries to third parties, Sverdrup will use its engineering experience and judgment to generate the required costs.
9. During negotiations, the following tasks were deleted from the Scope of Work:
 - Site Visit
 - Estimating for items common to all four alternatives, including lock equipment, miscellaneous mental, electrical and mechanical.

In addition, hours were reduced to reflect a clearer understanding in the following areas:

- Generation of crews and their costs. When the crew (labor and equipment) requirements for tasks among alternatives are similar (but not identical), a unique crew cost will not be generated for each task. Rather, a common cost will be used for all similar tasks.
- Contractor tiering/markup. Contractor tiering and markup will be constant among the alternatives. Percent markups will be applied for items such as home and field overhead, bond and profit. The percentages will be based on engineering judgment rather than an enumeration of individual items of overhead cost or research into industry averages.
- Narrative generation. A slightly less extensive narrative than originally planned will be generated.

U.S. Army Corps of Engineers
Rock Island District
St Louis District
St. Paul District

Independent Review of Concept Design Construction Costs
for
Upper Mississippi River-Illinois Waterway System Navigation Study
Large Scale Measures for Reducing Traffic Congestion

Documentation Report

C

JACOB'S CONSTRUCTION COST ESTIMATES

Lock and Dam 25, Location 2, Type R, Sand Founded (P2R)

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	AMOUNT w/ CONTNGCY	CONT FACTOR
Locks						
Sitework						
Mobilization		1 JOB		\$ 439,928	\$ 879,855	2.00
Demolition	2541	JOB		\$ 334,425	\$ 548,875	1.64
Excavation	40970	CY	17.15	\$ 702,498	\$ 969,351	1.38
Scour Protection	12300	TN	23.32	\$ 286,862	\$ 315,548	1.10
Foundation/Lock Dewatering	1	JOB		\$ 4,438,133	\$ 5,311,494	1.20
Marine Facilities, Temp Mooring Structure	1	JOB		\$ 2,983,178	\$ 4,398,581	1.47
Concrete						
Underbase Grouting	3378	CY	307	\$ 1,037,225	\$ 1,717,735	1.66
Cast in Place Reinforced Concrete	11955	CY	300	\$ 3,583,102	\$ 4,486,444	1.25
Lightweight Concrete	4870	CY	129	\$ 626,554	\$ 689,209	1.10
Precast Concrete	377	CY	659	\$ 248,525	\$ 273,377	1.10
Tremie Concrete	20078	CY	247	\$ 4,962,662	\$ 6,155,626	1.24
Stone Fill for I-wall Cells	36523	TN	39.24	\$ 1,433,194	\$ 1,856,236	1.30
Grout for Stone Filled Cells	10435	CY	444	\$ 4,637,046	\$ 5,841,371	1.26
Sand Fill for Landwall Cells	17379	CY	15.13	\$ 262,982	\$ 289,280	1.10
Furnish and Set Landing Pads / Guide Piles	10	EA	19473	\$ 194,726	\$ 235,934	1.21
Float in and Set Miter Gate Sill	1	JOB		\$ 534,461	\$ 1,031,580	1.93
36" Dia. Pipe Piles, QTY 64 Piles	5120	LF	288	\$ 1,476,600	\$ 1,624,260	1.10
Set Precast Wall Panels	44	EA	4574	\$ 201,253	\$ 336,123	1.67
Set Precast Beams	22	EA	1131	\$ 24,893	\$ 40,828	1.64
Articulated Concrete Mat for Floor	41085	SF	7.29	\$ 299,377	\$ 378,517	1.26
Bedding Under Floor Mat	7718	TN	22.27	\$ 171,834	\$ 213,057	1.24
Metals						
River Wall Sheet Piling (PS-31)	121503	SF	24.47	\$ 2,973,313	\$ 3,646,024	1.23
Stay in Place Templates	35	EA	49649	\$ 1,737,703	\$ 2,334,363	1.34
Landwall Sheet Piling (PS-31)	109427	SF	18.51	\$ 2,025,783	\$ 2,228,361	1.10
Z-pile Cradle for Float-in Monolith	31455	SF	38.38	\$ 1,207,180	\$ 1,589,670	1.32
Foundation Piling and Testing	1	SUM		\$ 154,344	\$ 297,438	1.93
H-Piling HP 12X53	5495	VLF	25.89	\$ 142,266	\$ 156,492	1.10
Structural Steel (Gates, Valves, Trashracks)		JOB		\$ 11,613,000	\$ 14,516,250	1.25
Structural Steel (Miscellaneous- Ladders, Etc.)		JOB		\$ 3,040,000	\$ 3,800,000	1.25
Rock Bolts & Supports for Precast Beams	144	EA	668	\$ 96,138	\$ 161,512	1.68
Fasteners for Precast Panels	748	EA	31.62	\$ 23,650	\$ 39,731	1.68
Electrical						
Electrical System		JOB		\$ 4,700,000	\$ 4,700,000	1.00
Instrumentation		JOB		\$ 1,250,000	\$ 1,562,500	1.25
Mechanical						
Gate and Valve Operating Machinery		JOB		\$ 2,750,000	\$ 3,437,500	1.25
Mechanical Systems		JOB		\$ 3,200,000	\$ 4,000,000	1.25
Miscellaneous	1	JOB		\$ 5,098,669	\$ 6,906,303	1.35
Guidewalls						
Sitework						
Excavation	11900	CY	27.47	\$ 326,893	\$ 467,457	1.43
Backfill	23467	CY	15.06	\$ 353,395	\$ 706,790	2.00
Scour Protection	18607	TN	23.32	\$ 433,962	\$ 477,358	1.10
Concrete						
48" Diameter Piles	1044	VLF	372	\$ 388,714	\$ 466,344	1.20
Cast in Place Concrete	213	CY	297	\$ 63,184	\$ 83,409	1.32
Prestressed Box Beams	1	JOB		\$ 5,425,100	\$ 6,030,244	1.11
Precast Beam Seats	6	EA	22013	\$ 132,079	\$ 193,472	1.46
Tremie Concrete	648	CY	200	\$ 129,839	\$ 149,354	1.15
Permanent Cell-Fill (Concrete)	3423	CY	202	\$ 690,614	\$ 795,620	1.15
Grout and Bladders	2938	CF	46.77	\$ 137,388	\$ 215,955	1.57
Steel Reinforcement	30637	LB	0.86	\$ 26,394	\$ 37,744	1.43
Stone Fill for Wall Cells	9240	CY	51.64	\$ 477,147	\$ 599,706	1.26
Metals						
Steel Sheet Piling for Cells (PS-31)	62696	SF	29.25	\$ 1,834,150	\$ 2,285,974	1.25
Steel Sheet Piling for Skirt	29520	SF	42.56	\$ 1,256,408	\$ 1,606,746	1.28
Steel H-Piling (for 57 ft Diameter cell)	4080	VLF	38.60	\$ 157,488	\$ 192,432	1.22
Anchor Bars for Beams	1728	LF	93.19	\$ 161,025	\$ 267,082	1.66
Wall Armor (14 Strips)	399600	LB	1.05	\$ 419,580	\$ 503,496	1.20
Steel Rub Plate and Accessories	65809	LB	1.00	\$ 65,985	\$ 80,677	1.22
Ladders and Miscellaneous Metals		LB		\$ 300,000	\$ 375,000	1.25
Handrailing (Aluminum)		LF		\$ 176,000	\$ 220,000	1.25
Checkpoint		EA		\$ 46,000	\$ 57,500	1.25
Access Hatches		JOB		\$ 33,000	\$ 41,250	1.25
Electrical						
Electrical System		JOB		\$ 78,000	\$ 97,500	1.25
Miscellaneous						
		JOB				
Channel Work						
		JOB		\$ 680,000	\$ 850,000	1.25
Project Total						
				\$ 82,683,847	\$ 103,770,537	1.26

Note: Amounts in *italics* are for items not included in the scope of work for this estimate. They are from the COE estimate and have been included to allow a bottom-line comparison. The amounts in *italics* include the 25% contingency from the COE estimates.

Lock and Dam 25, Location 3, Type C, Pile Founded (P3C)

ITEM	UNIT	QUANTITY	UNIT PRICE (no profit)	AMOUNT (profit included)	AMOUNT w/ CONTINGENCY	CONTINGENCY FACTOR
Real Estate	JOB					
Dam						
Removal of Existing Structures	JOB					
Locks						
Sitework						
Mobilization	JOB	1		\$ 410,226	\$ 820,451	2.00
Demolition	JOB	1		\$ 3,304,645	\$ 4,583,296	1.39
Excavation	CY	71,157	27.25	\$ 1,939,004	\$ 2,136,577	1.10
Foundation Fill at Scour Hole	CY	110,040	19.24	\$ 2,116,777	\$ 2,116,777	1.00
Wall Fill	CY	0		\$ -	\$ -	
Capstone	TN	19,367	32.37	\$ 658,244	\$ 724,068	1.10
Riprap	TN	70,084	22.21	\$ 1,634,384	\$ 1,797,822	1.10
Leveling Stone in Lock Floor	TN	6,075	24.38	\$ 162,907	\$ 238,333	1.46
Gravel and Sand Filter in Lock Floor	TN	20,698	24.38	\$ 555,068	\$ 812,065	1.46
Geotextile	SY	13,640	3.75	\$ 56,278	\$ 112,274	2.00
Foundation/Lock Dewatering	JOB	1		\$ 1,609,788	\$ 2,124,920	1.32
Marine Facilities, Temp Mooring Structure	JOB	1		\$ 3,831,649	\$ 5,073,029	1.32
Concrete						
Structural Grouting	CY	440	400	\$ 193,411	\$ 251,435	1.30
Cast in Place Reinforced Concrete	CY	62,091	222	\$ 15,188,737	\$ 17,381,611	1.14
Cast in Place Connections	CY	964	600	\$ 636,240	\$ 930,819	1.46
Precast Concrete	CY	4,039	559	\$ 2,481,860	\$ 2,522,122	1.02
Tremie Concrete	CY	25,931	206	\$ 5,875,906	\$ 7,368,386	1.25
Precast Floor Pavers and Struts	CY	13,125	335	\$ 4,836,666	\$ 4,836,666	1.00
Set Precast Floor Beams	EA	31	13581	\$ 463,119	\$ 615,948	1.33
Set Floor Panels	EA	32	33008	\$ 1,161,884	\$ 1,250,120	1.08
Steel Reinforcement	LB	2,794,088	0.90	\$ 2,766,111	\$ 3,165,468	1.14
Metals						
Sheet Piling	SF	278,528	32.79	\$ 10,046,194	\$ 10,568,395	1.05
Sheet Pile Bracing	JOB	1		\$ 853,074	\$ 1,228,427	1.44
Foundation Piling and Testing	LF	204,279	40.62	\$ 9,127,594	\$ 12,048,424	1.32
Structural Steel (Gates, Valves, Trashracks)	JOB			\$ 11,613,000	\$ 14,516,250	1.25
Structural Steel (Miscellaneous- Ladders, Etc.)	JOB			\$ 3,040,000	\$ 3,800,000	1.25
Electrical						
Electrical System	JOB			\$ 4,700,000	\$ 5,875,000	1.25
Instrumentation	JOB			\$ 1,250,000	\$ 1,562,500	1.25
Mechanical						
Gate and Valve Operating Machinery	JOB			\$ 2,750,000	\$ 3,437,500	1.25
Mechanical Systems	JOB			\$ 3,200,000	\$ 4,000,000	1.25
Miscellaneous	JOB	1		\$ 8,222,780	\$ 9,079,132	1.10
Guidewalls						
Sitework						
Excavation	CY	46,240	27.25	\$ 1,260,027	\$ 1,527,257	1.21
Backfill	CY	32,519	11.41	\$ 408,140	\$ 469,361	1.15
Scour Protection	TN	67,600	22.21	\$ 1,651,536	\$ 1,899,266	1.15
Concrete						
42" Diameter Piles	LF	5,510	311	\$ 1,884,971	\$ 1,979,220	1.05
Cast in Place Reinforced Concrete	CY	1,012	222	\$ 247,628	\$ 327,141	1.32
Precast Beams	CY	14,940	1,357	\$ 20,274,274	\$ 20,505,479	1.01
Precast Beam Seats	CY	644	903	\$ 640,127	\$ 780,613	1.22
Tremie Concrete	CY	945	206	\$ 214,159	\$ 282,689	1.32
Permanent Cell Fill (Concrete)	CY	7,372	206	\$ 1,670,438	\$ 2,204,978	1.32
Grout for Beams	CY	525	1265	\$ 664,030	\$ 876,520	1.32
Steel Reinforcement	LB	101,229	0.90	\$ 100,215	\$ 126,271	1.26
Gravel Fill	CY	43,402	46.95	\$ 2,241,624	\$ 2,824,446	1.26
Metals						
Sheet Piling	JOB	1		\$ 7,112,938	\$ 7,770,600	1.09
Foundation Piling	JOB	1		\$ 711,470	\$ 853,764	1.20
Post Tensioning	LF	1634	30	\$ 49,020	\$ 61,275	1.25
Structural Steel	JOB	1		\$ 1,825,340	\$ 2,007,874	1.10
Floating Guidewall	JOB	1		\$ 2,401,436	\$ 2,761,651	1.15
Channel Work	JOB	1		\$ 680,000	\$ 850,000	1.25
Project Total				\$ 148,722,918	\$ 173,086,225	1.16

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Lock and Dam 22, Location 2, Type R, Rock Founded (R2R)						
ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	AMOUNT w/ CONTINGENCY	CONTINGENCY FACTOR
Real Estate	1	JOB	\$ 150,000	\$ 150,000	\$ 187,500	1.25
Locks						
Sitework						
Mobilization	1	JOB	\$ 422,147	\$ 422,147	\$ 844,295	2.00
Demolition	1	JOB	\$ 60,426	\$ 60,426	\$ 92,308	1.53
Rock Excavation	5,098	CY	\$ 228	\$ 1,160,921	\$ 1,767,701	1.52
Overburden Excavation	9,120	CY	\$ 82	\$ 749,095	\$ 796,579	1.06
Backfill	25,450	CY	\$ 7.67	\$ 195,321	\$ 242,249	1.24
Lock Dewatering	1	JOB	\$ 171,166	\$ 171,166	\$ 242,375	1.42
Marine Facilities, Temp Mooring Structure	1	JOB	\$ 3,774,944	\$ 3,774,944	\$ 4,715,530	1.25
Concrete						
Underbase Grouting	1,399	CY	\$ 400	\$ 558,960	\$ 781,517	1.40
Cast in Place Reinforced Concrete	23,505	CY	\$ 248	\$ 5,820,357	\$ 7,374,719	1.27
Precast Concrete	526	CY	\$ 591	\$ 310,844	\$ 341,928	1.10
Gate Monolith Tremie Concrete	1,650	CY	\$ 214	\$ 353,139	\$ 463,086	1.31
Concrete Cell Fill	19,274	CY	\$ 200	\$ 3,852,927	\$ 5,020,926	1.30
Furnish and Set Landing Pads	16	EA	\$ 11,379	\$ 182,059	\$ 248,182	1.36
Float in and Set Miter Gate Shell Shells	4	EA	\$ 242,389	\$ 969,555	\$ 1,528,724	1.58
Set Precast Wall Panels	52	EA	\$ 2,462	\$ 128,017	\$ 191,876	1.50
Set Precast Beams	65	EA	\$ 964	\$ 62,677	\$ 95,822	1.53
Anchor for Landwall	1,008	EA	\$ 9.13	\$ 9,205	\$ 10,126	1.10
Metals						
River Wall Sheet Piling (PS-31)	69,229	SF	\$ 28	\$ 1,930,493	\$ 2,425,943	1.26
Stay in Place Templates	42	EA	\$ 46,696	\$ 1,961,235	\$ 2,615,502	1.33
Structural Steel (Gates, Valves, Trashracks)	1	JOB	\$ 3,250,000	\$ 3,250,000	\$ 4,062,500	1.25
Structural Steel (Miscellaneous- Ladders, Etc.)	1	JOB	\$ 3,040,000	\$ 3,040,000	\$ 3,800,000	1.25
Rock Bolts & Supports for Precast Beams	1,170	EA	\$ 687	\$ 804,360	\$ 1,240,354	1.54
Fasteners for Precast Panels	520	EA	\$ 630	\$ 327,600	\$ 501,228	1.53
High Capacity Rock Anchors	40	EA	\$ 10,500	\$ 420,000	\$ 595,770	1.42
Electrical						
Electrical System	1	JOB	\$ 4,700,000	\$ 4,700,000	\$ 5,875,000	1.25
Mechanical						
Gate and Valve Operating Machinery	1	JOB	\$ 2,750,000	\$ 2,750,000	\$ 3,437,500	1.25
Mechanical Systems	1	JOB	\$ 3,200,000	\$ 3,200,000	\$ 4,000,000	1.25
Miscellaneous	1	JOB	\$ 5,743,901	\$ 5,743,901	\$ 7,777,603	1.35
Guidewalls						
Sitework						
Rock Excavation	674	CY	\$ 277	\$ 186,467	\$ 233,084	1.25
Overburden Excavation	0	CY	\$ -	\$ -	\$ -	
Concrete						
Cast in Place Reinforced Concrete	4,910	CY	\$ 221	\$ 1,085,784	\$ 1,426,461	1.31
Precast Concrete Beams (Prestressed)	2,018	LF	\$ 2,770	\$ 5,587,572	\$ 6,208,964	1.11
Tremie Concrete with reinforcement	4,227	CY	\$ 202	\$ 853,271	\$ 1,118,225	1.31
Metals						
Steel Cylinders for Cells (filled with Concrete)	5	EA	\$ 276,759	\$ 1,383,793	\$ 1,544,422	1.12
Nose Steel Cylinder (filled with Concrete)	1	EA	\$ 732,789	\$ 732,789	\$ 811,736	1.11
Anchor Bars for Beams	2,646	LF	\$ 54	\$ 142,287	\$ 197,165	1.39
Wall Armor (14 Strips)	339,685	LB	\$ 1.00	\$ 339,685	\$ 407,622	1.20
Steel Rub Plate and Accessories	63,600	LB	\$ 6.01	\$ 382,000	\$ 477,500	1.25
Ladders and Miscellaneous Metals	100,000	LB	\$ 3.00	\$ 300,000	\$ 375,000	1.25
Handrailing (Aluminum)	1,400	LF	\$ 126	\$ 176,000	\$ 220,000	1.25
Checkpost	30	EA	\$ 1,533	\$ 46,000	\$ 57,500	1.25
Access Hatch	1	JOB	\$ 33,000	\$ 33,000	\$ 41,250	1.25
Electrical						
Electrical System	1	JOB	\$ 78,000	\$ 78,000	\$ 97,500	1.25
Miscellaneous						
Channel Work	1	JOB	SUM	\$ 3,200,000	\$ 4,000,000	1.25
Project Total				\$ 61,585,998	\$ 78,493,270	
Note: Amounts in italics are for items not included in the scope of work for this estimate.						
They are from the COE estimate and have been included to allow a bottom-line comparison. In the column which includes contingencies, the amount in italics include the 25% contingency from the COE estimate.						

Lock & Dam 22, Location 3, Type C, Rock Founded (R3C)

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT	AMOUNT W/ CONTINGENCY	CONTINGENCY
Real Estate	<i>1</i>	<i>JOB</i>	<i>SUM</i>	<i>\$ 15,000</i>	<i>\$ 18,750</i>	<i>1.25</i>
Locks						
Sitework						
Mobilization	1	JOB	SUM	\$ 422,147	\$ 844,295	2
Demolition	-	JOB	-	-	-	
Dredging	10740	CY	\$ 27.47	\$ 295,035	\$ 368,794	1.25
Rock Excavation	52,100	CY	\$ 69.26	\$ 3,608,685	\$ 6,656,610	1.844608315
Extension of Existing Downstream Guidewall	1	JOB	SUM	\$ 4,802,871	\$ 5,917,847	1.232147843
Cofferdam Fill (Downstream Closure)	4,040	CY	\$ 51.64	\$ 208,623	\$ 252,433	1.21
Existing Lock Dewatering	1	JOB	SUM	\$ 165,748	\$ 217,530	1.31241097
New Lock Dewatering	1	JOB	SUM	\$ 342,486	\$ 407,915	1.191042643
Concrete						
Cast in Place Reinforced Concrete	26,068	CY	\$ 296.89	\$ 7,739,500	\$ 10,073,401	1.301557099
Precast Concrete (w/ reinforcement)	-	CY	-	-	-	
Tremie Concrete	2,038	CY	\$ 236.27	\$ 481,430	\$ 641,921	1.333362049
Permanent Cell Fill –Gravel (Riverwall)	34,901	CY	\$ 51.64	\$ 1,802,262	\$ 1,982,489	1.1
Permanent Cell Fill –Concrete (I-Wall)	14,324	CY	\$ 195.82	\$ 2,804,882	\$ 3,367,478	1.200577207
Other Gravel Fill	-	CY	-	-	-	
Precast Panels for Cellular Wall (Riverwall)	2,540	CY	\$ 919.60	\$ 2,335,516	\$ 2,730,618	1.169171355
Precast Panels for Cellular Wall (I-Wall)	2,347	CY	\$ 952.52	\$ 2,235,686	\$ 2,738,508	1.224907128
Metals						
Sheetpiling (Downstream Closure , PSA23)	14,600	SF	\$ 40.90	\$ 597,143	\$ 722,788	1.210410368
Sheetpiling – Permanent PSA 23 (Lockwalls)	186,919	SF	\$ 56.76	\$ 10,610,358	\$ 11,937,511	1.125080864
Structural Steel (Gates, Valves, Trashracks)	1	JOB	SUM	\$ 3,250,000	\$ 4,062,500	1.25
Structural Steel (Miscellaneous- Ladders, Etc.)	1	JOB	SUM	\$ 2,500,000	\$ 3,125,000	1.25
Electrical						
Electrical System	1	JOB	SUM	\$ 4,700,000	\$ 5,875,000	1.25
Mechanical						
Gate and Valve Operating Machinery	1	JOB	SUM	\$ 2,053,000	\$ 2,566,250	1.25
Mechanical Systems	1	JOB	SUM	\$ 2,900,000	\$ 3,625,000	1.25
Miscellaneous						
Miter Gate Monolith Installation	1	JOB	SUM	\$ 5,679,811	\$ 7,491,457	1.318962219
Tie in I-wall and R-wall	1	JOB	SUM	\$ 4,491,029	\$ 6,002,932	1.336649607
Bulkhead slots for upper aux. lock gate	1	JOB	SUM	\$ 773,037	\$ 928,321	1.200875465
				\$ 891,501	\$ 980,651	1.1
Guidewalls						
Sitework						
Excavation	9195	CY	\$ 27.47	\$ 252,575	\$ 335,331	1.327647059
Concrete						
Cast in Place Reinforced Concrete	13249	CY	\$ 225.76	\$ 2,991,035	\$ 3,559,367	1.190011834
Precast Concrete Beams (Prestressed)	6000	LF	\$ 557.36	\$ 3,344,181	\$ 3,845,639	1.149949379
Precast Concrete (W/Reinforcement)	2667	CY	\$ 768.27	\$ 2,048,988	\$ 2,515,508	1.22768301
Tremie Concrete	2164	CY	\$ 196.07	\$ 424,287	\$ 509,143	1.19999875
Gravel Fill	27073	CY	\$ 51.64	\$ 1,398,030	\$ 1,674,970	1.198092565
Metals						
Sheet Piling For Cells (PS 31)	137,830	SF	\$ 44.49	\$ 6,131,798	\$ 6,938,936	1.131631545
Sheet Pile Cutoff Wall (PZ35)	31,484	SF	\$ 27.19	\$ 855,985	\$ 941,584	1.1
Structural Steel	1	JOB	SUM	\$ 1,290,013	\$ 1,955,984	1.516251363
Protection Barges (US and DS)	1	JOB	SUM	\$ 734,544	\$ 807,999	1.1
Channel Work						
	1	JOB	SUM	\$ 3,400,000	\$ 4,250,000	1.25
Project Total				\$ 88,577,189	\$ 110,870,459	1.251681851

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U.S. Army Corps of Engineers
Rock Island District
St. Louis District
St. Paul District

Independent Review of Concept Design Construction Costs
for
Upper Mississippi River-Illinois Waterway System Navigation Study
Large Scale Measures for Reducing Traffic Congestion

Documentation Report

D

ADJUSTMENTS TO JACOB'S CONSTRUCTION COSTS ESTIMATES
FOR PRICE LEVEL

Lock and Dam 25
Pile Founded
Location 2, Type R

LOCK 25: LOCATION 2, TYPE R - PILE FOUNDED													
ITEM	COE	JACOBS	UNIT	UNIT COST	2000 96 Costs			Jan-96	2000 Costs	1996 Costs	Jacobs Jan 96		
	QUANTITY	QUANTITY			COE	JACOBS	JACOBS 96 Adj	Jacobs Jan 96	COE	JACOBS 00		JACOBS 96	
					UNIT COST	UNIT COST	Unit Cost	Unit Cost	AMOUNT	AMOUNT		Amount	Amount*
					Jul 00/Jan 96	Jan 96/Jul 00	Jan 96/Jan 96						
					1.112202966	0.899116466	0.986778631						
LANDS AND DAMAGES													
REAL ESTATE	1	1	JOB	\$150,000.00	\$150,000.00	\$150,000.00	\$150,000.00	\$150,000	\$150,000	150,000	\$150,000		
DAMS													
04 DAMS SUBTOTAL													
LOCKS													
SITWORK													
MOBILIZATION	1	1	JOB	\$8,650,000	\$439,928.00	\$395,546.51	\$390,316.84	\$8,650,000	\$439,928	\$395,546.51	\$390,317		
DEMOBILIZATION	1	1	JOB	500000	\$334,425	\$300,687.02	\$296,711.53	\$500,000	\$334,425	\$300,687.02	\$296,712		
EXCAVATION	16,600	40,970	CY	\$4.50	\$17.15	\$15.42	\$15.21	\$74,700	\$702,498	\$631,627.52	\$623,277		
SCOUR PROTECTION	15,625	12,300	TN	\$20.00	\$23.32	\$20.97	\$20.69	\$312,500	\$286,862	\$257,922.35	\$254,512		
FOUNDATION/LOCK DEWATERING	1	1	JOB	\$3,000,000	\$4,438,133.00	\$3,990,398.46	\$3,937,639.93	\$3,000,000	\$4,438,133	\$3,990,398.46	\$3,937,640		
MARINE FACILITIES, TEMP MOORING STRUCTURE	1	1	JOB	\$950,000	\$2,983,178.00	\$2,682,224.46	\$2,646,761.78	\$950,000	\$2,983,178	\$2,682,224.46	\$2,646,762		
CONCRETE													
UNDERBASE GROUTING	2,200	3,378	CY	\$200.00	\$307.05	\$276.08	\$272.43	\$440,000	\$1,037,225	\$932,586.08	\$920,256		
CAST IN PLACE REINFORCED CONCRETE	12,568	11,955	CY	\$280.00	\$299.72	\$269.48	\$265.92	\$3,519,040	\$3,583,102	\$3,221,626.01	\$3,179,032		
LIGHTWEIGHT CONCRETE	6,030	4,870	CY	\$325.00	\$128.66	\$115.68	\$114.15	\$1,959,750	\$626,554	\$563,345.02	\$555,897		
PRECAST CONCRETE	7,015	377	CY	\$400.00	\$659.22	\$592.71	\$584.88	\$2,806,000	\$248,525	\$223,452.92	\$220,499		
TREMIE CONCRETE	9,178	20,078	CY	\$165.00	\$247.17	\$222.23	\$219.30	\$1,514,370	\$4,962,662	\$4,462,011.12	\$4,403,017		
STONE FILL FOR I-WALL CELLS	47,535	36,523	TN	\$20.00	\$39.24	\$35.28	\$34.82	\$950,700	\$1,433,194	\$1,288,608.32	\$1,271,571		
GROUT FOR STONE FILLED CELLS	5,212	10,435	CY	\$200.00	\$444.37	\$399.54	\$394.26	\$1,042,400	\$4,637,046	\$4,169,244.41	\$4,114,121		
SAND FILL FOR LANSWALL CELLS	23,300	17,379	CY	\$10.00	\$15.13	\$13.61	\$13.43	\$233,000	\$262,982	\$236,451.45	\$233,325		
FURNISHED AND SET LANDING PADS	6	10	EA	\$19,000.00	\$19,472.60	\$17,508.14	\$17,276.65	\$114,000	\$194,726	\$175,081.35	\$172,767		
FLOAT IN AND SET MITER GATE SILL	1	1	JOB	\$140,000	\$534,461.00	\$480,542.69	\$474,189.25	\$140,000	\$534,461	\$480,542.69	\$474,189		
36"DIA PIPE PILES, QTY 56 PILES	4,200	5,120	LF	\$350.00	\$288.40	\$259.30	\$255.88	\$1,470,000	\$1,476,600	\$1,327,635.37	\$1,310,082		
SET PRECAST WALL PANELS	48	44	EA	\$8,000.00	\$4,573.93	\$4,112.50	\$4,058.12	\$384,000	\$201,253	\$180,949.89	\$178,557		
SET PRECAST BEAMS	50	22	EA	\$3,000.00	\$1,131.50	\$1,017.35	\$1,003.90	\$150,000	\$24,893	\$22,381.71	\$22,086		
ARTICULATED CONCRETE MAT FOR FLOOR	70,000	41,085	SF	\$10.00	\$7.29	\$6.55	\$6.47	\$700,000	\$299,377	\$269,174.79	\$265,616		
BEDDING UNDER FLOOR MAT	7,000	7,718	TN	\$20.00	\$22.26	\$20.02	\$19.75	\$140,000	\$171,834	\$154,498.78	\$152,456		
METALS													
RIVER WALL SHEETPIILING (PS-31)	114,282	121,503	SF	\$22.04	\$24.47	\$22.00	\$21.71	\$2,518,775	\$2,973,313	\$2,673,354.68	\$2,638,009		
STAY IN PLACE TEMPLATES	14	35	EA	\$50,000.00	\$49,648.66	\$44,639.93	\$44,049.72	\$700,000	\$1,737,703	\$1,562,397.38	\$1,541,740		
LANDWALL SHEET PILING (PS-31)	137,295	109,427	SF	19.64	\$18.51	\$16.65	\$16.42	\$2,696,474	\$2,025,783	\$1,821,414.85	\$1,797,333		

* Italics indicates amounts provided by the Corps of Engineers.

Lock and Dam 25
Pile Founded
Location 2, Type R

LOCK 25: LOCATION 2, TYPE R - PILE FOUNDED	COE	JACOBS		COE	JACOBS	JACOBS 96 Adj	Jacobs Jan 96	COE	JACOBS 00	JACOBS June 96	Jacobs Jan 96
ITEM	QUANTITY	QUANTITY	UNIT	UNIT COST	UNIT COST	Unit Cost	Unit Cost	AMOUNT	AMOUNT	Amount	Amount*
Z-PILE CRADLE FOR FLOAT-IN MONOLIGH	29,700	31,455	SF	21.74	\$38.38	\$34.51	\$34.05	\$645,678	\$1,207,180	\$1,085,395.42	\$1,071,045
FOUNDATION PILING AND TESTING	1	1	JOB	\$1,000,000	\$154,344.00	\$138,773.23	\$136,938.46	\$1,000,000	\$154,344	\$138,773.23	\$136,938
H-PILING HP 12x53	5,472	5,495	VLF	\$33.50	\$25.89	\$23.28	\$22.97	\$183,312	\$142,266	\$127,913.70	\$126,223
STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS)	1	1	JOB	\$11,613,000.00	\$12,916,013.04	\$11,613,000.00	\$11,613,000	\$11,613,000	\$11,613,000	\$11,613,000.00	\$11,613,000
STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC.)	1	1	JOB	\$3,040,000.00	\$3,381,097.02	\$3,040,000.00	\$3,040,000	\$3,040,000	\$3,381,097	\$3,040,000.00	\$3,040,000
ROCK BOLTS & SUPPORTS FOR PRECAST BEAMS	140	144	EA	\$350.00	\$667.63	\$600.27	\$592.34	\$49,000	\$96,138	\$86,439.26	\$85,296
FASTENERS FOR PRECAST PANELS	336	748	EA	\$100.00	\$31.62	\$28.43	\$28.05	\$33,600	\$23,650	\$21,264.10	\$20,983
ELECTRICAL											
ELECTRICAL SYSTEM	1	1	JOB	\$4,700,000	\$5,227,353.94	\$4,700,000.00	\$4,700,000	\$4,700,000	\$5,227,354	\$4,700,000.00	\$4,700,000
INSTRUMENTATION	1	1	JOB	\$1,250,000	\$1,390,253.71	\$1,250,000.00	\$1,250,000	\$1,250,000	\$1,390,254	\$1,250,000.00	\$1,250,000
MECHANICAL											
GATE AND VALVE OPERATING MACHINERY	1	1	JOB	\$2,750,000	\$3,058,558.16	\$2,750,000.00	\$2,750,000	\$2,750,000	\$3,058,558	\$2,750,000.00	\$2,750,000
MECHANICAL SYSTEMS	1	1	JOB	\$3,200,000	\$3,559,049.49	\$3,200,000.00	\$3,200,000	\$3,200,000	\$3,559,049	\$3,200,000.00	\$3,200,000
MISCELLANEOUS	1	1	JOB	\$1,950,000	\$5,098,669.00	\$4,584,297.25	\$4,523,686.57	\$1,950,000	\$5,098,669	\$4,584,297.25	\$4,523,687
LOCKS SUBTOTAL								\$65,380,299	\$70,567,816	\$64,620,246.09	\$64,116,945
GUIDEWALLS											
SITEWORK											
EXCAVATION	118490	11900	CY	\$4.50	\$27.47	\$24.70	\$24.37	\$533,205	\$326,893	\$293,914.88	\$290,029
BACKFILL	73,640	23467	CY	\$10.00	\$15.06	\$13.54	\$13.36	\$736,400	\$353,395	\$317,743.26	\$313,542
SCOUR PROTECTION	18,900	18607	TN	\$20.00	\$23.32	\$20.97	\$20.69	\$378,000	\$433,962	\$390,182.38	\$385,024
CONCRETE											
48" DIAMETER PILES	1,068	1,044	VLF	\$370.00	\$372.33	\$334.77	\$330.34	\$395,160	\$388,714	\$349,499.16	\$344,878
CAST IN PLACE CONCRETE	195	213	CY	\$180.00	\$296.64	\$266.71	\$263.19	\$35,100	\$63,184	\$56,809.77	\$56,059
PRESTRESSED BOX BEAMS	1	1	JOB	\$5,067,000	\$5,425,100.00	\$4,877,796.74	\$4,813,305.59	\$5,067,000	\$5,425,100	\$4,877,796.74	\$4,813,306
PRECAST BEAM SEATS	6	6	EA	\$22,500.00	\$22,013.17	\$19,792.40	\$19,530.72	\$135,000	\$132,079	\$118,754.40	\$117,184
TREMIE CONCRETE	90	648	CY	\$165.00	\$200.37	\$180.15	\$177.77	\$14,850	\$129,839	\$116,740.38	\$115,197
PERMANENT CELL FILL (CONCRETE)	3,302	3,423	CY	\$200.00	\$201.76	\$181.40	\$179.00	\$660,400	\$690,614	\$620,942.42	\$612,733
GROUT AND BLADDERS	5,328	2,938	CF	\$29.40	\$46.76	\$42.04	\$41.49	\$156,643	\$137,388	\$123,527.81	\$121,895
STEEL REINFORCEMENT	155,000	30,637	LB	\$1.00	\$0.86	\$0.77	\$0.76	\$155,000	\$26,394	\$23,731.28	\$23,418
STONE FILL FOR WALL CELLS	8,975	9,240	CY	\$20.00	\$51.64	\$46.43	\$45.82	\$179,500	\$477,147	\$429,010.72	\$423,339
METALS											
STEEL SHEET PILING FOR CELLS (PS-31)	62,040	62,696	SF	\$22.04	\$29.25	\$26.30	\$25.96	\$1,367,362	\$1,834,150	\$1,649,114.47	\$1,627,311
STEEL SHEET PILING FOR SKIRT	29,160	29,520	SF	\$18.35	\$42.56	\$38.27	\$37.76	\$535,086	\$1,256,408	\$1,129,657.12	\$1,114,722
STEEL H-PILING (FOR 57 FT DIA CELL)	4,080	4,080	VLF	\$52.50	\$38.60	\$34.71	\$34.25	\$214,200	\$157,488	\$141,600.05	\$139,728

* Italics indicates amounts provided by the Corps of Engineers.

Lock and Dam 25
Pile Founded
Location 2, Type R

LOCATION 2, TYPE R - PILE FOUNDED											
ITEM	COE	JACOBS		COE	JACOBS	JACOBS 96 Adj	Jacobs Jan 96	COE	JACOBS 00	JACOBS June 96	Jacobs Jan 96
	QUANTITY	QUANTITY	UNIT	UNIT COST	UNIT COST	Unit Cost	Unit Cost	AMOUNT	AMOUNT	Amount	Amount*
ANCHOR BARS FOR BEAMS	2,160	1,728	LF	\$87.60	\$93.19	\$83.78	\$82.68	\$189,216	\$161,025	\$144,780.23	\$142,866
WALL ARMOR (14 STRIPS)	369,600	399,600	LB	\$4.20	\$1.05	\$0.94	\$0.93	\$1,552,320	\$419,580	\$377,251.29	\$372,264
STEEL RUB PLATE AND ACCESSORIES	63,600	65,809	LB	\$6.00	\$1.00	\$0.90	\$0.89	\$381,600	\$65,985	\$59,328.20	\$58,544
LADDERS AND MISC METALS	100,000	100,000	LB	\$3.00		\$3.00	\$300,000	\$300,000	\$333,661	\$300,000	\$300,000
HANDRAILING (ALUM.)	1,400	1,400	LF	\$125.40			\$175,560	\$175,560	\$195,258	\$175,560	\$175,560
CHECKPOST	30	30	EA	1546			\$46,380	\$46,380	\$51,584	\$46,380	\$46,380
ACCESS HATCHES	1	1	JOB	\$33,000	\$33,000.00		\$33,000	\$33,000	\$36,703	\$33,000	\$33,000
ELECTRICAL											
ELECTRICAL SYSTEM	1	1	JOB	\$78,000	\$78,000.00		\$78,000	\$78,000	\$86,752	\$78,000	\$78,000
GUIDEWALLS SUBTOTAL								\$13,318,982	\$13,183,303	\$11,853,324.57	\$11,704,976
CHANNEL WORK	1	1	JOB	\$680,000	\$756,298.02		\$680,000	\$680,000	\$756,298	680000	\$680,000
PROJECT SUBTOTAL								\$79,529,281	\$84,657,417	\$77,303,570.66	\$76,651,921

* Italics indicates amounts provided by the Corps of Engineers.

Lock and Dam 25
 Pile Founded
 Location 3, Type C

LOCK 25: LOCATION 3, TYPE C - PILE FOUNDED											
ITEM	COE	JACOBS	UNIT	COE	JACOBS 00	JACOBS 96 ADJ	JACOBS Jan 96	Jan-96	2000 costs	96 Costs	
	QUANTITY	QUANTITY		UNIT COST	UNIT COST	UNIT COST	Unit Cost	AMOUNT	JACOBS	JACOBS June 96	JACOBS Jan 96
					Jul 00/Jul 96	Jun 96/Jul 00	Jan 96/Jun 96				
LANDS AND DAMAGES					1.112202966	0.899116466	0.986778631				
REAL ESTATE	1	1	JOB	\$150,000.00	\$150,000.00	\$150,000.00	\$150,000.00	\$150,000	\$150,000	\$150,000	\$150,000
DAMS											
REMOVAL OF EXISTING STRUCTURES											
04 DAMS SUBTOTAL											
LOCKS											
SITWORK											
MOBILIZATION	1	1	JOB	\$10,650,000	\$410,226.00	\$368,840.95	\$363,964.37	\$10,650,000	\$410,226	\$368,841	363,964
DEMOBILIZATION	1	1	JOB	\$1,910,000	\$3,304,645.00	\$2,971,260.73	\$2,931,976.60	\$1,910,000	\$3,304,645	\$2,971,261	2,931,977
EXCAVATION	48,960	71,157	CY	\$6.25	\$27.25	\$24.50	\$24.18	\$306,000	\$1,939,004	\$1,743,390	1,720,340
FOUNDATION FILL AT SCOUR HOLE	125,000	110,040	CY	\$18.75	\$19.24	\$17.30	\$17.07	\$2,343,750	\$2,116,777	\$1,903,229	1,878,066
WALL FILL	15,760	0	CY	\$10.00	\$0.00	\$0.00	\$0.00	\$157,600	\$0	\$0	0
CAPSTONE	52,660	19,367	TN	\$25.00	\$33.99	\$30.56	\$30.16	\$1,316,500	\$658,244	\$591,838	584,013
RIPRAP	33,380	70,084	TN	\$20.00	\$23.32	\$20.97	\$20.69	\$667,600	\$1,634,384	\$1,469,502	1,450,073
LEVELING STONE IN LOCK FLOOR	4,580	6,075	TN	\$15.00	\$26.82	\$24.11	\$23.79	\$68,700	\$162,907	\$146,472	144,536
GRAVEL FILTER IN LOCK FLOOR	16,606	20,698	TN	\$15.00	\$26.82	\$24.11	\$23.79	\$249,090	\$555,068	\$499,071	492,472
GEOTEXTILE	13,740	13,640	SY	\$6.00	\$4.13	\$3.71	\$3.66	\$82,440	\$56,278	\$50,600	49,931
FOUNDATION/LOCK DEWATERING	1	1	JOB	\$3,000,000	\$1,609,788.00	\$1,447,386.90	\$1,428,250.46	\$3,000,000	\$1,609,788	\$1,447,387	1,428,250
MARINE FACILITIES, TEMP. MOORING STR.	1	1	JOB	\$3,900,000	\$3,831,649.00	\$3,445,098.71	\$3,399,549.79	\$3,900,000	\$3,831,649	\$3,445,099	3,399,550
CONCRETE											
STRUCTURAL GROUTING	450	440	CY	\$200.00	\$439.57	\$395.23	\$390.00	\$90,000	\$193,411	\$173,899	171,600
CAST IN PLACE REINFORCED CONCRETE	64,790	62,091	CY	\$217.00	\$244.62	\$219.94	\$217.03	\$14,059,430	\$15,188,737	\$13,656,444	13,475,887
CAST IN PLACE CONNECTIONS	964	964	CY	\$725.00	\$660.00	\$593.42	\$585.57	\$698,900	\$636,240	\$572,054	564,491
PRECAST CONCRETE	2,904	4,039	CY	\$400.00	\$614.47	\$552.48	\$545.18	\$1,161,600	\$2,481,860	\$2,231,481	2,201,978
TREMIE CONCRETE	10,340	25,931	CY	\$165.00	\$226.60	\$203.74	\$201.04	\$1,706,100	\$5,875,906	\$5,283,124	5,213,274
PRECAST FLOOR PAVERS AND STRUTS	15,450	13,125	CY	\$286.00	\$368.51	\$331.33	\$326.95	\$4,418,700	\$4,836,666	\$4,348,726	4,291,230
SET PRECAST FLOOR BEAMS	31	31	EA	\$16,000.00	\$14,939.32	\$13,432.19	\$13,254.60	\$496,000	\$463,119	\$416,398	410,893
SET FLOOR PANELS	62	32	EA	\$10,000.00	\$36,308.88	\$32,645.91	\$32,214.28	\$620,000	\$1,161,884	\$1,044,669	1,030,857
STEEL REINFORCEMENT	7,268,000	2,794,088	LB	\$0.75	\$0.99	\$0.89	\$0.88	\$5,451,000	\$2,766,111	\$2,487,056	2,454,174
METALS											
SHEET PILING	272,800	278,528	SF	\$35.80	\$36.07	\$32.43	\$32.00	\$9,766,240	\$10,046,194	\$9,032,698	8,913,274
SHEET PILE BRACING	1	1	JOB	\$350,000	\$853,074.00	\$767,012.88	\$756,871.92	\$350,000	\$853,074	\$767,013	756,872

* Italics indicates amount provided by the Corps of Engineers

Lock and Dam 25
Pile Founded
Location 3, Type C

LOCK 25: LOCATION 3, TYPE C - PILE FOUNDED											
	COE	JACOBS		COE	JACOBS 00	JACOBS 96 ADJ		2000 costs	96 Costs		
ITEM	QUANTITY	QUANTITY	UNIT	UNIT COST	UNIT COST	UNIT COST		COE	JACOBS	Jacobs Amount	Jacobs Jan 96
								AMOUNT	AMOUNT		Amount*
FOUNDATION PILING AND TESTING	209,190	204,279	LF	39.75	\$44.68	\$40.17	\$39.64	\$8,315,303	\$9,127,594	\$8,206,770	8,098,265
STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS,)	1	1	JOB	\$11,613,000	\$12,916,013.04	\$11,613,000	\$11,613,000	\$11,613,000	\$12,916,013.04	\$11,613,000	11,613,000
STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC.)	1	1	JOB	\$3,040,000	\$3,381,097.02	3040000	\$3,040,000.00	\$3,040,000	\$3,381,097.00	\$3,040,000	3,040,000
ELECTRICAL											
ELECTRICAL SYSTEM	1	1	JOB	\$4,700,000	\$5,227,353.94	\$4,700,000.00	\$4,700,000.00	\$4,700,000	\$5,227,354	\$4,700,000	4,700,000
INSTRUMENTATION	1	1	JOB	\$1,250,000	\$1,390,253.71	\$1,250,000.00	\$1,250,000.00	\$1,250,000	\$1,390,253	\$1,250,000	1,250,000
MECHANICAL											
GATE AND VALVE OPERATING MACHINERY	1	1	JOB	\$2,750,000	\$3,058,558.16	\$2,750,000.00	\$2,750,000.00	\$2,750,000	\$3,058,558	\$2,750,000	2,750,000
MECHANICAL SYSTEMS	1	1	JOB	\$3,200,000	\$3,559,049.49	\$3,200,000.00	\$3,200,000.00	\$3,200,000	\$3,559,049	\$3,200,000	3,200,000
MISCELLANEOUS	1	1	JOB	\$1,950,000	\$8,222,790.00	\$7,393,245.88	\$7,295,497.06	\$1,950,000	\$8,222,790.00	\$7,393,246	7,295,497
LOCKS SUBTOTAL								\$100,287,953	\$107,664,880	\$96,803,268	95,874,463
GUIDEWALLS											
SITWORK											
EXCAVATION	95,384	46240	CY	\$4.50	\$27.25	\$24.50	\$24.18	\$429,228	\$1,260,027	\$1,132,911	1,117,932
BACKFILL	59,280	32519	CY	\$10.00	\$12.55	\$11.28	\$11.14	\$592,800	\$408,140	\$366,965	362,114
SCOUR PROTECTION	37,312	67600	TN	\$15.00	\$24.43	\$21.97	\$21.68	\$559,680	\$1,651,536	\$1,484,923	1,465,290
CONCRETE											
42" DIAMETER PILES	5,120	5,510	LF	\$400.00	\$342.10	\$307.59	\$303.52	\$2,048,000	\$1,884,971	\$1,694,808	1,672,401
CAST IN PLACE REINFORCED CONCRETE	2,013	1,012	CY	\$150.00	\$244.69	\$220.01	\$217.10	\$301,950	\$247,628	\$222,646	219,703
PRECAST BEAMS	13,947	14,940	CY	\$500.00	\$1,357.05	\$1,220.14	\$1,204.01	\$6,973,500	\$20,274,274	\$18,228,934	17,987,922
PRECAST BEAM SEATS	211	644	CY	\$1,000.00	\$993.99	\$893.71	\$881.89	\$211,000	\$640,127	\$575,549	567,939
TREMIE CONCRETE	168	945	CY	\$500.00	\$226.62	\$203.76	\$201.07	\$84,000	\$214,159	\$192,554	190,008
PERMANENT CELL FILL (CONCRETE)	8,372	7,372	CY	\$200.00	\$226.59	\$203.73	\$201.04	\$1,674,400	\$1,670,438	\$1,501,918	1,482,061
GROUT FOR BEAMS	626	525	CY	\$1,000.00	\$1,264.82	\$1,137.22	\$1,122.18	\$626,000	\$664,030	\$597,040	589,147
STEEL REINFORCEMENT	2,351,969	101,229	LB	\$0.75	\$0.99	\$0.89	\$0.88	\$1,763,977	\$100,215	\$90,105	88,914
GRAVEL FILL	42,263	43,402	CY	\$10.00	\$51.65	\$46.44	\$45.82	\$422,630	\$2,241,624	\$2,015,481	1,988,834
METALS											
SHEET PILING	1	1	JOB	\$6,131,000	\$7,112,938.00	\$6,395,359.68	\$6,310,804.27	\$6,131,000	\$7,112,938	\$6,395,360	6,310,804
FOUNDATION PILING	1	1	JOB	\$256,000	\$711,470.00	\$639,694.39	\$631,236.76	\$256,000	\$711,470	\$639,694	631,237
POST TENSIONING	1,634	1,634	LF	\$30.00	\$33.37	\$30.00	\$30.00	\$49,020	\$54,520	\$49,020.00	49,020
STRUCTURAL STEEL	1	1	JOB	\$3,268,000	\$1,825,340.00	\$1,641,193.25	\$1,619,494.43	\$3,268,000	\$1,825,340	\$1,641,193	1,619,494
FLOATING GUIDEWALL	1	1	JOB	\$3,750,000	\$2,401,436.00	\$2,159,170.65	\$2,130,623.46	\$3,750,000	\$2,401,436	\$2,159,171	2,130,623
GUIDEWALLS SUBTOTAL								\$29,141,185	\$43,362,873	\$38,988,273	38,473,443
CHANNEL WORK	1	1	JOB	\$680,000	\$756,298.02	\$680,000.00	\$680,000.00	\$680,000	\$756,298	680000	680000
PROJECT SUBTOTAL								\$130,259,137	\$281,436,890	\$136,621,541	\$135,177,906
								Jan-96			

* Italics indicates amount provided by the Corps of Engineers

Lock and Dam 22
Rock Founded
Location 2, Type R

LOCK 22: LOCATION 2, TYPE R - ROCK FOUNDED												
ITEM	COE	JACOBS		COE	JACOBS	96 COSTS			Jan-96	2000 COSTS	96 COSTS	
	QUANTITY	QUANTITY	UNIT	UNIT COST	UNIT COST	JACOBS 96 ADJ	Jacobs Jan 96	COE	JACOBS	Jacobs June 96	Jacobs Jan 96	
						UNIT COST	Unit Cost	AMOUNT	AMOUNT	AMOUNT	Amount*	
						Jul 00/Jan 96	Jan 96/Jul 00	Jan 96/Jan 96				
						1.112202966	0.899116466	0.986778631				
LANDS AND DAMAGES							0.8991					
REAL ESTATE	1	1	JOB	\$150,000.00	\$150,000.00	\$150,000.00	\$150,000.00	\$150,000	\$150,000	150,000	\$150,000	
DAMS												
04 DAMS SUBTOTAL												
LOCKS							0.8991					
SITWORK												
MOBILIZATION	1	1	JOB	\$8,000,000.00	\$422,147.00	\$379,552.37	\$374,534.17	\$8,000,000	\$422,147	379,552	\$374,534	
DEMOBILIZATION	1	1	JOB	\$500,000.00	\$60,426.00	\$54,329.02	\$53,610.71	\$500,000	\$60,426	54,329	\$53,611	
ROCK EXCAVATION	8,247	5,098	CY	\$45.00	\$227.72	\$204.74	\$202.04	\$371,115	\$1,160,921	1,043,784	\$1,029,984	
OVERBURDEN EXCAVATION	40,900	9,120	CY	\$4.50	\$82.14	\$73.85	\$72.87	\$184,050	\$749,095	673,511	\$664,607	
BACKFILL	16,700	25,450	CY	\$10.00	\$7.67	\$6.90	\$6.81	\$167,000	\$195,321	175,613	\$173,291	
LOCK DEWATERING	1	1	JOB	\$1,250,000	\$171,166.00	\$153,895.35	\$151,860.64	\$1,250,000	\$171,166	153,895	\$151,861	
MARINE FACILITIES, TEMP MOORING STRUCTURE	1	1	JOB	\$3,900,000	\$3,774,944.00	\$3,394,052.15	\$3,349,178.14	\$3,900,000	\$3,774,944	3,394,052	\$3,349,178	
CONCRETE												
UNDERBASE GROUTING	460	1,399	CY	\$200.00	\$399.54	\$359.23	\$354.48	\$92,000	\$558,960	502,561	\$495,916	
CAST IN PLACE REINFORCED CONCRETE	15,415	23,505	CY	\$280.00	\$247.62	\$222.64	\$219.69	\$4,316,200	\$5,820,357	5,233,083	\$5,163,894	
PRECAST CONCRETE	5,019	526	CY	\$400.00	\$590.96	\$531.33	\$524.31	\$2,007,600	\$310,844	279,480	\$275,785	
GATE MONOLITH TREMIE CONCRETE	1,650	1,650	CY	\$210.00	\$214.02	\$192.43	\$189.88	\$346,500	\$353,139	317,507	\$313,309	
CONCRETE CELL FILL	29,510	19,274	CY	\$200.00	\$199.90	\$179.73	\$177.36	\$5,902,000	\$3,852,927	3,464,167	\$3,418,366	
FURNISHED AND SET LANDING PADS	16	16	EA	\$19,000.00	\$11,378.69	\$10,230.58	\$10,095.32	\$304,000	\$182,059	163,689	\$161,525	
FLOAT IN AND SET MITER GATE SILL	4	4	EA	\$100,000.00	\$242,388.75	\$217,931.73	\$215,050.37	\$400,000	\$969,555	871,727	\$860,201	
SET PRECAST WALL PANELS	48	52	EA	\$8,000.00	\$2,461.87	\$2,213.46	\$2,184.20	\$384,000	\$128,017	115,100	\$113,578	
SET PRECAST BEAMS	50	65	EA	\$3,000.00	\$964.26	\$866.97	\$855.51	\$150,000	\$62,677	56,353	\$55,608	
ANCHOR FOR LANDWALL	1,875	1,008	EA	\$50.00	\$9.13	\$8.21	\$8.10	\$93,750	\$9,205	8,276	\$8,167	
METALS												
RIVER WALL SHEET PILING (PS-31)	100,200	69,229	SF	\$22.04	\$27.89	\$25.07	\$24.74	\$2,208,408	\$1,930,493	1,735,706	\$1,712,758	
STAY IN PLACE TEMPLATES	20	42	EA	\$50,000.00	\$46,696.07	\$41,984.44	\$41,429.35	\$1,000,000	\$1,961,235	1,763,346	\$1,740,033	
STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS)	1	1	JOB	\$3,250,000	\$3,614,659.64	\$3,250,000	\$3,250,000	\$3,250,000	\$3,614,660	3,250,000	\$3,250,000	
STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC)	1	1	JOB	\$3,040,000	\$3,381,097.02	\$3,040,000	\$3,040,000	\$3,040,000	\$3,381,092	3,040,000	\$3,040,000	
ROCK BOLTS & SUPPORTS FOR PRECAST BEAMS	140	1,170	EA	\$350.00	\$687.49	\$618.12	\$609.95	\$49,000	\$804,360	723,200	\$713,638	
FASTENERS FOR PRECAST PANELS	336	520	EA	\$100.00	\$630.00	\$566.43	\$558.94	\$33,600	\$327,600	294,545	\$290,651	
HIGH CAPACITY ROCK ANCHORS	53	40	EA	\$8,700.00	\$10,500.00	\$9,440.55	\$9,315.73	\$461,100	\$420,000	377,622	\$372,629	

* Italics indicates amounts provided by the Corps of Engineers.

Lock and Dam 22
Rock Founded
Location 2, Type R

LOCK 22: LOCATION 2, TYPE R - ROCK FOUNDED											
ITEM	COE	JACOBS		COE	JACOBS	JACOBS 96 ADJ	Jacobs Jan 96	COE	JACOBS	Jacobs 96	Jacobs Jan 96
	QUANTITY	QUANTITY	UNIT	UNIT COST	UNIT COST		Unit Cost	AMOUNT	AMOUNT	AMOUNT	Amount*
ELECTRICAL											
ELECTRICAL SYSTEM	1	1	JOB	\$4,700,000	\$5,227,353.94	\$4,700,000	\$4,700,000	\$4,700,000	\$5,227,354	4,700,000	\$4,700,000
MECHANICAL											
GATE AND VALVE OPERATING MACHINERY	1	1	JOB	\$2,750,000	\$3,058,558.16	\$2,750,000	\$2,750,000	\$2,750,000	\$3,058,558	2,750,000	\$2,750,000
MECHANICAL SYSTEMS	1	1	JOB	\$3,200,000	\$3,559,049.49	\$3,200,000	\$3,200,000	\$3,200,000	\$3,559,049	3,200,000	\$3,200,000
MISCELLANEOUS											
	1	1	JOB	\$1,950,000	\$5,743,901.00	\$5,164,341.39	\$5,096,061.73	\$1,950,000	\$5,743,901	5,164,341	\$5,096,062
LOCKS SUBTOTAL								\$51,010,323	\$48,810,062	43,885,442	\$43,529,186
GUIDEWALLS											
SITEWORK											
ROCK EXCAVATION	210	674	CY	\$45.00	\$276.66	\$248.74	\$245.45	\$9,450	\$186,467	167,652	\$165,436
OVERBURDEN EXCAVATION	3,060	0	CY	\$4.50	\$0.00	\$0.00	\$0.00	\$13,770	\$0	0	\$0
CONCRETE											
CAST IN PLACE REINFORCED CONCRETE	500	4,910	CY	\$280.00	\$221.14	\$198.82	\$196.20	\$140,000	\$1,085,784	976,228	\$963,321
PRECAST CONCRETE BEAMS (PRESTRESSED)	2,025	2,018	LF	\$2,000.00	\$2,768.87	\$2,489.49	\$2,456.57	\$4,050,000	\$5,587,572	5,023,786	\$4,957,365
TREMIE CONCRETE (WITH REINFORCEMENT)	2,515	4,227	CY	\$210.00	\$201.86	\$181.49	\$179.09	\$528,150	\$853,271	767,176	\$757,033
METALS											
STEEL CYLINDERS FOR CELLS (FILLED W CONCRETE)	5	5	EA	\$450,000.00	\$276,758.60	\$248,833.66	\$245,543.74	\$2,250,000	\$1,383,793	1,244,168	\$1,227,719
NOSE STEEL CYLINDER (FILLED W CONCRETE)	1	1	EA	\$900,000.00	\$732,789.00	\$658,850.59	\$650,139.68	\$900,000	\$732,789	658,851	\$650,140
ANCHOR BARS FOR BEAMS	2,010	2,646	LF	\$87.60	\$53.77	\$48.35	\$47.71	\$176,076	\$142,287	127,930	\$126,239
WALL ARMOR (14 STRIPS)	369,600	339,685	LB	\$4.20	\$1.00	\$0.90	\$0.89	\$1,552,320	\$339,685	305,411	\$301,373
STEEL RUB PLATE AND ACCESSORIES	63,600	63,600	LB	\$6.00	\$6.67	\$6.00	\$5.92	\$381,600	\$424,417	381,600	\$381,600
LADDERS AND MISC METALS	100,000	100,000	LB	\$3.00	\$3.34	\$3.00	\$2.96	\$300,000	\$333,661	300,000	\$300,000
HANDRAILING (ALUM.)	1,400	1,400	LF	\$125.40	\$139.47	\$125.40	\$123.74	\$175,560	\$195,258	175,560	\$175,560
CHECKPOST	30	30	EA	\$1,546.00	\$1,719.47	\$1,546.00	\$1,525.56	\$46,380	\$51,584	46,380	\$46,380
ACCESS HATCH	1	1	JOB	\$33,000	\$36,702.70	\$33,000.00	\$32,563.69	\$33,000	\$36,703	33,000	\$33,000
ELECTRICAL											
ELECTRICAL SYSTEM	1	1	JOB	\$78,000	\$86,751.83	\$78,000.00	\$76,968.73	\$78,000	\$86,752	78,000	\$78,000
GUIDEWALLS SUBTOTAL						\$1,023,532.44	\$1,009,999.94	10,634,306	\$11,440,022	10,285,743	\$10,163,165
CHANNEL WORK	1	1	JOB	3,200,000	\$3,559,049.49	\$3,200,000.00	\$3,200,000.00	3,200,000	\$3,559,049	3,200,000	\$3,200,000
PROJECT SUBTOTAL								\$64,844,629	\$63,959,133	57,521,184	\$57,042,351

* Italics indicates amounts provided by the Corps of Engineers.

Lock and Dam 22
Rock Founded
Location 3, Type C

LOCK 22: LOCATION 3, TYPE C - ROCK FOUNDED												
ITEM	COE	JACOBS	UNIT	COE	JACOBS 00	JACOBS 96 ADJ	JACOBS Jan 96	Jan-96	2000 costs	96 Costs		
	QUANTITY	QUANTITY		UNIT COST	UNIT COST	UNIT COST	Unit Cost	AMOUNT	AMOUNT	JACOBS	JACOBS June 96	JACOBS Jan 96
					Jun 00/Jul96	Jun 96/Jul 00	Jan 96/Jan 96					
					1.112202966	0.899116466	0.986778631					
LANDS AND DAMAGES												
REAL ESTATE	1	1	JOB	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000.00	\$15,000
DAMS												
04 DAMS SUBTOTAL												
LOCKS												
SITEWORK												
MOBILIZATION	1	1	JOB	\$8,000,000.00	\$422,147.00	\$379,559.32	\$374,541.03	\$8,000,000	\$422,147		379,559	\$374,541
DEMOBILIZATION	1	1	JOB	\$1,800,000.00	\$0.00	\$0.00	\$0.00	\$1,800,000	\$0		0	\$0
DREDGING	43,131	10,740	CY	\$4.50	\$27.47	\$24.70	\$24.37	\$194,090	\$295,035		265,271	\$261,764
ROCK EXCAVATION	39,194	52,100	CY	\$45.00	\$69.26	\$62.28	\$61.45	\$1,763,730	\$3,608,685		3,244,628	\$3,201,730
EXTENSION OF EXISTING D.S. GUIDEWALL	1	1	JOB	\$7,700,000.00	\$4,802,871.00	\$4,318,340.40	\$4,261,246.03	\$7,700,000	\$4,802,871		4,318,340	\$4,261,246
COFFERDAM FILL (DOWNSTREAM CLOSURE)	9,720	4,040	CY	\$14.50	\$51.64	\$46.43	\$45.82	\$140,940	\$208,623		187,576	\$185,096
EXISTING LOCK DEWATERING	1	1	JOB	\$440,000.00	\$165,748.00	\$149,026.76	\$147,056.42	\$440,000	\$165,748		149,027	\$147,056
NEW LOCK DEWATERING	1	1	JOB	\$440,000.00	\$342,486.00	\$307,934.80	\$303,863.48	\$440,000	\$342,486		307,935	\$303,863
CONCRETE												
CAST IN PLACE REINFORCED CONCRETE	26,283	26,068	CY	\$280.00	\$296.90	\$266.94	\$263.42	\$7,359,240	\$7,739,500		6,958,712	\$6,866,708
PRECAST CONCRETE (W/REINFORCEMENT)	2,325	0	CY	\$400.00	\$0.00	\$0.00	\$0.00	\$930,000	\$0		0	\$0
TREMIE CONCRETE	4,114	2,038	CY	\$210.00	\$236.23	\$212.40	\$209.59	\$863,940	\$481,430		432,862	\$427,139
PERMANENT CELL FILL - GRAVEL** (RIVERWALL)	33,650	34,901	CY	\$15.00	\$51.64	\$46.43	\$45.82	\$504,750	\$1,802,262		1,620,443	\$1,599,019
PERMANENT CELL FILL - CONCRETE (I-WALL)	16,140	14,324	CY	\$280.00	\$195.82	\$176.06	\$173.73	\$4,519,200	\$2,804,882		2,521,916	\$2,488,572
OTHER GRAVEL FILL	2,900		CY	\$15.00	\$0.00	\$0.00	\$0.00	\$43,500	\$0		0	\$0
PRECAST PANELS FOR CELLULAR WALL (RIVERWALL)	2,370	2,540	CY	\$600.00	\$919.49	\$826.73	\$815.80	\$1,422,000	\$2,335,516		2,099,901	\$2,072,137
PRECAST PANELS FOR CELLULAR WALL (I-WALL)	2,270	2,347	CY	\$800.00	\$952.57	\$856.47	\$845.15	\$1,816,000	\$2,235,686		2,010,142	\$1,983,565
METALS												
SHEETPIILING (DOWNSTREAM CLOSURE, PSA23)	15,920	14,600	SF	\$25.00	\$40.90	\$36.77	\$36.29	\$398,000	\$597,143		536,901	\$529,803
SHEETPIILING - PERMANENT PSA23 (LOCKWALLS)	189,560	186,919	SF	\$25.00	\$56.76	\$51.04	\$50.36	\$4,739,000	\$10,610,358		9,539,948	\$9,413,816
STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS)	1	1	JOB	\$3,250,000.00	\$3,614,659.64	\$3,250,000.00	\$3,250,000	\$3,250,000	\$3,614,660		3,250,000	\$3,250,000
STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC)	1	1	JOB	\$2,500,000.00	\$2,780,507.41	\$2,500,000.00	\$2,500,000	\$2,500,000	\$2,780,507		2,500,000	\$2,500,000

* Italics indicates amounts provided by the Corps of Engineers.

Lock and Dam 22
Rock Founded
Location 3, Type C

LOCK 22: LOCATION 3, TYPE C - ROCK FOUNDED											
ITEM	COE	JACOBS	UNIT	COE	JACOBS 00	JACOBS 96 ADJ	JACOBS Jan 96	COE	JACOBS	2000 costs	96 Costs
	QUANTITY	QUANTITY		UNIT COST	UNIT COST	UNIT COST	Unit Cost	AMOUNT	AMOUNT	JACOBS	JACOBS
										Amount	Amount*
ELECTRICAL											
ELECTRICAL SYSTEM	1	1	JOB	\$4,700,000.00	\$5,227,353.94	\$4,700,000.00	\$4,700,000	\$4,700,000	\$5,227,354	4,700,000	\$4,700,000
MECHANICAL											
GATE AND VALVE OPERATING MACHINERY	1	1	JOB	\$2,053,000.00	\$2,283,352.69	\$2,053,000.00	\$2,053,000	\$2,053,000	\$2,283,353	2,053,000	\$2,053,000
MECHANICAL SYSTEMS	1	1	JOB	\$2,900,000.00	\$3,225,388.60	\$2,900,000.00	\$2,900,000	\$2,900,000	\$3,225,389	2,900,000	\$2,900,000
MISCELLANEOUS											
MITER GATE MONOLITH INSTALLATION		1	JOB	\$5,848,000.00	\$5,679,811.00	\$5,106,811.59	\$5,039,292.55	\$5,848,000	\$5,679,811	5,106,812	\$5,039,293
TIE IN I-WALL AND R-WALL		1	JOB		\$4,491,029.00	\$4,037,958.12	\$3,984,570.79		\$4,491,029	4,037,958	\$3,984,571
BULKHEAD SLOTS FOR UPPER AUS. LOCK GATE		1	JOB		\$773,037.00	\$695,050.30	\$685,860.78		\$773,037	695,050	\$685,861
LOCKS SUBTOTAL					\$891,501.00	\$801,563.23	\$790,965.47		\$891,501	801,563	\$790,965
								\$64,325,390	\$67,419,012	60,617,544	\$60,019,746
GUIDEWALLS											
SITWORK											
Excavation		9195	CY		\$27.47	\$24.70	\$24.37		\$252,575	227,094	\$224,092
CONCRETE											
CAST IN PLACE REINFORCED CONCRETE	2,316	13,249	CY	\$280.00	\$225.76	\$202.98	\$200.30	\$648,480	\$2,991,035	2,689,289	\$2,653,733
PRECAST CONCRETE BEAMS (PRESTRESSED)	6,000	6,000	LF	\$1,170.00	\$557.36	\$501.13	\$494.51	\$7,020,000	\$3,344,181	3,006,808	\$2,967,054
PRECAST CONCRETE (W/REINFORCEMENT)	2,960	2,667	CY	\$400.00	\$768.27	\$690.77	\$681.64	\$1,184,000	\$2,048,988	1,842,279	\$1,817,921
TREMIE CONCRETE	15,186	2,164	CY	\$210.00	\$196.07	\$176.29	\$173.96	\$3,189,060	\$424,287	381,483	\$376,440
GRAVEL FILL	29,582	27,073	CY	\$15.00	\$51.64	\$46.43	\$45.82	\$443,730	\$1,398,030	1,256,992	\$1,240,373
METALS											
SHEETPIILING FOR CELLS (ps31)	152,602	137,830	SF	\$25.00	\$44.49	\$40.00	\$39.47	\$3,815,050	\$6,131,798	5,513,201	\$5,440,308
SHEETPILE CUTOFF WALL (PZ35)	32,775	31,484	SF	\$30.00	\$27.19	\$24.45	\$24.12	\$983,250	\$855,985	769,630	\$759,455
STRUCTURAL STEEL	1	1	JOB	\$3,811,000.00	\$1,290,013.00	\$1,159,871.93	\$1,144,536.84	\$3,811,000	\$1,290,013	1,159,872	\$1,144,537
PROTECTION BARGES (US AND DS)		1	JOB		\$734,544.00	\$660,440.61	\$651,708.68		\$734,544	660,441	\$651,709
GUIDEWALLS SUBTOTAL								21,094,570	\$19,471,436	17,507,089	\$17,275,621
CHANNEL WORK					\$3,781,490.08	\$3,400,000.00	3,400,000	3,400,000	\$3,781,490	3,400,000	3,400,000
PROJECT SUBTOTAL								\$88,834,960	\$90,686,938	\$81,539,633	\$80,710,367

* Italics indicates amounts provided by the Corps of Engineers.

U.S. Army Corps of Engineers
Rock Island District
St. Louis District
St. Paul District

Independent Review of Concept Design Construction Costs
for
Upper Mississippi River-Illinois Waterway System Navigation Study

Large Scale Measures for Reducing Traffic Congestion

Documentation Report

E

COMPARISON BETWEEN CORPS OF ENGINEERS' AND AE'S
COST ESTIMATES

Lock and Dam 25
Pile Founded
Location 2, Type R

Lock/Dam 25, Location 2, Type R - P2R								
ITEM	Corps Amount	Contingency Factor	Contingency Amount	Corps Amount with Contingency	Jacobs Amount	Contingency Factor	Contingency Amount	Jacobs Amount with Contingency
LANDS AND DAMAGES								
REAL ESTATE	\$150,000	0.25	\$37,500	\$187,500.00	\$150,000	0.25	\$37,500.00	\$187,500
DAMS								
04 DAMS SUBTOTAL								
LOCKS								
SITWORK								
MOBILIZATION	\$8,650,000	0.25	\$2,162,500	\$10,812,500	\$390,317	1.00	\$390,318.84	\$780,634
DEMobilIZATION	\$500,000	0.25	\$125,000	\$625,000	\$298,712	0.84	\$189,895.38	\$486,807
EXCAVATION	\$74,700	0.25	\$18,675	\$93,375	\$623,277	0.38	\$236,845.08	\$860,122
SCOUR PROTECTION	\$312,500	0.25	\$78,125	\$390,625	\$254,512	0.10	\$25,451.23	\$279,963
FOUNDATION/LOCK DEWATERING	\$3,000,000	0.25	\$750,000	\$3,750,000	\$3,937,840	0.20	\$787,527.99	\$4,725,168
MARINE FACILITIES, TEMP MOORING STRUCTURE	\$950,000	0.25	\$237,500	\$1,187,500	\$2,646,762	0.47	\$1,243,978.04	\$3,890,740
CONCRETE								
UNDERBASE GROUTING	\$440,000	0.25	\$110,000	\$550,000	\$920,268	0.68	\$807,368.97	\$1,527,625
CAST IN PLACE REINFORCED CONCRETE	\$3,519,040	0.25	\$879,760	\$4,398,800	\$3,179,032	0.25	\$794,757.93	\$3,973,790
LIGHTWEIGHT CONCRETE	\$1,959,750	0.25	\$489,938	\$2,449,688	\$555,897	0.10	\$55,589.68	\$611,487
PRECAST CONCRETE	\$2,806,000	0.25	\$701,500	\$3,507,500	\$220,499	0.10	\$22,049.96	\$242,548
TREMIE CONCRETE	\$1,514,370	0.25	\$378,593	\$1,892,963	\$4,403,017	0.24	\$1,056,724.13	\$5,459,741
STONE FILL FOR H-WALL CELLS	\$950,700	0.25	\$237,675	\$1,188,375	\$1,271,571	0.30	\$381,471.35	\$1,653,043
GROUT FOR STONE FILLED CELLS	\$1,042,400	0.25	\$260,600	\$1,303,000	\$4,114,121	0.28	\$1,089,671.54	\$5,183,793
SAND FILL FOR LANSWALL CELLS	\$233,000	0.25	\$58,250	\$291,250	\$233,325	0.10	\$23,332.52	\$256,958
FURNISHED AND SET LANDING PADS	\$114,000	0.25	\$28,500	\$142,500	\$172,787	0.21	\$36,280.97	\$209,048
FLOAT IN AND SET MITER GATE SILL	\$140,000	0.25	\$35,000	\$175,000	\$474,189	0.93	\$440,896.01	\$915,185
36" DIA PIPE PILES, QTY 56 PILES	\$1,470,000	0.25	\$367,500	\$1,837,500	\$1,310,082	0.10	\$131,008.22	\$1,441,090
SET PRECAST WALL PANELS	\$384,000	0.25	\$96,000	\$480,000	\$178,557	0.67	\$119,633.51	\$298,191
SET PRECAST BEAMS	\$150,000	0.25	\$37,500	\$187,500	\$22,088	0.84	\$14,134.91	\$38,221
ARTICULATED CONCRETE MAT FOR FLOOR	\$700,000	0.25	\$175,000	\$875,000	\$265,616	0.28	\$89,060.14	\$334,676
BEDDING UNDER FLOOR MAT	\$140,000	0.25	\$35,000	\$175,000	\$152,456	0.24	\$36,589.46	\$189,046
METALS								
RIVER WALL SHEETPIILING (PS-31)	\$2,518,775	0.25	\$629,694	\$3,148,469	\$2,638,009	0.23	\$606,742.13	\$3,244,751
STAY IN PLACE TEMPLATES	\$700,000	0.25	\$175,000	\$875,000	\$1,541,740	0.34	\$524,191.72	\$2,066,932
LANDWALL SHEET PILING (PS-31)	\$2,698,474	0.25	\$674,118	\$3,372,592	\$1,797,333	0.10	\$179,733.33	\$1,977,067
ITEM								
Z-PILE CRADLE FOR FLOAT-IN MONOLITH	\$645,678	0.25	\$161,420	\$807,098	\$1,071,045	0.32	\$342,734.40	\$1,413,779
FOUNDATION PILING AND TESTING	\$1,000,000	0.25	\$250,000	\$1,250,000	\$136,938	0.93	\$127,352.77	\$284,291
H-PILING HP 12x53	\$183,312	0.25	\$45,828	\$229,140	\$128,223	0.10	\$12,622.25	\$138,845
STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS)	\$11,813,000	0.25	\$2,953,250	\$14,766,250	\$11,613,000	0.25	\$2,903,250.00	\$14,516,250
STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC.)	\$3,040,000	0.25	\$760,000	\$3,800,000	\$3,040,000	0.25	\$760,000.00	\$3,800,000
ROCK BOLTS & SUPPORTS FOR PRECAST BEAMS	\$49,000	0.25	\$12,250	\$61,250	\$85,296	0.68	\$58,001.56	\$143,298
FASTENERS FOR PRECAST PANELS	\$33,800	0.25	\$8,400	\$42,200	\$20,983	0.68	\$14,268.42	\$36,251
ELECTRICAL								
ELECTRICAL SYSTEM	\$4,700,000	0.25	\$1,175,000	\$5,875,000	\$4,700,000	0.25	\$1,175,000.00	\$5,875,000
INSTRUMENTATION	\$1,250,000	0.25	\$312,500	\$1,562,500	\$1,250,000	0.25	\$312,500.00	\$1,562,500
MECHANICAL								
GATE AND VALVE OPERATING MACHINERY	\$2,750,000	0.25	\$687,500	\$3,437,500	\$2,750,000	0.25	\$687,500.00	\$3,437,500
MECHANICAL SYSTEMS	\$3,200,000	0.25	\$800,000	\$4,000,000	\$3,200,000	0.25	\$800,000.00	\$4,000,000
MISCELLANEOUS	\$1,950,000	0.25	\$487,500	\$2,437,500	\$4,523,687	0.35	\$1,583,290.30	\$8,106,977
LOCKS SUBTOTAL	\$65,380,299		\$16,345,075	\$81,725,374	\$64,116,945		\$17,819,870.82	\$81,936,816
GUIDEWALLS								
SITWORK								
EXCAVATION	\$533,205	0.25	\$133,301	\$666,506	\$290,029	0.43	\$124,712.44	\$414,741
BACKFILL	\$736,400	0.25	\$184,100	\$920,500	\$313,542	1.00	\$313,542.26	\$627,085
SCOUR PROTECTION	\$378,000	0.25	\$94,500	\$472,500	\$385,024	0.10	\$38,502.38	\$423,526
CONCRETE								
48" DIAMETER PILES	\$395,160	0.25	\$98,790	\$493,950	\$344,878	0.20	\$68,975.66	\$413,854
CAST IN PLACE CONCRETE	\$35,100	0.25	\$8,775	\$43,875	\$56,059	0.32	\$17,938.77	\$73,967
PRESTRESSED BOX BEAMS	\$5,067,000	0.25	\$1,266,750	\$6,333,750	\$4,813,308	0.10	\$481,330.56	\$5,294,638
PRECAST BEAM SEATS	\$135,000	0.25	\$33,750	\$168,750	\$117,184	0.48	\$53,904.78	\$171,088
TREMIE CONCRETE	\$14,850	0.25	\$3,713	\$18,563	\$115,197	0.15	\$17,279.54	\$132,476
PERMANENT CELL FILL (CONCRETE)	\$960,400	0.25	\$240,100	\$1,200,500	\$812,733	0.15	\$91,809.91	\$704,643
GROUT AND BLADDERS	\$156,643	0.25	\$39,161	\$195,804	\$121,895	0.57	\$69,478.93	\$191,375
STEEL REINFORCEMENT	\$155,000	0.25	\$38,750	\$193,750	\$23,418	0.43	\$10,069.53	\$33,487
STONE FILL FOR WALL CELLS	\$179,500	0.25	\$44,875	\$224,375	\$423,339	0.26	\$110,068.04	\$533,407
METALS								
STEEL SHEET PILING FOR CELLS (PS-31)	\$1,367,362	0.25	\$341,840	\$1,709,202	\$1,627,311	0.25	\$406,827.73	\$2,034,139
STEEL SHEET PILING FOR SKIRT	\$535,086	0.25	\$133,772	\$668,858	\$1,114,722	0.28	\$312,122.02	\$1,426,844
STEEL H-PILING (FOR 57 FT DIA CELL)	\$214,200	0.25	\$53,550	\$267,750	\$139,728	0.22	\$30,740.14	\$170,468
ITEM								
ANCHOR BARS FOR BEAMS	\$189,216	0.25	\$47,304	\$236,520	\$142,866	0.68	\$94,291.58	\$237,158
WALL ARMOR (14 STRIPS)	\$1,552,320	0.25	\$388,080	\$1,940,400	\$372,264	0.20	\$74,452.70	\$446,716
STEEL RUB PLATE AND ACCESSORIES	\$381,800	0.25	\$95,400	\$477,200	\$58,544	0.22	\$12,879.64	\$71,423
LADDERS AND MISC METALS	\$300,000	0.25	\$75,000	\$375,000	\$300,000	0.25	\$75,000.00	\$375,000
HANDRAILING (ALUM.)	\$175,580	0.25	\$43,890	\$219,450	\$175,560	0.25	\$43,890.00	\$219,450
CHECKPOST	\$46,380	0.25	\$11,595	\$57,975	\$46,380	0.25	\$11,595.00	\$57,975
ACCESS HATCHES	\$33,000	0.25	\$8,250	\$41,250	\$33,000	0.25	\$8,250.00	\$41,250
ELECTRICAL								
ELECTRICAL SYSTEM	\$78,000	0.25	\$19,500	\$97,500	\$78,000	0.25	\$19,500.00	\$97,500
GUIDEWALLS SUBTOTAL	\$13,318,982		\$3,329,745	\$16,648,727	\$11,704,976		\$2,487,262.59	\$14,192,238
CHANNEL WORK	\$680,000	0.25	\$170,000	\$850,000	\$680,000	0.25	\$170,000.00	\$850,000
PROJECT SUBTOTAL	\$79,529,281	0.25	\$19,882,320	\$99,411,601	\$76,651,921	0.27	\$20,514,633.22	\$87,166,554
* Price Level for All Costs - Jan 96			(average factor)				(avg factor)	

Amounts/factors in italics were provided by the Corps of Engineers.

Lock and Dam 25
Pile Founded
Location 3, Type C

Lock/Dam 25, Pile Founded, Location 3, Type C - P3C								
ITEM	Corps Amount	Contingency	Contingency	Corps Amount with Contingency	Jacobs Amount	Contingency	Contingency	Jacobs Amount with Contingency
		Factor	Amount			Factor	Amount	
LANDS AND DAMAGES								
REAL ESTATE	\$150,000	0.25	\$37,500	\$187,500	\$150,000	0.25	\$37,500	187,500
DAMS								
REMOVAL OF EXISTING STRUCTURES								
04 DAMS SUBTOTAL								
LOCKS								
SITWORK								
MOBILIZATION	\$10,850,000	0.25	\$2,862,500	\$13,312,500	\$363,964	1.00	\$363,964	727,928
DEMOBILIZATION	\$1,910,000	0.25	\$477,500	\$2,387,500	\$2,831,877	0.38	\$1,143,471	4,075,447
EXCAVATION	\$308,000	0.25	\$76,500	\$382,500	\$1,720,340	0.10	\$172,034	1,852,374
FOUNDATION FILL AT SCOUR HOLE	\$2,343,750	0.25	\$585,938	\$2,929,888	\$1,878,066	0.00	\$0	1,878,066
WALL FILL	\$157,800	0.25	\$39,400	\$197,000	\$0	0.00	\$0	0
CAPSTONE	\$1,316,500	0.25	\$329,125	\$1,645,625	\$584,013	0.10	\$58,401	642,414
RIPRAP	\$867,600	0.25	\$186,900	\$834,500	\$1,450,073	0.10	\$145,007	1,595,080
LEVELING STONE IN LOCK FLOOR	\$98,700	0.25	\$17,175	\$85,875	\$144,536	0.46	\$66,486	211,022
GRAVEL FILTER IN LOCK FLOOR	\$248,080	0.25	\$62,273	\$311,353	\$492,472	0.46	\$226,537	719,010
GEOTEXTILE	\$82,440	0.25	\$20,610	\$103,050	\$49,931	1.00	\$49,931	99,863
FOUNDATION/LOCK DEWATERING	\$3,000,000	0.25	\$750,000	\$3,750,000	\$1,428,250	0.32	\$457,040	1,885,291
MARINE FACILITIES, TEMP. MOORING STR.	\$3,900,000	0.25	\$975,000	\$4,875,000	\$3,389,550	0.32	\$1,087,856	4,487,406
CONCRETE								
STRUCTURAL GROUTING	\$90,000	0.25	\$22,500	\$112,500	\$171,800	0.30	\$51,480	223,080
CAST IN PLACE REINFORCED CONCRETE	\$14,059,430	0.25	\$3,514,858	\$17,574,288	\$13,475,887	0.14	\$1,886,824	15,362,511
CAST IN PLACE CONNECTIONS	\$898,900	0.25	\$174,725	\$873,625	\$584,491	0.46	\$269,666	824,156
PRECAST CONCRETE	\$1,181,800	0.25	\$290,400	\$1,452,000	\$2,201,978	0.02	\$44,040	2,246,018
TREMI CONCRETE	\$1,706,100	0.25	\$426,525	\$2,132,625	\$5,213,274	0.25	\$1,303,318	6,516,592
PRECAST FLOOR PAVERS AND STRUTS	\$4,418,700	0.25	\$1,104,675	\$5,523,375	\$4,291,230	0.00	\$0	4,291,230
SET PRECAST FLOOR BEAMS	\$496,000	0.25	\$124,000	\$620,000	\$410,893	0.33	\$135,595	546,87
SET FLOOR PANELS	\$620,000	0.25	\$155,000	\$775,000	\$1,030,857	0.08	\$82,468	1,113,326
STEEL REINFORCEMENT	\$5,451,000	0.25	\$1,362,750	\$6,813,750	\$2,454,174	0.14	\$343,584	2,797,758
METALS								
SHEET PILING	\$9,786,240	0.25	\$2,441,560	\$12,207,800	\$8,913,274	0.05	\$445,664	9,358,937
SHEET PILE BRACING	\$350,000	0.25	\$87,500	\$437,500	\$756,872	0.44	\$333,024	1,089,896
ITEM								
FOUNDATION PILING AND TESTING	\$8,315,303	0.25	\$2,078,826	\$10,394,128	\$9,098,265	0.32	\$2,591,445	10,889,710
STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS)	\$11,613,000	0.25	\$2,903,250	\$14,516,250	\$11,613,000	0.25	\$2,903,250	14,516,250
STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC.)	\$3,040,000	0.25	\$760,000	\$3,800,000	\$3,040,000	0.25	\$760,000	3,800,000
ELECTRICAL								
ELECTRICAL SYSTEM	\$4,700,000	0.25	\$1,175,000	\$5,875,000	\$4,700,000	0.25	\$1,175,000	5,875,000
INSTRUMENTATION	\$1,250,000	0.25	\$312,500	\$1,562,500	\$1,250,000	0.25	\$312,500	1,562,500
MECHANICAL								
GATE AND VALVE OPERATING MACHINERY	\$2,750,000	0.25	\$687,500	\$3,437,500	\$2,750,000	0.25	\$687,500	3,437,500
MECHANICAL SYSTEMS	\$3,200,000	0.25	\$800,000	\$4,000,000	\$3,200,000	0.25	\$800,000	4,000,000
MISCELLANEOUS	\$1,950,000	0.25	\$487,500	\$2,437,500	\$7,295,497	0.10	\$729,550	8,025,047
LOCKS SUBTOTAL	\$100,287,953		\$25,071,988	\$125,359,941	\$85,874,463		\$18,615,436	114,489,899
GUIDEWALLS								
SITWORK								
EXCAVATION	\$428,228	0.25	\$107,307	\$536,535	\$1,117,932	0.21	\$234,766	1,352,698
BACKFILL	\$582,900	0.25	\$148,200	\$741,000	\$382,114	0.15	\$54,317	416,431
SCOUR PROTECTION	\$559,880	0.25	\$139,920	\$699,600	\$1,485,290	0.15	\$219,794	1,685,084
CONCRETE								
42" DIAMETER PILES	\$2,048,000	0.25	\$512,000	\$2,560,000	\$1,872,401	0.05	\$83,620	1,756,021
CAST IN PLACE REINFORCED CONCRETE	\$301,950	0.25	\$75,488	\$377,438	\$219,703	0.32	\$70,305	290,008
PRECAST BEAMS	\$6,973,500	0.25	\$1,743,375	\$8,716,875	\$17,987,922	0.01	\$179,879	18,197,801
PRECAST BEAM SEATS	\$211,000	0.25	\$52,750	\$263,750	\$567,839	0.22	\$124,947	692,886
TREMI CONCRETE	\$84,000	0.25	\$21,000	\$105,000	\$190,008	0.32	\$60,803	250,811
PERMANENT CELL FILL (CONCRETE)	\$1,874,400	0.25	\$468,600	\$2,093,000	\$1,482,061	0.32	\$474,259	1,956,320
GROUT FOR BEAMS	\$826,000	0.25	\$165,500	\$782,500	\$589,147	0.32	\$188,527	777,874
STEEL REINFORCEMENT	\$1,783,977	0.25	\$446,994	\$2,204,971	\$88,814	0.28	\$23,118	112,031
GRAVEL FILL	\$422,630	0.25	\$105,658	\$528,288	\$1,988,834	0.26	\$517,097	2,505,930
METALS								
SHEET PILING	\$6,131,000	0.25	\$1,532,750	\$7,663,750	\$6,310,804	0.08	\$587,972	6,878,777
FOUNDATION PILING	\$256,000	0.25	\$64,000	\$320,000	\$631,237	0.20	\$126,247	757,484
POST TENSIONING	\$48,020	0.25	\$12,255	\$61,275	\$49,020	0.25	\$12,255	61,275
STRUCTURAL STEEL	\$3,268,000	0.25	\$817,000	\$4,085,000	\$1,615,494	0.10	\$161,549	1,781,444
FLOATING GUIDEWALL	\$3,750,000	0.25	\$937,500	\$4,687,500	\$2,130,623	0.15	\$319,594	2,450,217
GUIDEWALLS SUBTOTAL	\$29,141,185		\$7,285,296	\$36,426,481	\$38,473,443		\$3,419,448	41,882,881
CHANNEL WORK	\$680,000		\$170,000	\$850,000	\$680,000	0.25	\$170,000	850,000
PROJECT SUBTOTAL	\$130,259,137	0.25	\$32,564,784	\$162,823,922	\$135,177,906	0.16	\$22,242,384	167,420,290
* Price Level for All Costs - Jan 96		(average factor)				(average factor)		

Amounts/factors in italics were provided by the Corps of Engineers.

Lock and Dam 22
Rock Founded
Location 2, Type R

Lock/Dam 22, Location 2, Type R - R2R	Corps Amount	Contingency	Contingency	Corps Amount	Jacobs Amount	Contingency	Contingency	Jacobs Amount
ITEM		Factor	Amount	with Contingency		Factor	Amount	with Contingency
LANDS AND DAMAGES								
REAL ESTATE	\$150,000	0.25	\$37,500	\$187,500	\$150,000	0.25	\$37,500	\$187,500
DAMS								
04 DAMS SUBTOTAL								
LOCKS								
SITWORK								
MOBILIZATION	\$8,000,000	0.25	\$2,000,000	\$10,000,000	\$374,534	1	\$374,534	\$749,068
DEMOBILIZATION	\$500,000	0.25	\$125,000	\$625,000	\$53,611	0.53	\$28,414	\$82,024
ROCK EXCAVATION	\$371,115	0.25	\$92,779	\$463,894	\$1,028,984	0.52	\$535,592	\$1,565,575
OVERBURDEN EXCAVATION	\$184,050	0.25	\$46,013	\$230,063	\$684,607	0.06	\$39,878	\$704,483
BACKFILL	\$187,000	0.25	\$46,750	\$208,750	\$173,291	0.24	\$41,590	\$214,881
LOCK DEWATERING	\$1,250,900	0.25	\$312,500	\$1,562,500	\$151,861	0.42	\$63,781	\$215,642
MARINE FACILITIES, TEMP MOORING STRUCTURE	\$3,900,000	0.25	\$975,000	\$4,875,000	\$3,349,178	0.25	\$837,295	\$4,186,473
CONCRETE								
UNDERBASE GROUTING	\$82,000	0.25	\$20,500	\$115,000	\$495,918	0.4	\$198,367	\$694,283
CAST IN PLACE REINFORCED CONCRETE	\$4,316,200	0.25	\$1,079,050	\$5,395,250	\$5,163,864	0.27	\$1,394,252	\$6,558,148
PRECAST CONCRETE	\$2,007,900	0.25	\$501,900	\$2,509,500	\$275,785	0.1	\$27,578	\$303,363
GATE MONOLITH TREMIE CONCRETE	\$346,500	0.25	\$86,625	\$433,125	\$313,309	0.31	\$97,126	\$410,435
CONCRETE CELL FILL	\$5,802,000	0.25	\$1,475,500	\$7,377,500	\$3,418,368	0.3	\$1,025,510	\$4,443,875
FURNISHED AND SET LANDING PADS	\$304,000	0.25	\$76,000	\$380,000	\$181,525	0.36	\$58,149	\$219,674
FLOAT IN AND SET MITER GATE SILL	\$400,000	0.25	\$100,000	\$500,000	\$960,201	0.58	\$498,917	\$1,359,118
SET PRECAST WALL PANELS	\$384,000	0.25	\$96,000	\$480,000	\$113,578	0.5	\$56,789	\$170,367
SET PRECAST BEAMS	\$150,000	0.25	\$37,500	\$187,500	\$55,608	0.53	\$29,472	\$85,080
ANCHOR FOR LANDWALL	\$93,750	0.25	\$23,438	\$117,188	\$8,167	0.1	\$817	\$8,983
METALS								
RIVER WALL SHEET PILING (PS-31)	\$2,208,408	0.25	\$552,102	\$2,760,510	\$1,712,758	0.26	\$445,317	\$2,158,075
STAY IN PLACE TEMPLATES	\$1,000,000	0.25	\$250,000	\$1,250,000	\$1,740,033	0.33	\$574,211	\$2,314,243
STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS)	\$3,250,000	0.25	\$812,500	\$4,062,500	\$3,250,000	0.25	\$812,500	\$4,062,500
STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC)	\$3,040,000	0.25	\$760,000	\$3,800,000	\$3,040,000	0.25	\$760,000	\$3,800,000
ROCK BOLTS & SUPPORTS FOR PRECAST BEAMS	\$49,000	0.25	\$12,250	\$61,250	\$713,638	0.54	\$385,385	\$1,099,003
FASTENERS FOR PRECAST PANELS	\$33,600	0.25	\$8,400	\$42,000	\$280,851	0.53	\$154,045	\$444,896
HIGH CAPACITY ROCK ANCHORS	\$461,100	0.25	\$115,275	\$576,375	\$372,629	0.42	\$156,504	\$529,134
ITEM								
ELECTRICAL								
ELECTRICAL SYSTEM	\$4,700,000	0.25	\$1,175,000	\$5,875,000	\$4,700,000	0.25	\$1,175,000	\$5,875,000
MECHANICAL								
GATE AND VALVE OPERATING MACHINERY	\$2,750,000	0.25	\$687,500	\$3,437,500	\$2,750,000	0.25	\$687,500	\$3,437,500
MECHANICAL SYSTEMS	\$3,200,000	0.25	\$800,000	\$4,000,000	\$3,200,000	0.25	\$800,000	\$4,000,000
MISCELLANEOUS	\$1,950,000	0.25	\$487,500	\$2,437,500	\$5,098,062	0.35	\$1,783,822	\$6,879,883
LOCKS SUBTOTAL	\$51,010,323		\$12,752,591	\$63,762,904	\$43,529,186		\$13,042,121	\$66,671,307
GUIDEWALLS								
SITWORK								
ROCK EXCAVATION	\$9,450	0.25	\$2,363	\$11,813	\$165,436	0.25	\$41,359	\$206,795
OVERBURDEN EXCAVATION	\$13,770	0.25	\$3,443	\$17,213	\$0			
CONCRETE								
CAST IN PLACE REINFORCED CONCRETE	\$140,000	0.25	\$35,000	\$175,000	\$963,321	0.31	\$298,630	\$1,261,951
PRECAST CONCRETE BEAMS (PRESTRESSED)	\$4,050,000	0.25	\$1,012,500	\$5,062,500	\$4,967,365	0.11	\$545,310	\$5,502,675
TREMIE CONCRETE (WITH REINFORCEMENT)	\$528,150	0.25	\$132,038	\$660,188	\$757,033	0.31	\$234,680	\$891,713
METALS								
STEEL CYLINDERS FOR CELLS (FILLED W CONCRETE)	\$2,250,000	0.25	\$562,500	\$2,812,500	\$1,227,719	0.12	\$147,328	\$1,375,045
NOSE STEEL CYLINDER (FILLED W CONCRETE)	\$900,000	0.25	\$225,000	\$1,125,000	\$650,140	0.11	\$71,516	\$721,655
ANCHOR BARS FOR BEAMS	\$176,078	0.25	\$44,019	\$220,095	\$126,239	0.38	\$49,233	\$175,472
WALL ARMOR (14 STRIPS)	\$1,552,320	0.25	\$388,080	\$1,940,400	\$301,373	0.2	\$60,275	\$381,647
STEEL RUB PLATE AND ACCESSORIES	\$381,800	0.25	\$95,400	\$477,000	\$391,600	0.25	\$95,400	\$477,000
LADDERS AND MISC METALS	\$300,000	0.25	\$75,000	\$375,000	\$300,000	0.25	\$75,000	\$375,000
HANDRAILING (ALUM.)	\$175,560	0.25	\$43,890	\$219,450	\$175,560	0.25	\$43,890	\$219,450
CHECKPOST	\$46,380	0.25	\$11,595	\$57,975	\$46,380	0.25	\$11,595	\$57,975
ACCESS HATCH	\$33,000	0.25	\$8,250	\$41,250	\$33,000	0.25	\$8,250	\$41,250
ELECTRICAL								
ELECTRICAL SYSTEM	\$78,000	0.25	\$19,500	\$97,500	\$78,000	0.25	\$19,500	\$97,500
GUIDEWALLS SUBTOTAL	\$10,634,306		\$2,658,577	\$13,292,883	\$10,163,165		\$1,701,963	\$11,865,128
CHANNEL WORK	\$3,200,000	0.25	\$800,000	\$4,000,000	\$3,200,000	0.25	\$800,000	\$4,000,000
PROJECT SUBTOTAL	\$84,844,828	0.25	\$16,248,657	\$101,243,288	\$57,042,351	0.27	\$15,581,584	\$72,823,936
		(average factor)				(average factor)		

Amounts/factors in italics were provided by the Corps of Engineers.

Lock and Dam 22
Rock Founded
Location 3, Type C

Lock/Dam 22, Location 3, Type C - R3C	Corps Amount	Contingency Factor	Contingency Amount	Corps Amount with Contingency	Jacobs Amount	Contingency Factor	Contingency Amount	Jacobs Amount with Contingency
LANDS AND DAMAGES								
REAL ESTATE	\$15,000	0.25	\$3,750	\$18,750	\$15,000	0.25	\$3,750	\$18,750
DAMS								
Q4 DAMS SUBTOTAL								
LOCKS								
SITWORK								
MOBILIZATION	\$8,000,000	0.25	\$2,000,000	\$10,000,000	\$374,541	1.00	\$374,541	\$749,082
DEMobilIZATION	\$1,800,000	0.25	\$450,000	\$2,250,000	\$0	0.00	\$0	\$0
DREDGING	\$184,080	0.25	\$46,522	\$242,812	\$281,784	0.25	\$65,441	\$327,204
ROCK EXCAVATION	\$1,783,730	0.25	\$440,933	\$2,204,863	\$3,201,730	0.84	\$2,889,453	\$5,891,183
EXTENSION OF EXISTING D.S. GUIDEWALL	\$7,700,000	0.25	\$1,925,000	\$9,625,000	\$4,281,246	0.23	\$980,087	\$5,241,333
COFFERDAM FILL (DOWNSTREAM CLOSURE)	\$140,940	0.25	\$35,235	\$178,175	\$185,086	0.21	\$38,870	\$223,967
EXISTING LOCK DEWATERING	\$440,000	0.25	\$110,000	\$550,000	\$147,066	0.31	\$45,587	\$192,844
NEW LOCK DEWATERING	\$440,000	0.25	\$110,000	\$550,000	\$303,863	0.19	\$57,734	\$361,598
CONCRETE								
CAST IN PLACE REINFORCED CONCRETE	\$7,359,240	0.25	\$1,839,810	\$9,199,050	\$8,868,708	0.30	\$2,060,012	\$8,928,721
PRECAST CONCRETE (W/REINFORCEMENT)	\$930,000	0.25	\$232,500	\$1,162,500	\$0	0.00	\$0	\$0
TREMI CONCRETE	\$863,840	0.25	\$215,965	\$1,079,925	\$427,139	0.33	\$140,958	\$568,094
PERMANENT CELL FILL - GRAVEL** (RIVERWALL)	\$504,750	0.25	\$126,188	\$630,938	\$1,598,019	0.10	\$159,802	\$1,758,921
PERMANENT CELL FILL - CONCRETE (I-WALL)	\$4,519,200	0.25	\$1,129,800	\$5,849,000	\$2,488,572	0.20	\$497,714	\$2,986,287
OTHER GRAVEL FILL	\$43,500	0.25	\$10,875	\$54,375	\$0	0.00	\$0	\$0
PRECAST PANELS FOR CELLULAR WALL (RIVERWALL)	\$1,422,000	0.25	\$355,500	\$1,777,500	\$2,072,137	0.17	\$352,263	\$2,424,401
PRECAST PANELS FOR CELLULAR WALL (I-WALL)	\$1,818,000	0.25	\$454,000	\$2,270,000	\$1,983,565	0.22	\$436,384	\$2,419,950
METALS								
SHEETPIILING (DOWNSTREAM CLOSURE, PSA23)	\$388,000	0.25	\$99,500	\$497,500	\$528,803	0.21	\$111,259	\$641,061
SHEETPIILING - PERMANENT PSA23 (LOCKWALLS)	\$4,738,000	0.25	\$1,184,750	\$5,923,750	\$9,413,818	0.13	\$1,223,798	\$10,637,813
STRUCTURAL STEEL (GATES, VALVES, TRASHRACKS)	\$3,250,000	0.25	\$812,500	\$4,062,500	\$3,250,000	0.25	\$812,500	\$4,062,500
STRUCTURAL STEEL (MISCELLANEOUS - LADDERS, ETC)	\$2,500,000	0.25	\$625,000	\$3,125,000	\$2,500,000	0.25	\$625,000	\$3,125,000
ITEM								
ELECTRICAL								
ELECTRICAL SYSTEM	\$4,700,000	0.25	\$1,175,000	\$5,875,000	\$4,700,000	0.25	\$1,175,000	\$5,875,000
MECHANICAL								
GATE AND VALVE OPERATING MACHINERY	\$2,053,000	0.25	\$513,250	\$2,566,250	\$2,053,000	0.25	\$513,250	\$2,566,250
MECHANICAL SYSTEMS	\$2,900,000	0.25	\$725,000	\$3,625,000	\$2,900,000	0.25	\$725,000	\$3,625,000
MISCELLANEOUS								
MITER GATE MONOLITH INSTALLATION	\$5,848,000	0.25	\$1,462,000	\$7,310,000	\$5,039,293	0.32	\$1,612,574	\$6,951,868
TIE IN I-WALL AND R-WALL					\$3,984,671	0.34	\$1,354,754	\$5,339,325
BULKHEAD SLOTS FOR UPPER AUS. LOCK GATE					\$895,961	0.20	\$177,172	\$823,033
LOCKS SUBTOTAL	\$64,325,390		\$16,081,347	\$80,406,737	\$80,019,748		\$16,288,347	\$78,288,092
GUIDEWALLS								
SITWORK								
Excavation					\$224,092	0.33	\$73,950	\$298,042
CONCRETE								
CAST IN PLACE REINFORCED CONCRETE	\$648,480	0.25	\$162,120	\$810,600	\$2,653,733	0.19	\$504,209	\$3,157,942
PRECAST CONCRETE BEAMS (PRESTRESSED)	\$7,020,000	0.25	\$1,755,000	\$8,775,000	\$2,867,064	0.15	\$445,068	\$3,412,112
PRECAST CONCRETE (W/REINFORCEMENT)	\$1,184,000	0.25	\$296,000	\$1,480,000	\$1,817,921	0.23	\$418,122	\$2,236,043
TREMI CONCRETE	\$3,189,060	0.25	\$797,265	\$3,986,325	\$376,440	0.20	\$75,288	\$451,728
GRAVEL FILL	\$443,730	0.25	\$110,933	\$554,663	\$1,240,373	0.20	\$248,075	\$1,488,447
METALS								
SHEETPIILING FOR CELLS (ps31)	\$3,815,050	0.25	\$953,763	\$4,788,813	\$5,440,308	0.13	\$707,240	\$6,147,549
SHEETPILE CUTOFF WALL (P235)	\$983,250	0.25	\$245,813	\$1,229,063	\$759,455	0.10	\$75,945	\$835,400
STRUCTURAL STEEL	\$3,811,000	0.25	\$952,750	\$4,783,750	\$1,144,537	0.52	\$595,159	\$1,739,898
PROTECTION BARGES (US AND DS)					\$651,709	0.10	\$65,171	\$716,880
GUIDEWALLS SUBTOTAL	\$21,094,570		\$5,273,643	\$26,388,213	\$17,275,621		\$3,208,218	\$20,483,839
CHANNEL WORK	\$3,400,000	0.25	\$850,000	\$4,250,000	\$3,400,000	0.25	\$850,000	\$4,250,000
PROJECT SUBTOTAL	\$88,834,960	0.25	\$22,208,740	\$111,043,699	\$80,710,387	0.25	\$20,330,314	\$101,040,681
* Price Level for All Costs - Jan 96		(average factor)				(average factor)		

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