APPENDIX B

COST ENGINEERING APPENDIX

COST ESTIMATES AND RISK ANALYSIS

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B.0 COST ENGINEERING

B.1 GENERAL INFORMATION

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

- Engineer Technical Letter (ETL) 1110-2-573, Construction Cost Estimating Guide for Civil Works, 30 September 2008
- Engineer Regulation (ER) 1110-1-1300, Cost Engineering Policy and General Requirements, 26 March 1993
- ER 1110-2-1302, Civil Works Cost Engineering, 15 September 2008
- ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 August 1999
- ER 1105-2-100, Planning Guidance Notebook, 22 April 2000, as amended
- Engineer Manual (EM) 1110-2-1304 (Tables Revised 31 March 2009), Civil Works Construction Cost Index System, 31 March 2000
- CECW-CP Memorandum for Distribution, Subject: USACE Civil Works Feasibility Study Program Execution and Delivery, 8 February 2012
- CECW-CP Memorandum for Distribution, Subject: Initiatives to Improve the Accuracy of Total Project Costs in Civil Works Feasibility Studies Requiring Congressional Authorization, 19 September 2007
- CECW-CE Memorandum for Distribution, Subject: Application of Cost Risk Analysis
- Methods to Develop Contingencies for Civil Works Total Project Costs, 3 July 2007
- Cost and Schedule Risk Analysis Process, March 2008
- Engineering and Construction Bulleting (ECB) 2012-18, Engineering Within the Planning Modernization Paradigm, 18 May 2012

The goal of the cost estimates for the Central Everglades Planning Project Study are to present a Total Project Cost (Construction and Non-Construction costs) for the recommended plan at the current price level to be used for project authorization and to escalate costs for budgeting purposes. In addition, the costing efforts are intended to produce a final product (cost estimate) that is reliable and accurate, and that supports the definition of the Government's and the Non-Federal sponsor's obligations.

The cost estimating effort for the study also yielded a series of alternative plan formulation cost estimates for decision making. The final set of plan formulation cost estimates used for plan selection relies on historic construction feature unit pricing. The cost estimate supporting the National Ecosystem Restoration plan (Recommended Plan/Locally Preferred Alternative Plan) is prepared in MCACES/MII format to the Civil Works Work Breakdown Structure (CWWBS) sub-feature level. This estimate is supported by the preferred labor, equipment, materials and crew/production breakdown. A fully funded (escalated for inflation through project completion) cost estimate, the Baseline Cost Estimate or Total Project Cost Summary has been produced by the Cost MCX for the draft report. A risk analysis has been produced by the Cost MCX for the draft report. It addresses the project uncertainties and sets contingencies for the Recommended Plan's cost items. An initial cost risk workshop was held during the week of February 4, through February 8, 2013. The workshop included reviewing and discussing risks associated with each feature, while team members appraised the features separately. The cost estimates were prepared using the data provided by the Project Delivery Team (PDT) and a series of assumptions that were input into the Parametric Costing Tool. The Parametric Cost tool was created by the sponsor South Florida Water Management District. This tool combined project estimates from completed projects as well as estimated costs from larger type projects such as Modified Waters Delivery (MWD) and Everglades Agricultural Area (EAA).

This Parametric Cost tool was a major factor in the process of screening potential features and components of the overall project. The tool estimated costs and generated quantities based on factors and presets from multiple resource points that were built into the Microsoft Access database. The tool did have a few pitfalls such as not being able to capture the entirety of the scope. Some items, such as real estate, O&M and contingencies had to be created outside of the tool for completion and then combined with the total for a total cost.

An Agency Technical Review (ATR) was completed on the Draft Cost Appendix dated February 15, 2013. The MCX had concerns about the Cost ATR effort and reviewing the final array of alternatives focusing on the supporting data that confidently establishes the recommended plan as the reasonable plan, worthy of USACE support in pursuing Federal funds through the Assistant Secretary of the Army's office. A potential recommended plan is ready for HQUSACE decision and commitment once the recommended plan is established from various alternatives with the associated confident comparative costs. The resolution for this is better cost traceability, development of preliminary scope, quantities, parametric costs and associated risks for each alternative. These costs must be clearly developed, calculated and presented. Another item of concern for the MCX is that the data presented in the first submission was inadequate and the resolution for this is to note the Cost ATR comments as a means of supporting better quality products that lend confidence that everyone made the right choice at the right estimate cost.

Second Cost Schedule Risk Analysis Workshop was conducted June 18 and 19, 2013. PDT participants from multiple agencies discussed the high risk items identified in first risk analysis workshop and identified additional risks.

Following this two day workshop a third step was undertaken to further reduce risk associated with uncertainty of specific site conditions. The local sponsor and USCE engineers, construction and cost personnel, held a meeting between June 25 through 28, 2013, and revisited and refined costs scope with respect to particular means of performing construction work, confirming site specific assumptions with respect to subsurface conditions, hauling, material processing, care and diversion of water, and etc. This information assisted in the final development of the recommended plan costs for the project.

These cost schedule risk analysis workshops and the meetings with the Sponsor in June 2013 proved to be a successful partnering opportunity. It reduced the total cost and contingencies developed during the screening of alternatives to those developed for the recommended plan from $2.2B (82% contingency) to $1.9B (44% contingency). During the process of developing preliminary costs, a comparison/reasonable check was prepared of the costs of similar features proposed in CEPP's predecessor, The Yellow Book. The differences between the similar features were less than $200M. Lastly, an analysis of the contingencies for eleven of the past planning documents (post-certification) prepared by Jacksonville Districts resulted in a range of 20-40%. CEPP's contingency of 44% is slightly higher than the range; however, CEPP is consistent with the pilot concept of using existing data and best professional judgment in lieu of expending additional resources for site specific data collection.

COST COMPARISON - CERP (YELLOWBOOK) AND CEPP

CERP AND CEPP FEATURE DESCRIPTIONS		FY99 Yellow book Costs Costs include PED and Construction Management Implementation Plan Construction & Real Estate	 Cost Appendix Construction Only	FY99 Yellow book without Real Estate Escalated Construction Cost to FY14 1.642664692 Cost Escalation Factor	CEPP Construction First Cost (includes contingency)
EAA Storage and Conveyance (G)		**$ 436,648,000.00**	**$ 350,112,000.00**	**$ 575,116,620.72**	**$ 582,468,000.00**
(G) EAA Storage Reservoirs 360kaf total (3 comp)		$ 350,112,000.00	$ 350,112,000.00	$ 575,116,620.72	
CEPP Flow Equalization Basin 60kaf (1 comp) - A2 FEB					$ 545,826,000.00
Real Estate		$ 86,536,000.00			$ 36,642,000.00
Flow to Northwest and Central Water Conservation Area 3A (II, RR)		**$ 30,877,000.00**	**$ 30,877,000.00**	**$ 50,720,557.70**	**$ 223,994,000.00**
(RR) S-140 Relocation and spreader system		$ 20,740,000.00	$ 20,740,000.00	$ 34,068,865.72	
(II) G404 Modifications		$ 10,137,000.00	$ 10,137,000.00	$ 16,651,691.98	
CEPP S-8 Modifications					$ 71,497,000.00
L-6 Diversion, L-5 Canal Improvements and Infrastructure					$ 104,779,000.00
L-4 Degrade and pump station (to maintain water supply)					$ 47,718,000.00
Real Estate					
WCA 3 Decompartmentalization & Sheetflow Enhancement (AA, QQ, SS) * QQ grp 1 costs, ** QQ grp 2 costs		**$ 211,687,000.00**	**$ 185,408,000.00**	**$ 304,563,175.25**	**$ 369,965,000.00**
(AA) Additional S-345/S-349s (adding 3000 cfs, or 6 S-345 structures)		$ 48,450,000.00	$ 48,450,000.00	$ 79,587,104.34	
(QQ) Miami Canal Backfill ~35 miles	*		*		
(QQ) Remove L-29 Levee and Canal Backfill (~20 miles)	*		ALL OF QQ		
(QQ) Bridge and Elevate Tamiami Trail (~20 miles) Bridges and road raising between L-31N and L-28 levees	*	$ 26,467,000.00			
(QQ) Remove L-68A Levee	**				
(QQ) Degrade L-67C Levee and Canal Backfill	**				
(QQ) Remove L-28 & L-28 tieback levees and Canal Backfill	**				
(QQ) Construct 8 passive weirs along L-67A (north of S-345's)	**	$ 59,204,000.00	$ 85,671,000.00	$ 140,728,726.85	
(QQ) Backfill L-67A Canal from Tamiami Trail (~7.5 miles north)					
(QQ) Relocate a single MWD S-349 structure (within L-67A Canal)					
(QQ) Remove S-344, S-343 (A&B) and S-12s (A thru D)			*		
(SS) Reroute Miami-Dade WS Deliveries/North New River Mods		$ 51,287,000.00	$ 51,287,000.00	$ 84,247,344.07	
CEPP Miami Canal Backfill ~13.5 miles					$ 148,227,000.00
S-345 like (New L-67A structures S-631, S-632 and S-633)					$ 36,111,000.00
Degrade L-67C Levee w/o Canal Backfill (~8 miles)					$ 6,553,000.00
Remove L-29 Levee w/o Canal Backfill (~4.3 miles)					$ 14,651,000.00
New L-67D Levee (~8.5 miles) L-67C to L-29					$ 119,840,000.00
New S-333N Structure just north of existing S-333					$ 16,760,000.00
New S-355W divide structure in the L-29 Canal					$ 27,823,000.00
Real Estate		$ 26,279,000.00			
ENP/L-31N Seepage Management and S-356 Structures (U, V with pilot project, and FF) * V grp costs, ** FF grp costs		**$ 337,081,000.00**	**$ 162,076,000.00**	**$ 266,236,522.65**	**$ 104,744,000.00**
(U) Bird Drive Basin Recharge Area Reservoir (11.5kaf)		$ 52,459,000.00	$ 52,459,000.00	$ 86,172,547.09	
(V) Seepage Barrier (Cutoff) Wall	*				
(V) Seepage Groundwater Wells	*	$ 68,611,000.00	$ 68,611,000.00	$ 112,704,867.20	
(V) L-31N (Pilot Project)		$ 10,000,000.00	$ 10,000,000.00	$ 16,426,646.92	
(FF) Remove MWD S-356 Pump Station	**				
(FF) Relocate MWD S-357 Pump Station	**				
(FF) Add New S-356 A & B Pump Stations (900 cfs) each	**				
(FF) Reroute L31N Borrow Canal	**	$ 20,903,000.00	$ 20,903,000.00	$ 34,336,620.06	
CEPP Seepage Barrier (Cutoff) Wall					$ 31,622,000.00
Add New S-356 Pump Station 1000 cfs					$ 50,838,000.00
Remove old Tamiami Trail					$ 8,796,000.00
Remove L-67 extension					$ 13,488,000.00
(BB)Dade Broward Levee Improvements		$ 10,103,000.00	$ 10,103,000.00	$ 16,595,841.39	
Real Estate		$ 175,005,000.00			
Everglades Rain-Driven Operations (H)					
TOTALS		**$ 1,016,293,000.00**	**$ 728,473,000.00**	**$ 1,196,636,876.33**	**$ 1,281,171,000.00**
			Escalated with real estate	$ 1,669,428,628.04	
				PED, S&A, EDC	$ 479,751,000.00
				TOTAL CEPP	**$ 1,760,922,000.00**

Table B.1a

CERP (YELLOWBOOK) AND CEPP COMPARISON TABLE

CERP AND CEPP FEATURE DESCRIPTION	CERP 1999	CEPP TSP	NOTES: INFRASTRUCTURE DIFFERENCES
EAA Storage and Conveyance (G)			
EAA Storage Reservoirs	X	P	CERP 360 kaf storage volume (3 compartment) vs CEPP 60 kaf (1 compartment)
Flow to Northwest and Central Water Conservation Area 3A (II, RR)			
S-140 Relocation and spreader system	X		
G404 Modifications	X	X	CEPP coupled with S-8 Modifications for deliveries
S-8 Modifications		X	
L-6 Diversion, L-5 Canal Improvements and Infrastructure		X	
L-4 Degrade and pump station (to maintain water supply)		X	CERP assumed L-4 degrade and other WCA2/WCA3A hydropattern restoration components as pre-CERP
WCA 3 Decompartmentalization & Sheetflow Enhancement (AA, QQ, SS)			
(AA) Additional S-345/S-349s (adding 3000 cfs, or 6 S-345 structures) *	X	P	CERP 6 S-345/S-349s (adding 3000 cfs to 1500 cfs assumed from MWD) vs CEPP 3 S-345 (adding 1500 cfs, with no MWD features)
(QQ) Miami Canal Backfill ~35 miles	X	P	CERP ~35 miles (S-8 to S-31) vs CEPP ~ 13.5 miles (north of I-75)
(QQ) Remove L-29 Levee and Canal Backfill (~20 miles)	X	P	CERP removed ~ 20 miles (south of WCA 3A and WCA 3B) vs. CEPP removes ~ 4.3 miles without canal backfill
(QQ) Bridge and Elevate Tamiami Trail (~20 miles) Bridges and road raising between L-31N and L-28 levees *	X	*	CEPP is dependent on completion of the DOI Tamiami Trail Next Steps project (~10 miles, south of WCA 3B)
(QQ) Remove L-68A Levee	X		
(QQ) Degrade L-67C Levee and Canal Backfill	X	P	CERP degrades ~24 miles with backfill vs. CEPP degrades ~ 8 miles without canal backfill
(QQ) Remove L-28 & L-28 tieback levees and Canal Backfill	X		
(QQ) Construct 8 passive weirs along L-67A (north of MWD/CERP S-345's)	X		
(QQ) Backfill L-67A Canal from Tamiami Trail (~7.5 miles north)	X		
(QQ) Relocate a single MWD S-349 structure (within L-67A Canal)	X		
(QQ) Remove S-344, S-343 (A&B) and S-12s (A thru D)	X		
(SS) Reroute Miami-Dade Water Supply Deliveries/North New River Mods	X		CEPP/Decomp analysis concluded that NNR Canal mods are not required for WCA 3A Miami Canal backfill
New S-333N Structure just north of existing S-333		X	
New S-355W divide structure in the L-29 Canal		X	
New L-67D Levee (~8.5 miles) L-67A to L-29		X	
Old Tamiami Trail Removal		X	CERP assumed removal with MWD
Remove L-67 Extension levee and Canal Backfill		X	CERP assumed removal with MWD, CEPP removes ~5.5 miles of the remaining levee
ENP/L-31N Seepage Management and S-356 Structures (U, V with pilot project, and FF)			
(U) Bird Drive Basin Recharge Area Reservoir (11.5 kaf)	X		
(V) Seepage Barrier (Cutoff) Wall	X	P	CERP Pilot Project seepage barrier wall assumed between S-334 and S-335 (~ 1.7 miles). Length of L31N Seepage Management is unclear.
(V) Seepage Groundwater Wells	X		
(FF) Remove MWD S-356 Pump Station	X	X	
(FF) Relocate MWD S-357 Pump Station	X		CERP S-357 location proposed to discharge into ENP (different than MWD 2000 GRR)
(FF) Add New S-356 A & B Pump Stations (900 cfs) each	X	P	CERP Adding 2 S-356 (900 cfs) structures vs CEPP Adding 1 S-356 (1000 cfs)
(FF) Reroute L31N Borrow Canal	X		
(H) Everglades Rain-Driven Operations	X	X	

CEPP FEATURES as "P" for Partial CERP infrastructure and "X" is full CERP

Table B.1b

B.1.1 FINAL ARRAY OF ALTERNATIVES/SUMMARY OF COST

Optimized components from the screening of treatment and storage, distribution and conveyance and the resulting seepage management measures were combined into a limited final array of alternatives to undergo a detailed evaluation. Operational optimization in the form of Everglades' rain-driven operations was utilized for the development of the Final Array of Alternatives. Evaluation of the Final Array was conducted utilizing hydrologic models. These ecological Performance Measures were developed from (restoration, coordination and verification) RECOVER Conceptual Ecological Models (CEM) and approved by RECOVER. RECOVER is responsible for establishing the system wide ecological goals for the central & southern Florida ecosystem.

B.1.1.1 ALTERNATIVE 1

For Storage and Treatment Alternative 1 included A-2 Flow Equalization Basin (FEB) integrated with state remedies Flow Equalization Basin on A-1 and will utilize Hydropattern Restoration Feature: spreader canal 3 miles west of S-8. It will also include backfilling the Miami canal from 1 mile south of S-8 to I-75 and the L-28 triangle-gap levee for distribution and conveyance. Alternative 1 would also increase the S-333 capacity to 3000 cfs have (1) 750 cfs gated structure in L-67 A, (1) 6000-ft gap in L67-C levee, Tamiami trail western 2.6 mile and eastern 1 mile bridge, L-29 canal max stage at 9.7 el., and degrading of the southern 1.5 mile L-67 extension. Alternative 1 also includes expanding S-356 to 1000 cfs, (2) 250 cfs pumps on L-31N to return seepage, G-211 flood control operations if needed and the utilization of coastal canal to convey seepage.

B.1.1.2 ALTERNATIVE 2

For Storage and Treatment Alternative 2 included A-2 Flow Equalization Basin integrated with state remedies Flow Equalization Basin on A-1 and will utilize Hydropattern Restoration Feature: spreader canal 3 miles east & west of S-8 and 1.5 mile 400 cfs spreader canal east of G-206. It will also include backfilling the Miami canal from S-8 to I-75. Alternative 2 would also increase the S-333 capacity to 3000 cfs have (1) 750 cfs and (2) 500 cfs gated structures in L-67 A, (1) 6000-ft gap in L67-C levee at each structure, and additional 500 cfs gravity structure out of WCA-3B. Tamiami trail western 2.6 mile and eastern 1 mile bridge, L-29 canal max stage at 9.7 el., and degrading of the L-67 extension. For seepage management control this alternative increases S-356 to 1000 cfs, creates a full depth penetrating seepage barrier from S-335 to S-334 with a partial seepage barrier south of Tamiami Trail 2 miles along L-31N, (1) 250 cfs pump on L-31N into ENP while using G-211 for limited water use only.

B.1.1.3 ALTERNATIVE 3

For Storage and Treatment Alternative 3 included A-2 Flow Equalization Basin integrated with state remedies Flow Equalization Basin on A-1 and will utilize Hydropattern Restoration Feature: spreader canal 3 miles east & west of S-8 and 1.5 mile 400 cfs spreader canal east of G-206. It will also include backfilling the Miami canal from S-8 to I-75. Alternative 3 would also increase the S-333 capacity to 3000 cfs have (4) 500 cfs gated structure in the southern end of L-67 A, (1) 6000-ft gap in L67-C levee at each structure, Tamiami trail western 2.6 mile and eastern 1 mile bridge, L-29 canal max stage at 9.7 el., and degrading of the L-67 extension. For seepage management control this alternative increases S-356 to 1000 cfs, creates a partial depth seepage barrier south of Tamiami Trail 5 miles along L-31N, full depth penetrating seepage barrier from S-335 to S-334 G-211 for limited water use only.

B.1.1.4 ALTERNATIVE 4

For Storage and Treatment Alternative 4 included A-2 Flow Equalization Basin integrated with state remedies Flow Equalization Basin on A-1 and will utilize Hydropattern Restoration Feature: spreader canal 3 miles east & west of S-8 and 1.5 mile 400 cfs spreader canal east of G-206. It will also include backfilling the Miami canal from S-8 to I-75. Alternative 4 would also increase the S-333 capacity to 3000 cfs have (2) 500 cfs gated structure in the southern end of L-67 A, an included levee in WCA 3B, degrade L-67C levee in Blue Shanty Flow way, (1) 500 cfs gated structure north of the blue shanty levee and (1) 6000-ft gap in L67-C levee, Tamiami trail western 2.6 mile and eastern 1 mile bridge, L-29 canal max stage at 9.7 el., and degrading of the southern 1.5 mile portion of L-67 extension levee. For seepage management control this alternative increases S-356 to 1000 cfs, creates a partial depth seepage barrier south of Tamiami Trail 5 miles along L-31N, G-211 used in flood control operations and utilizing coastal canals.

B.1.2 RECOMMENDED PLAN

The Recommended Plan was chosen by the Project Delivery Team (PDT) according to Cost Effectiveness/Incremental Cost Analysis procedures and resulted directly from the plan formulation described above. The Economics Appendix fully describes the plan selection. The scope of work for the Recommended Plan is found in Appendix A, Engineering. The MCACES/MII cost estimate for the Recommended Plan (Section B3, below) is based on that scope and is formatted in the Civil Works Work Breakdown Structure (CWWBS). The notes provided in the body of the estimate detail the estimate parameters and assumptions. These include pricing at the Fiscal Year 2013 price level (1 October 2012-30 September 2013). For project justification purposes, the estimate costs are categorized under the appropriate CWWBS code and include both construction and non-construction costs.

The construction costs fall under the following feature codes:

- 02 Relocations
- 03 Reservoirs
- 08 Roads, Railroads, and Bridges
- 09 Channels and Canals
- 11 Channels and Canals
- 13 Pumping Plant
- 14 Recreation Facilities
- 15 Floodway Control-Diversion Structures
- 16 Bank Stabilization

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

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

B.1.2.1 CONSTRUCTION COST

For the construction costs, unit prices for heavy construction related work were developed in the Parametric cost tool then verified by the USACE cost spreadsheet/database and then entered into MCACES/MII. The spreadsheet, database and MCACES/MII documents have been internally reviewed and were sent to the MCX for the ATR review. These costs include all major project components categorized under the appropriate CWWBS to the sub-feature level. The Total Project Cost Summary (TPCS) on the Recommended Plan contains contingencies as noted in the estimate (below) and were determined as a result of the risk analysis.

B.1.2.2 NON-CONSTRUCTION COST

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

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

B.1.3 PLAN FORMULATION COST ESTIMATES

For the plan formulation cost estimates, unit prices for heavy construction related activities work were developed in the parametric costing tool. Unit prices for the remaining major or variable construction elements were also developed in MCACES/MII based on input from the PDT. Design details, information and assumptions were provided in the Engineering Appendix. Plan formulation alternatives were run through the parametric costing tool for calculation of quantities. Cost Engineering provided estimates for the initial construction on all alternatives that were input into the parametric costing tool. An abbreviated risk analysis was done to establish the contingency for each of the alternatives. The possibility that a particular feature may indeed not be built, or that its capacity or configuration may indeed be radically altered, is not within the scope of cost risk analysis. The range estimates are based on the scope of work presented with limited design information. The design variances assumed for the cost risk analysis are not within a range that would perceive to change the fundamental nature of the component feature; however, within any project for which design is limited there will be a higher rate at which the contingency will be applied. These factors are largely into play when a project is in its planning phase. As with most risks, mitigating factors such as a more detailed design will reduce these risks and therefore, reduce the contingency. The design data itself cannot be taken as exact. From the standpoint of cost, it must be assumed that a design specific such as levee length is, in actuality, the most probable value of a range of values. The cost estimates rely on assumed values for criteria essential for the estimate, but for which there is limited or no engineering data. It should be noted that even with risk mitigation cost should not be swayed. As the design increases with detail, costs go up but the contingency percentage goes down. Costs should be balanced once this takes effect.

B.1.4 CONSTRUCTION SCHEDULE

A construction schedule has been produced by the Cost MCX and is included in the draft report by utilizing input from the PDT and reflects all project construction components. The schedule considers not only durations of individual components of construction, but also the timing of construction contracts based on funding and construction windows. The construction schedule was combined with the project schedule to create an overall schedule that will be used for the generation of the Total Project Cost Summary (TPCS). The construction schedule will change as the project moves through the various project lifecycle phases.

B.1.5 TOTAL PROJECT COST SUMMARY

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

B.1.6 CONSTRUCTION COST ESTIMATE

A MII cost estimate was produced by the Cost MCX, in the Walla Walla district, and is included in the draft PIR. The estimate was produced using labor, material, equipment and site specific information obtained from the non-federal sponsor. The estimate is based on the engineering appendix and the assumptions and quantity take offs document. The assumptions and quantity take offs document was produced in collaboration with the non-federal sponsor, SFWMD. Non-construction costs were included as percentages of the total construction contract cost including; Planning, Engineering and Design, Engineering during Construction, Construction Management, supervision and administration and Lands and Damages. There were two rounds of cost and schedule risk assessment that were used to develop the contingency applied to the estimate. This was developed by the Cost MCX in Walla Walla using the Oracle Crystal Ball Software and the Monte Carlo model. A construction schedule and TPCS was also developed by the Cost MCX.

The MII cost estimate will be refined further after initial release in the draft report. Once all reviews and comments have been addressed, the estimate and other supporting products will be adjusted to account for any changes that affect cost and schedule. After the final estimate is produced, it will undergo cost certification for inclusion in the final report.

B.2 PLAN FORMULATION COST ESTIMATES

TABLE B.2

	SUMMARY OF COSTS FOR CEPP ALTERNATIVE PLANS*			
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cost Component				
Construction Features	**$1,855,000,000**	**$2,174,000,000**	**$2,282,000,000**	**$2,147,000,000**
Lands	**$74,000,000**	**$70,000,000**	**$70,000,000**	**$70,000,000**
Total First Cost	**$1,929,000,000**	**$2,244,000,000**	**$2,352,000,000**	**$2,217,000,000**
Interest During Construction				
Construction	$103,000,000	$121,000,000	$127,000,000	$119,000,000
Lands	$8,000,000	$7,000,000	$7,000,000	$7,000,000
Total Interest During Construction	**$111,000,000**	**$128,000,000**	**$134,000,000**	**$126,000,000**
Total Project Investment	**$2,040,000,000**	**$2,372,000,000**	**$2,486,000,000**	**$2,343,000,000**
Average Annual Cost				
Interest & Amortization	$118,900,000	$138,300,000	$144,900,000	$136,600,000
Operation, Maintenance, Repair, Rehabilitation, and Replacement	$5,500,000	$6,400,000	$6,900,000	$6,500,000
Average Annual Cost	**$124,400,000**	**$144,700,000**	**$151,800,000**	**$143,100,000**

* NER Annual costs are based on a 28-year period of analysis. Costs do not include costs of recreation features.
*Costs are planning level costs and do not coincide exactly with the detailed costs of the recommended plan presented in other sections of the report. Computation of the detailed estimate for the recommended plan will be based on additional engineering and design.

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B.3 RECOMMENDED PLAN COST ESTIMATE

Please see the following pages for the cost broken down by features.

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Print Date Wed 12 March 2014
Eff. Date 10/1/2013

U.S. Army Corps of Engineers
Project .: CEPP Master 20 Feb 2014 with cont

Time 12:39:40

Title Page

This estimate is a Class 3 - Baseline (Feasibility/DPR/LRR) based on Engineering Appendix Dated June 2013. With updated scope assumptions based on the PDT dated 07-15-2013.

Estimated by	Walla Walla District
Designed by	Jacksonville District USACE
Prepared by	Amro Habib
Preparation Date	3/12/2014
Effective Date of Pricing	10/1/2013
Estimated Construction Time	4,406 Days

Labor ID: FL130032 EQ ID: EP11R03

Currency in US dollars

TRACES MII Version 4.2

Print Date Wed 12 March 2014
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Designed by
Jacksonville District USACE

Estimated by
Walla Walla District

Prepared by
Amro Habib

Design Document	Engineering Appendix : Appendix A and Annexes
Document Date	3/12/2014
District	Jacksonville District
Contact	Amro Habib
Budget Year	2014
UOM System	Original

Direct Costs
LaborCost
EQCost
MatlCost
SubBidCost
UserCost1

Timeline/Currency

Preparation Date	3/12/2014
Escalation Date	10/1/2013
Eff. Pricing Date	10/1/2013
Estimated Duration	4406 Day(s)
Currency	US dollars
Exchange Rate	1.000000

Costbook CB12EB-b: MII English Cost Book 2012-b

Labor FL130032: Florida Labor Rates.
Note: This estimate uses Department of Labor Statistics for South Florida Dated May 2012.
Davis Bacon labor rates for Palm Beach county FL130032 dated 04/05/2013 and Wage determination No.: 2005-2112 dated 06/13/2012.

Labor Rates
LaborCost1
LaborCost2
LaborCost3
LaborCost4

Equipment EP11R03: MII Equipment 2011 Region 03
Note: Fuel Prices updated from EIA.gov dated 6/3/2013 for Gulf Coast Area. assumed 85% cost of on road diesel for off road.

03 SOUTHEAST

Sales Tax	8.35
Working Hours per Year	1,530
Labor Adjustment Factor	0.86
Cost of Money	2.13
Cost of Money Discount	25.00
Tire Recap Cost Factor	1.50
Tire Recap Wear Factor	1.80
Tire Repair Factor	0.15
Equipment Cost Factor	1.00
Standby Depreciation Factor	0.50

Fuel

Electricity	0.087
Gas	3.413
Diesel Off-Road	3.205
Diesel On-Road	3.770

Shipping Rates

Over 0 CWT	15.58
Over 240 CWT	14.19
Over 300 CWT	12.14
Over 400 CWT	10.20
Over 500 CWT	6.13
Over 700 CWT	6.13
Over 800 CWT	9.25

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Date **Author** **Note**

6/5/2013 8:35:02 AM NWW

PROJECT DESCRIPTION

The study area for the Central Everglades Planning Project (CEPP) encompasses the Northern Estuaries (St. Lucie River and Indian River Lagoon and the Caloosahatchee River and Estuary), Lake Okeechobee, a portion of the EAA, the Water Conservation Areas (WCAs), Everglades National Park (ENP), the Southern Estuaries (Florida Bay and Biscayne Bay), and the Lower East Coast. The purpose of CEPP is to improve the quantity, quality, timing and distribution of water flows to the Central Everglades.

The recommended plan will provide approximately 200,000 ac-ft per year of additional water flow to the Everglades by redirecting through the EAA water which is currently being discharged to tide via the St. Lucie and Caloosahatchee Estuaries and providing FEB storage to attenuate flow rates, prior to water quality treatment using available, off-peak capacity of the state-operated STA-2 and STA-3/4. Following water quality treatment, this additional flow quantity will be re-distributed as inflows to WCA 2A and WCA 3A, and the recommended plan features will modify the quantity, quality, timing, and spatial distribution of flows into and through WCA 3A, WCA 3B, and ENP to Florida Bay in order to meet the project objectives. This plan would be accomplished by a combination of modifications to the existing Central and South Florida project components, construction of additional components, and modifications to current approved water control manuals. Several proposed or existing levees, canals, and culverts, and pump stations would be constructed, modified, or removed to improve the flow of water through the system as the first increment of CEPP.

The recommended plan includes features in three major studied areas: North of the Redline, South of the Redline, and along Blue-Green-Yellow-Line.

Features in the EAA (North of the Redline) include construction of the 14,000 acre A-2 FEB (L-624 perimeter levee and L-625 interior levee; C-624, C-624E, C-626 internal distribution channels; S-623, S-624, S-628 inlet structures; S-625 outlet structures, and C-625E, C-625W canals and channels connecting the FEB to the Miami Canal).

Conveyance features in WCA 2A and northern WCA 3A (South of the Redline) include: S-620 a gated culvert to deliver water from the L-6 Canal to the remnant L-5 Canal, S-622 a new gated spillway to deliver water from the remnant L-5 canal to the western L-5 canal (during L-6 diversion operations), S-621 a new gated spillway to deliver water from STA 3/4 to the S-7 pump station during peak discharge events (eastern flow route is not typically used during normal operations, including L-6 diversion operations, enlarge approximately 13.6 miles of the L-5 Canal, degrade approximately 2.9 miles of the southern L-4 Levee along the northwest boundary of WCA-3A, S-630 a 360 cfs pump station to maintain Seminole Tribe water supply deliveries west of the L-4 Canal, S-8A new gated culverts to deliver water from the Miami Canal (downstream of S-8, which pulls water from the L-5 Canal) to the L-4 Canal, and backfill approximately 13.5 miles of the Miami Canal and include upland mounds between a point approximately 1.5 miles south of the S-8 pump station and Interstate Highway I-75.

Additional conveyance features that would be located in southern WCA 3A, WCA 3B, and the northern edge of ENP (Blue Green Yellow line) include: S-333N a 1,150 cfs gated spillway adjacent to S-333, S-631 a 500 cfs gated culvert in L-67A Levee and an associated 6,000 foot gap in the L-67C Levee, a flow way through the western end of WCA 3B (S-632 and S-633 2 gated culverts in L-67A Levee, removal of approximately 8 miles of L-67C Levee, removal of approximately 4.3 miles of L-29 Levee, construct L-67D a new approximately 8.5 mile levee), S-355W a gated spillway in the L-29 Canal to maintain water deliveries in the L-29 Canal to the eastern Modified Water Deliveries (MWD) 1-mile bridge and maintain western access to the L-29 Levee, remove approximately 5.5 miles of the L-67 Extension Levee, remove approximately 6 miles of Old Tamiami Trail between the Everglades National Park (ENP) Tram Road and the L-67 Extension Levee, S-356 a new 1,000 cfs pump station to replace the existing temporary S-356 pump station and a ~4.2 mile long, 35 feet deep tapering seepage barrier cutoff wall along the L-31N Levee just south of Tamiami Trail. Work in this area also includes removal of spoil along the western L-67A canal in the vicinity of the new control

Date **Author** **Note**

structures and removal of vegetation along WCA-3B agricultural ditches.

BASIS OF DESIGN

This estimate is a Class 3 - Baseline (Feasibility/DPR/LRR) based on Engineering Appendix Dated June 2013. With updated scope assumptions based no the PDT dated 07-15-2013.

ACQUISITION PLAN

The project will be acquired by the Bidding process.

This work will not be performed by a Contractor under the Small Business Administration 8a program.

This estimate acknowledges no Amendments.

Prices are good for the period FY 2013.

SUB-CONTRACTING PLAN

It is assumed that the Prime Contractor will perform associated with either earthwork or concrete work dependant on the structure type. A general Subcontractor will be assigned for the remaining work. Sub contracting is currently considered at 35% of the total project.

PROJECT CONSTRUCTION

SITE ACCESS

The A-2 FEB is located West of Highway 27, north of the STA-3/4 canal and east of the Miami Canal. It is adjacent to the Northwest corner of the A-1 FEB.

The south of redline work area is along the L-5 canal east from the intersection of the L-6 canal west to the L-28 canal North of Interstate 75.

The Blue Green Yellow area is located along Highway 90 and throughout WCA 3A and 3B.

BORROW and MATERIAL PROCESSING AREAS

Date **Author** **Note**

When possible all material for the construction will use onsite borrow. If needed additional material will be commercially supplied. All material not used onsite will be removed from site and disposed of in a legal manor.

Borrow and Material Processing in the FEB is assumed to be setup and operated at a central location inside the FEB perimeter. (26°27'41.97"N, 80°44'30.24"W)

Borrow and Material Processing for the South of Redline area is assumed to be setup and operated directly southeast of the existing S-8 Pump Station. (26°19'53.18"N, 80°46'24.75"W)

Borrow and Material Processing for the Blue Green Yellow area will be setup north of the existing S-333 gated structure. (25°45'53.49"N, 80°40'23.33"W)

CONSTRUCTION METHODOLOGY

The construction methodology is standard.

UNUSUAL CONDITION (Soil, Water, Weather)
Care and diversion of water requires use of cofferdams around excavations as the water table is at or near the natural ground surface. This ground water will require the use of dewatering pumps or other means to prevent water infiltration. Some construction will be conducted in the wet and will not require extensive dewatering. It is assumed that the soil is composed of layers of organic material on the surface followed in some areas with common reusable soils. Below these 1-2 layers a layer of loose rippable limestone rock and below that is hard limestone which will require blasting in order to allow for excavation.

UNIQUE TECHNIQUES OF CONSTRUCTION
It is assumed that unique techniques of construction will not be required.

CONSTRUCTION WINDOWS

SCHEDULE

The schedule for construction has not been defined at this point in the project. It is assumed from previous contracts in the area that there will be a total of 73 anticipated weather delay work days based on a 5-day work week. These work days account for an assumed 90% productivity impact.

OVERTIME

This estimate contains overtime to complete the project. It is assumed that there will be 10% overtime to account for the 73 anticipated weather delay days in a year.

Date	**Author**	**Note**

EQUIPMENT AND LABOR AVAILABILITY & DISTANCE TRAVELED

This estimate uses Department of Labor Statistics for South Florida Dated May 2012. Davis Bacon labor rates for Palm Beach county FL130032 dated 04/05/2013 and Wage determination No.: 2005-2112 dated 06/13/2012.
Equipment rates used are from EP 1110-1-8, Volume 03, August 2011.

ENVIRONMENTAL CONCERNS

This estimate has no provisions for Monthly Anticipated Adverse Weather Delays as specified in the contract clauses.

6/11/2013 7:17:41 AM	SCOPE	Please Reference Attached PDF document for all scope assumptions and take off.

Document: CEPP Cost Estimate Quantity Takeoff.pdf

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Project Cost Summary Report Page 1

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
Project Cost Summary Report			**947,231,700**	**0**	**0**	**0**	**947,231,700**
CEPP CEPP Recommended Plan	**1**	**LS**	**947,231,700**	**0**	**0**	**0**	**947,231,700**
FEB North of the Red Line - Storage and Treatment Flow Equalization Basin (FEB) A-2	**1**	**LS**	**373,617,065**	**0**	**0**	**0**	**373,617,065**
S-623 S-623 [15] -- Gated Spillway 3700 CFS in STA 3/4 Canal	**1**	**LS**	**21,549,177**	**0**	**0**	**0**	**21,549,177**
S-624 S-624 [15] -- Gated Sag Culverts (FEB inflow structure) 1550 CFS on STA 3/4 Supply Canal	**1**	**LS**	**23,773,583**	**0**	**0**	**0**	**23,773,583**
S-625 S-625 [15] -- Gated Culverts (FEB discharge structure) 1550 CFS Discharge structure in FEB Perimeter	**1**	**LS**	**17,233,839**	**0**	**0**	**0**	**17,233,839**
S-626 S-626 [13] -- Seepage Pump Station 700 CFS West Side of Seepage Canal C-626	**1**	**LS**	**26,390,867**	**0**	**0**	**0**	**26,390,867**
S-627 S-627 [15] -- Emergency Overflow Weir 445 CFS Between A-2 and A-1 FEB just North of S-628	**1**	**LS**	**288,630**	**0**	**0**	**0**	**288,630**
S-628 S-628 [15] -- Gated Culvert FEB Intake / Discharge Structure 930 CFS Between A-2 and A-1 FEB	**1**	**LS**	**24,744,648**	**0**	**0**	**0**	**24,744,648**
L-624 L-624 [11] -- Levee FEB Perimeter Levee	**1**	**LS**	**111,131,186**	**0**	**0**	**0**	**111,131,186**
L-625 L-625 [11] -- Levee FEB Interior Inflow Canal Levee	**1**	**LS**	**22,623,926**	**0**	**0**	**0**	**22,623,926**
C-624 C-624 [09] -- Inflow Canal 1550 CFS West Side of FEB	**1**	**LS**	**8,676,277**	**0**	**0**	**0**	**8,676,277**
C-624E C-624E [09] -- Spreader Canal Northern Boundary of FEB	**1**	**LS**	**76,900,325**	**0**	**0**	**0**	**76,900,325**
C-625E C-625E [09] -- Collection Canal 400 CFS FEB Interior Collection Canal Along Southern Perimeter	**1**	**LS**	**6,299,125**	**0**	**0**	**0**	**6,299,125**
C-625W C-625W [09] -- Outflow Canal 1550 CFS FEB Exterior Outflow; between S-625 and G-372 HW	**1**	**LS**	**7,258,372**	**0**	**0**	**0**	**7,258,372**
C-626 C-626 [09] -- Seepage Canal 400 CFS West and Northern Exterior Perimeter of FEB	**1**	**LS**	**26,747,111**	**0**	**0**	**0**	**26,747,111**
SRL South of the Red Line - Diversion & Conveyance	**1**	**LS**	**254,723,789**	**0**	**0**	**0**	**254,723,789**
S-620 S-620 [15] -- Gated Culvert 500 CFS In L-6 Canal	**1**	**LS**	**10,040,965**	**0**	**0**	**0**	**10,040,965**
S-621 S-621 [15] -- Gated Spillway 2500 CFS On STA 3/4 Outflow Canal	**1**	**LS**	**22,205,410**	**0**	**0**	**0**	**22,205,410**
S-622 S-622 [15] -- Gated Spillway 500 CFS In L-5 Canal	**1**	**LS**	**13,764,260**	**0**	**0**	**0**	**13,764,260**
New (S-8A) PS New (S-8A) PS [09/15] -- Gated Culverts w. Canal 3080 and 1020 CFS In Miami and L-4 Canal	**1**	**LS**	**49,032,777**	**0**	**0**	**0**	**49,032,777**
			30,423,949.68				*30,423,949.68*
S-630 S-630 [13] -- Pump Station 360 CFS in L-4 Canal	**1**	**EA**	**30,423,950**	**0**	**0**	**0**	**30,423,950**
L-4 Levee L-4 Levee [11] -- Levee Removal L-4 Interior Levee	**1**	**LS**	**2,410,451**	**0**	**0**	**0**	**2,410,451**
Miami Canal Miami Canal [09] -- Miami Canal Backfill	**1**	**LS**	**94,138,408**	**0**	**0**	**0**	**94,138,408**
Tree Islands Tree Islands [09] -- Mounds Miami Canal	**1**	**LS**	**6,992,532**	**0**	**0**	**0**	**6,992,532**
L-5 East L-5 East [09] -- Canal 500 CFS Remnant L-5 Canal East	**1**	**LS**	**11,437,090**	**0**	**0**	**0**	**11,437,090**
L-5 West L-5 West [09] -- Canal 3000 CFS L-5 Canal West	**1**	**LS**	**14,277,946**	**0**	**0**	**0**	**14,277,946**
BGY Blue Green Yellow Line - Distribution, Conveyance and Seepage Management	**1**	**LS**	**223,869,278**	**0**	**0**	**0**	**223,869,278**
S-333 (N) S-333 (N) [09/15] -- Gated Spillway w/ New Canal 1150 CFS Just North of Existing S-333	**1**	**LS**	**11,493,935**	**0**	**0**	**0**	**11,493,935**
New S-356 New S-356 [13] -- Pump Station 1000 CFS In Vicinity of Existing S-356	**1**	**LS**	**34,993,180**	**0**	**0**	**0**	**34,993,180**
S-631 S-631 [15] -- Gated Culvert 500 CFS in L-67A	**1**	**LS**	**6,909,639**	**0**	**0**	**0**	**6,909,639**
S-632 S-632 [15] -- Gated Culvert 500 CFS in L-67A	**1**	**LS**	**6,952,948**	**0**	**0**	**0**	**6,952,948**

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Project Cost Summary Report Page 2

Description	Quantity	UOM	ContractCost	Escalation	Contingency	SIOH	ProjectCost
S-633 S-633 [15] -- Gated Culvert 500 CFS in L-67A	**1**	**LS**	**6,992,270**	**0**	**0**	**0**	**6,992,270**
L-67C Gap L-67C Gap [11] -- Levee Removal Gap In L-67C	**1**	**LS**	**799,980**	**0**	**0**	**0**	**799,980**
L-67D L-67D [11] -- New Levee In WCA 3B	**1**	**LS**	**82,089,120**	**0**	**0**	**0**	**82,089,120**
L-67C L-67C [11] -- Levee Removal L-67C Levee	**1**	**LS**	**4,489,118**	**0**	**0**	**0**	**4,489,118**
S-355W S-355W [15] -- Gated Spillway 1230 CFS in L29 Canal, East of L-67D Levee Terminus and 2.6 mile Bridge	**1**	**LS**	**19,081,111**	**0**	**0**	**0**	**19,081,111**
L-29 L-29 [11] -- Levee Removal in L-29 Levee	**1**	**LS**	**10,035,812**	**0**	**0**	**0**	**10,035,812**
Remove TT Remove TT [11] -- Road Removal Old Tamiami Trail (From L-67 Ext West to ENP Tram Rd)	**1**	**LS**	**5,917,835**	**0**	**0**	**0**	**5,917,835**
L-67 EXT L-67 EXT [11] -- Levee Removal and Canal Backfill in L-67 Ext Levee	**1**	**LS**	**9,239,181**	**0**	**0**	**0**	**9,239,181**
L-31N L-31N [11] -- Seepage Barrier Cutoff Wall In L-31N Levee just South of Tamiami Trail	**1**	**LS**	**21,661,172**	**0**	**0**	**0**	**21,661,172**
S-346 S-346 [15] -- 2-72” metal culvert w/Flash Board Removal 165 CFS in Old Tamiami Trail	**1**	**LS**	**108,154**	**0**	**0**	**0**	**108,154**
			172,545.70				*172,545.70*
L-67A Spoils L-67A Spoils [11] -- L-67A Spoil Mounds in the Vicinity of S-631, 632 and 633	**18**	**EA**	**3,105,823**	**0**	**0**	**0**	**3,105,823**
REC Recreation	**1**	**LS**	**4,440,568**	**0**	**0**	**0**	**4,440,568**
REC.FEB L-624 [14] -- Recreation FEB	**1**	**LS**	**1,011,789**	**0**	**0**	**0**	**1,011,789**
REC.SRL [14] -- Recreation North of the Red Line	**1**	**LS**	**577,490**	**0**	**0**	**0**	**577,490**
REC.BGY [14] -- Recreation Blue Green Yellow Line	**1**	**LS**	**2,851,290**	**0**	**0**	**0**	**2,851,290**
			72,516,000.00				*72,516,000.00*
06 Fish & Wildlife	**1**	**EA**	**72,516,000**	**0**	**0**	**0**	**72,516,000**
			72,516,000.00				*72,516,000.00*
AM & BO	**1**	**EA**	**72,516,000**	**0**	**0**	**0**	**72,516,000**
			18,065,000.00				*18,065,000.00*
Cultural Resource Preservation	**1**	**EA**	**18,065,000**	**0**	**0**	**0**	**18,065,000**
			18,065,000.00				*18,065,000.00*
Cultural Resources	**1**	**EA**	**18,065,000**	**0**	**0**	**0**	**18,065,000**

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B.4 SCHEDULE

Please see the attached for the construction schedule derived based on a $100M a year funding scenario. CEPP project construction is expected to cover more than two decades. The attached schedule considers construction contract durations, non-construction durations, monitoring and other mitigation measures.

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CEPP Tentative Contract Award Sequence and Construction Duration ($100M per year expenditures cap CSRA Values and durations)

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
FY 2014 $ in ($1,000s)	$ 91,077	$ 89,378	$ 87,712	$ 86,076	$ 84,471	$ 82,896	$ 81,351	$ 79,834	$ 78,345	$ 76,885	$ 75,451	$ 74,044	$ 72,664	$ 71,309

	FY 2033	FY 2034	FY 2035	FY 2036	FY 2037	FY 2038	FY 2039	FY 2040	FY 2041	FY2042	FY2043	FY2044	FY2045	FY2046
FY 2014 $ in ($1,000s)	$ 69,979	$ 68,674	$ 67,394	$ 66,137	$ 64,904	$ 63,694	$ 62,506	$ 61,341	$ 60,197	$ 59,075	$ 57,973	$ 56,892	$ 55,831	$ 54,790

Structure or Feature	FY 14 Cost ($1,000s)	Construction Duration (YR)
	FY 2014 $ in ($1,000s)	
S-620	$ 20,232	0.7
S-8A	$ 98,797	2.8
Contract	$ 119,029	
Remainder	$ 27,952	
S-630	$ 61,140	1.5
L-4 Levee	$ 4,860	0.1
S-622	$ 27,733	1.0
Contract	$ 121,685	
Remainder	$ 32,307	
S-621	$ 44,741	1.4
L-5 East	$ 23,131	1.6
Contract	$ 100,179	
Remainder	$ 12,467	
L-5 West	$ 28,877	1.5
Miami Canal	$ 191,552	2.2
Contract	$ 232,896	
Remainder	$ (20,548)	
Tree Islands	$ 14,143	0.8
S-631	$ 13,923	1.0
L-67A	$ 6,264	0.6
L-67C GAP	$ 1,613	0.1
S-356	$ 70,321	1.7
S-333 (N)	$ 25,071	1.1
Contract	$ 110,787	
Remainder	$ 29,436	
S-355W	$ 38,447	1.0
S-632	$ 14,010	1.0
S-633	$ 17,424	1.0
L-67C	$ 9,053	0.2
Contract	$ 108,370	
Remainder	$ 28,536	
L-67D	$ 165,875	1.2
Contract	$ 194,411	
Remainder	$ 39,181	
L-67 EXT	$ 18,632	0.4
L-29	$ 20,394	0.4
Remove TT	$ 11,935	1.0
S-346	$ 218	0.1
Contract	$ 90,360	
Remainder	$ 14,909	
L-31N	$ 43,683	1.5
S-624	$ 47,903	1.9
Contract	$ 106,495	
Remainder	$ 32,451	
S-625	$ 34,725	1.4
C-626	$ 54,095	2.2
Contract	$ 121,271	
Remainder	$ 48,608	
S-626	$ 53,035	1.4
Contract	$ 101,643	
Remainder	$ 30,334	
S-628	$ 49,859	1.2
S-623	$ 43,419	3.0
Contract	$ 123,612	
Remainder	$ 53,633	
C-625W	$ 14,679	1.0
Real Estate	$ 4,301	
C-625E	$ 12,740	0.6
Contract	$ 85,353	
Remainder	$ 16,679	
C-624E	$ 155,529	4.0
Contract	$ 172,208	
Remainder	$ 38,677	
L-624	$ 226,146	2.8
Contract	$ 264,823	
Remainder	$ 73,719	
S-627	$ 584	0.1
C-624	$ 17,547	0.7
L-625	$ 45,625	
Contract	$ 137,475	
Remainder	$ 76,134	

** a positive remainder indicates that money was used from the next FY. A negative remainder indicates that money was available for the next FY.
Construction Duration and Construction Management are shown in blue
Period of time to fund each feature is shown in green
Real Estate acquisition is shown in orange and does not include sunk costs of $32,341K
For the TPCS midpoint of preaward work is the start of 4 qtrs prior to construction starting
Funds in each FY are equal to $100 million, in FY 14, discounted to future years. This allows for a future value of $100 million per FY and a schedule based on the FY 15 estimate
The composite index (weighted average) from CWCCIS March 2013 was used to determine FY 14 present value shown
As HRTW, Adaptive Management and Cultural Resource exact dates are unknown, there will be work going on at different locations at different times throughout construction, the mid point of the entire schedule will be used to develop the TPCS
These costs are included as a percentage to all the features.
Recreation costs are attached to the appropriate feature cost

B.5 RISK AND UNCERTAINTY ANALYSIS

The Risk Analysis was conducted according to the procedures outlined in the following documents and sources:

- Cost and Schedule Risk Analysis Process guidance prepared by the USACE Cost Engineering MCX.
- Engineer Regulation (ER) 1110-2-1302 Civil Works Cost Engineering, dated September 15, 2008.
- Engineer Technical Letter (ETL) Construction Cost Estimating Guide for Civil Works, dated September 30, 2008.

B.5.1 RISK ANALYSIS METHODS

The risk register is a tool being used in the Pilot Planning Program as a means to identify, discuss and document issues early in the process. A risk register was developed by the study team to identify significant risks attributed to the shortened study period and to project success. In addition, a Cost and Schedule Risk Analysis was conducted specific to the project costs and schedule, that is separate from the study risk register and that results in contingency values that are applied to the project costs to set a total project cost. The risk analysis process for this study is intended to determine the probability of various cost outcomes and quantify the required contingency needed in the cost estimate to achieve the desired level of cost confidence. Two cost risk workshops were held to begin the process of Cost and Schedule Risk Analysis. The entire PDT participated in a risk analysis brainstorming session to identify risks associated with the recommended plan. The risks were listed in the risk register, which is a tool commonly used in project planning and risk analysis, and evaluated by the PDT. The actual Risk Register is provided. Assumptions were made as to the likelihood and impact of each risk item, as well as the probability of occurrence and magnitude of the impact if it were to occur. Separate risk models are also being developed for the initial construction and other co-main events using the Oracle Crystal Ball Risk Analysis software using the Monte Carlo Model in order to develop contingencies to apply to the project cost. The models were structured based on the CWWBS for the project and provide a contingency for each of the feature codes. Risks were evaluated for the following features of work:

- 01 Lands and Damages
- 02 Relocations
- 03 Reservoirs
- 08 Roads, Railroads, and Bridges
- 09 Channels and Canals
- 11 Channels and Canals
- 13 Pumping Plant
- 14 Recreation Facilities
- 15 Floodway Control-Diversion Structures
- 16 Bank Stabilization
- 30 Planning, Engineering and Design
- 31 Construction Management
- 32 HTRW

After the Risk models were run, the results were reviewed and all parameters were re-evaluated by the PDT as a sanity check of assumptions and inputs. Adjustments were made to the analyses accordingly and the final contingencies were established. The contingencies were applied to the recommended plan estimate in the Total Project Cost Summary in order to obtain the Fully Funded Cost.

B.5.2 RISK ANALYSIS RESULTS

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

Risk Determination For Alternatives Estimates: An abbreviated Cost and Schedule Risk Analysis method was applied to determine contingencies for the alternatives estimates. To iterate, the amount of design information, when limited, directly correlates with higher than average contingency percentages. Please see attachment A for the results of the Risk Analysis.

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B.6 TOTAL PROJECT COST SUMMARY

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

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

B.6.1 Total Project Cost Summary Spreadsheet

Refer to the Total Project Cost Summary on the next page.

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Total Project Cost Summary

Project: **Central Everglades Planning Project - P2 # 370939**
Location: Central and Southern Flordia
District: SAJ -Jacksonville District
POC: Tracy Leeser

Report Type: **LPP**
Contingency Development: Crystal Ball
CWCCIS Issue: **9/1/2013**

Authority: **CG**
TPCS Preparation Date: 25-Feb-14
Program Year: 2014

Scope Synopsis: The recommended plan will provide approximately 200,000 ac-ft per year of additional water flow to the Everglades by redirecting through the EAA water which is currently being discharged to tide via the St. Lucie and Caloosahatchee Estuaries and providing FEB storage to attenuate flow rates, prior to water quality treatment using available, off-peak capacity of the state-operated STA-2 and STA-3/4. Following water quality treatment, this additional flow quantity will be re-distributed as inflows to WCA 2A and WCA 3A, and the recommended plan features will modify the quantity, quality, timing, and spatial distribution of flows into and through WCA 3A, WCA 3B, and ENP to Florida Bay in order to meet the project objectives. This plan would be accomplished by a combination of modifications to the existing Central and South Florida project components, construction of additional components, and modifications to current approved water control manuals. Several proposed or existing levees, canals, and culverts, and pump stations would be constructed, modified, or removed to improve the flow of water through the system.

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				TOTAL PROJECT COST (FULLY FUNDED)			
	Civil Works	Risk Based				Program Price Level Date:	2014-1Q						
WBS	Feature Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
06	FISH & WILDLIFE FACILITIES	72,516	31,907	44%	104,423	1%	73,429	32,309	105,738	42%	104,076	45,793	149,869
09	CHANNELS & CANALS	252,726	111,199	44%	363,925	2%	257,235	113,183	370,418	40%	359,257	158,073	517,330
11	LEVEES & FLOODWALLS	273,504	120,342	44%	393,846	1%	277,277	122,002	399,279	55%	430,461	189,403	619,864
13	PUMPING PLANT	91,808	40,396	44%	132,204	1%	92,624	40,754	133,378	28%	118,678	52,218	170,896
14	RECREATION FACILITIES	4,440	1,954	44%	6,394	1%	4,479	1,971	6,450	37%	6,158	2,710	8,868
15	FLOODWAY CONTROL & DIVERSION STRUC	234,173	103,036	44%	337,209	1%	237,122	104,334	341,455	29%	306,864	135,020	441,884
18	CULTURAL RESOURCE PRESERVATION	18,065	7,949	44%	26,014	1%	18,226	8,019	26,245	42%	25,832	11,366	37,198
	S/T	947,232	416,782	44%	1,364,014	1%	960,392	422,572	1,382,965	41%	1,351,327	594,584	1,945,910
01	LANDS AND DAMAGES	35,328	1,314	4%	36,642		35,328	1,314	36,642	4%	36,842	1,980	38,822
	S/T	35,328	1,314	4%	36,642		35,328	1,314	36,642	4%	36,842	1,980	38,822
30	PLANNING ENGINEERING AND DESIGN	235,579	103,655	44%	339,234	2%	239,706	105,471	345,177	113%	511,128	224,896	736,024
	S/T	235,579	103,655	44%	339,234	2%	239,706	105,471	345,177	113%	511,128	224,896	736,024
31	CONSTRUCTION MANAGEMENT	91,845	40,412	44%	132,257	2%	93,454	41,120	134,574	140%	224,324	98,703	323,027
	S/T	91,845	40,412	44%	132,257	2%	93,454	41,120	134,574	140%	224,324	98,703	323,027
32	HTRW	625	275	44%	900	1%	633	278	911	42%	897	395	1,292
	S/T	625	275	44%	900	1%	633	278	911	42%	897	395	1,292
	Totals	1,310,609	562,438	43%	1,873,047	1%	1,329,513	570,756	1,900,269	60%	2,124,517	920,558	3,045,075

Project: *Central Everglades Planning Project - P2 # 370939* 25-Feb-14

CHIEF, COST ENGINEERING	
PROJECT MANAGER	
CHIEF, REAL ESTATE	
CHIEF, PLANNING	
CHIEF, ENGINEERING	
CHIEF, OPERATIONS	
CHIEF, CONSTRUCTION	
CHIEF, CONTRACTING	
CHIEF, PM-PB	
CHIEF, DPM	

Estimated Federal Cost:	50%	1,522,537
Estimated Non-Federal Cost:	50%	1,522,537
Estimated Total Project Cost:		3,045,075

Spent Cost as of:	Cost ($k)	Contingency ($k)	Totals ($k)
Project First Cost for Report:	$1,329,513	$570,756	$1,900,269
Total Project Cost used to provide Sponsor information:	$2,124,517	$920,558	$3,045,075

Project: *Central Everglades Planning Project - P2 # 370939* 25-Feb-14

B.7 COST DX TPCS CERTIFICATION

The Recommended Plan estimate as well as the Cost and Schedule Risk Analysis and Total Project Cost Summary have undergone Cost Review and Certification by the Walla Walla Mandatory Center of Expertise. Certification is attached.

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WALLA WALLA COST ENGINEERING
MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

SAJ - PN 370939
Central Everglades Planning Project
Central and Southern, Florida

The Central Everglades Planning Project (CEPP), as presented by the Jacksonville District, has undergone a successful Cost Agency Technical Review (Cost ATR) of remaining costs, performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the cost products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of March 14, 2014, the Cost MCX certifies the estimated total project cost:

FY2014 First Costs:	$1,900,269,000
Fully Funded Costs:	$3,045,075,000

Note: It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management throughout the life of the project.

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Kim C. Callan, PE, CCE, PM
Chief, Cost Engineering MCX
Walla Walla District

Total Project Cost Summary

Project:	**Central Everglades Planning Project - P2 # 370939**	Report Type: **LPP**	Authority: **CG**
Location:	Central and Southern Flordia	Contingency Development: Crystal Ball	TPCS Preparation Date: 25-Feb-14
District:	SAJ -Jacksonville District	CWCCIS Issue: **9/1/2013**	Program Year: 2014
POC:	Tracy Leeser		

Scope Synopsis: The recommended plan will provide approximately 200,000 ac-ft per year of additional water flow to the Everglades by redirecting through the EAA water which is currently being discharged to tide via the St. Lucie and Caloosahatchee Estuaries and providing FEB storage to attenuate flow rates, prior to water quality treatment using available, off-peak capacity of the state-operated STA-2 and STA-3/4. Following water quality treatment, this additional flow quantity will be re-distributed as inflows to WCA 2A and WCA 3A, and the recommended plan features will modify the quantity, quality, timing, and spatial distribution of flows into and through WCA 3A, WCA 3B, and ENP to Florida Bay in order to meet the project objectives. This plan would be accomplished by a combination of modifications to the existing Central and South Florida project components, construction of additional components, and modifications to current approved water control manuals. Several proposed or existing levees, canals, and culverts, and pump stations would be constructed, modified, or removed to improve the flow of water through the system.

WBS		**ESTIMATED COST**				**PROJECT FIRST COST** ***CONSTANT DOLLAR BASIS***						**TOTAL PROJECT COST (FULLY FUNDED)**			
	Civil Works	Risk Based				Program Price Level Date: 2014-1Q									
WBS	Feature Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT* ($K)	Total ($K)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
06	FISH & WILDLIFE FACILITIES	72,516	31,907	44%	104,423	1%	73,429	32,309	105,738		105,738	42%	104,076	45,793	149,869
09	CHANNELS & CANALS	252,726	111,199	44%	363,925	2%	257,235	113,183	370,418		370,418	40%	359,257	158,073	517,330
11	LEVEES & FLOODWALLS	273,504	120,342	44%	393,846	1%	277,277	122,002	399,279		399,279	55%	430,461	189,403	619,864
13	PUMPING PLANT	91,808	40,396	44%	132,204	1%	92,624	40,754	133,378		133,378	28%	118,678	52,218	170,896
14	RECREATION FACILITIES	4,440	1,954	44%	6,394	1%	4,479	1,971	6,450		6,450	37%	6,158	2,710	8,868
15	FLOODWAY CONTROL & DIVERSION STRUCTURE	234,173	103,036	44%	337,209	1%	237,122	104,334	341,455		341,455	29%	306,864	135,020	441,884
18	CULTURAL RESOURCE PRESERVATION	18,065	7,949	44%	26,014	1%	18,226	8,019	26,245		26,245	42%	25,832	11,366	37,198
	S/T	*947,232*	*416,782*	*44%*	*1,364,014*	*1%*	*960,392*	*422,572*	*1,382,965*		*1,382,965*	*41%*	*1,351,327*	*594,584*	*1,945,910*
01	LANDS AND DAMAGES	35,328	1,314	4%	36,642		35,328	1,314	36,642		36,642	4%	36,842	1,980	38,822
	S/T	*35,328*	*1,314*	*4%*	*36,642*		*35,328*	*1,314*	*36,642*		*36,642*	*4%*	*36,842*	*1,980*	*38,822*
30	PLANNING ENGINEERING AND DESIGN	235,579	103,655	44%	339,234	2%	239,706	105,471	345,177		345,177	113%	511,128	224,896	736,024
	S/T	*235,579*	*103,655*	*44%*	*339,234*	*2%*	*239,706*	*105,471*	*345,177*		*345,177*	*113%*	*511,128*	*224,896*	*736,024*
31	CONSTRUCTION MANAGEMENT	91,845	40,412	44%	132,257	2%	93,454	41,120	134,574		134,574	140%	224,324	98,703	323,027
	S/T	*91,845*	*40,412*	*44%*	*132,257*	*2%*	*93,454*	*41,120*	*134,574*		*134,574*	*140%*	*224,324*	*98,703*	*323,027*
32	HTRW	625	275	44%	900	1%	633	278	911		911	42%	897	395	1,292
	S/T	*625*	*275*	*44%*	*900*	*1%*	*633*	*278*	*911*		*911*	*42%*	*897*	*395*	*1,292*
	Totals	1,310,609	562,438	43%	1,873,047	1%	1,329,513	570,756	1,900,269		1,900,269	60%	2,124,517	920,558	3,045,075

CHIEF, COST ENGINEERING
PROJECT MANAGER
CHIEF, REAL ESTATE
CHIEF, PLANNING
CHIEF, ENGINEERING
CHIEF, OPERATIONS
CHIEF, CONSTRUCTION
CHIEF, CONTRACTING
CHIEF, PM-PB
CHIEF, DPM

Estimated Federal Cost:	50%	1,522,537
Estimated Non-Federal Cost:	50%	1,522,537
Estimated Total Project Cost:		3,045,075

*Spent Cost as of:

	Cost ($k)	***Contingency ($k)***	***Totals ($k)***
Project First Cost for Report:	$1,329,513	$570,756	1,900,269
Total Project Cost used to provide Sponsor information:	$2,124,517	$920,558	3,045,075

Contract Summary

WBS	ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-623 Gated Spillway 3700 CFS in STA 3/4 Canal	Est Preparation Date: 01-Jul-13				Program Yr: 2014				as of:					
	Est Price Level: 2013-1Q				Prog Level Date: 2014-1Q									
			Risk Based											
	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.	21,549	9,482	44.0%	31,031	1.3%	21,820	9,601	31,421		2036-3Q	54.7%	33,346	14,672	48,018
Construction Activities *Total*	21,549	9,482		31,031		21,820	9,601	31,421				33,346	14,672	48,018
30 Planning Engineering and Design *27.5%*	5,926	2,607	44.0%	8,533	1.8%	6,030	2,653	8,683		2034-1Q	152.1%	14,940	6,574	21,514
Planning Engineering and Design *Total*	5,926	2,607		8,533		6,030	2,653	8,683				14,940	6,574	21,514
31 Construction Management (S&A) *10.5%*	2,263	996	44.0%	3,258	1.8%	2,302	1,013	3,315		2036-3Q	188.2%	6,522	2,869	9,391
Construction Management *Total*	2,263	996		3,258		2,302	1,013	3,315				6,522	2,869	9,391
S-623 Gated Spillway 3700 CFS in STA 3/4 Canal *Total*	29,738	13,085		42,822		30,152	13,267	43,419				54,808	24,115	78,923

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-624 Gated Sag Culverts (FEB inflow structure) 1550 CFS on STA 3/4 Supply Canal		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.		23,774	10,461	44.0%	34,235	1.3%	24,073	10,592	34,666		2033-1Q	44.9%	34,440	15,153	49,593
Construction Activities	*Total*	23,774	10,461		34,235		24,073	10,592	34,666				34,440	15,153	49,593
30 Planning Engineering and Design	*27.5%*	6,538	2,877	44.0%	9,415	1.8%	6,652	2,927	9,579		2031-1Q	115.5%	14,087	6,198	20,285
Planning Engineering and Design	*Total*	6,538	2,877		9,415		6,652	2,927	9,579				14,087	6,198	20,285
31 Construction Management (S&A)	*10.5%*	2,496	1,098	44.0%	3,595	1.8%	2,540	1,118	3,658		2033-1Q	139.%	5,967	2,625	8,592
Construction Management	*Total*	2,496	1,098		3,595		2,540	1,118	3,658				5,967	2,625	8,592
S-624 Gated Sag Culverts (FEB inflow structure) 1550 CFS on STA 3/4 Supply Canal	*Total*	32,808	14,436		47,244		33,266	14,637	47,903				54,493	23,977	78,470

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl   District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-625 Gated Culverts (FEB discharge structure) 1550 CFS Discharge structure in FEB Perimeter		Est Preparation Date: 01-Jul-13; Est Price Level: 2013-1Q; Risk Based				Program Yr: 2014; Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.		17,234	7,583	44.0%	24,817	1.3%	17,451	7,678	25,129		2033-4Q	46.9%	25,324	11,143	36,466
Construction Activities	*Total*	17,234	7,583		24,817		17,451	7,678	25,129				25,324	11,143	36,466
30 Planning Engineering and Design	*27.5%*	4,739	2,085	44.0%	6,825	1.8%	4,822	2,122	6,944		2032-1Q	126.8%	10,750	4,730	15,481
Planning Engineering and Design	*Total*	4,739	2,085		6,825		4,822	2,122	6,944				10,750	4,730	15,481
31 Construction Management (S&A)	*10.5%*	1,810	796	44.0%	2,606	1.8%	1,841	810	2,651		2033-4Q	148.8%	4,502	1,981	6,483
Construction Management	*Total*	1,810	796		2,606		1,841	810	2,651				4,502	1,981	6,483
S-625 Gated Culverts (FEB discharge structure) 1550 CFS Discharge structure in FEB Perimeter	*Total*	23,783	10,464		34,247		24,115	10,610	34,725				40,576	17,854	58,430

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-626 Seepage Pump Station 700 CFS West Side of Seepage Canal C-626		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
13 PUMPING PLANT		26,391	11,612	44.0%	38,003	.9%	26,626	11,715	38,341		2034-4Q	49.2%	39,372	17,324	56,695
Construction Activities	*Total*	26,391	11,612		38,003		26,626	11,715	38,341				39,372	17,324	56,695
30 Planning Engineering and Design	*27.5%*	7,258	3,193	44.0%	10,451	1.8%	7,385	3,249	10,634		2033-1Q	139.%	17,347	7,633	24,980
Planning Engineering and Design	*Total*	7,258	3,193		10,451		7,385	3,249	10,634				17,347	7,633	24,980
31 Construction Management (S&A)	*10.5%*	2,771	1,219	44.0%	3,990	1.8%	2,820	1,241	4,060		2034-4Q	162.5%	7,273	3,200	10,473
Construction Management	*Total*	2,771	1,219		3,990		2,820	1,241	4,060				7,273	3,200	10,473
S-626 Seepage Pump Station 700 CFS West Side of Seepage Canal C-626	*Total*	36,420	16,025		52,444		36,830	16,205	53,035				63,992	28,157	92,149

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-627 Emergency Overflow Weir 445 CFS Between A-2 and A-1 FEB just North of S-628		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.		290	128	44.0%	418	1.3%	294	129	423		2045-1Q	81.6%	527	232	758
Construction Activities	*Total*	290	128		418		294	129	423				527	232	758
30 Planning Engineering and Design	*27.5%*	80	35	44.0%	115	1.8%	81	36	117		2044-1Q	330.6%	343	151	495
Planning Engineering and Design	*Total*	80	35		115		81	36	117				343	151	495
31 Construction Management (S&A)	*10.5%*	30	13	44.0%	44	1.8%	31	14	45		2045-1Q	354.3%	138	61	199
Construction Management	*Total*	30	13		44		31	14	45				138	61	199
S-627 Emergency Overflow Weir 445 CFS Between A-2 and A-1 FEB just North of S-628	*Total*	400	176		576		406	179	584				1,008	444	1,452

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-628 Gated Culvert FEB Intake / Discharge Structure 930 CFS Between A-2 and A-1 FEB		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.		24,745	10,888	44.0%	35,633	1.3%	25,057	11,025	36,081		2035-4Q	52.6%	37,756	16,612	54,368
Construction Activities	*Total*	24,745	10,888		35,633		25,057	11,025	36,081				37,756	16,612	54,368
30 Planning Engineering and Design	*27.5%*	6,805	2,994	44.0%	9,799	1.8%	6,924	3,047	9,971		2034-1Q	152.1%	17,156	7,549	24,705
Planning Engineering and Design	*Total*	6,805	2,994		9,799		6,924	3,047	9,971				17,156	7,549	24,705
31 Construction Management (S&A)	*10.5%*	2,598	1,143	44.0%	3,741	1.8%	2,644	1,163	3,807		2035-4Q	176.9%	7,195	3,166	10,360
Construction Management	*Total*	2,598	1,143		3,741		2,644	1,163	3,807				7,195	3,166	10,360
S-628 Gated Culvert FEB Intake / Discharge Structure 930 CFS Between A-2 and A-1 FEB	*Total*	34,148	15,025		49,173		34,624	15,235	49,859				62,106	27,327	89,433

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl   District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-624 Levee FEB Perimeter Levee		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS		111,131	48,898	44.0%	160,029	1.4%	112,664	49,572	162,236		2043-2Q	75.9%	195,490	86,016	281,505
14 RECREATION FACILITIES		1,012	445	44.0%	1,457	.9%	1,021	449	1,470		2043-2Q	75.1%	1,772	779	2,551
Construction Activities	Total	112,143	49,343		161,486		113,685	50,021	163,707				197,261	86,795	284,057
30 Planning Engineering and Design	27.5%	30,839	13,569	44.0%	44,409	1.8%	31,380	13,807	45,187		2039-4Q	243.%	105,790	46,548	152,338
Planning Engineering and Design	Total	30,839	13,569		44,409		31,380	13,807	45,187				105,790	46,548	152,338
31 Construction Management (S&A)	10.5%	11,775	5,181	44.0%	16,956	1.8%	11,981	5,272	17,253		2043-2Q	313.6%	48,700	21,428	70,128
Construction Management	Total	11,775	5,181		16,956		11,981	5,272	17,253				48,700	21,428	70,128
L-624 Levee FEB Perimeter Levee	Total	154,757	68,093		222,851		157,046	69,100	226,146				351,752	154,771	506,523

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-625 Levee FEB Interior Inflow Canal Levee		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS		22,624	9,955	44.0%	32,579	1.4%	22,936	10,092	33,028		2045-4Q	84.4%	41,718	18,356	60,074
Construction Activities	*Total*	22,624	9,955		32,579		22,936	10,092	33,028				41,718	18,356	60,074
30 Planning Engineering and Design	*27.5%*	6,222	2,738	44.0%	8,959	1.8%	6,331	2,785	9,116		2044-1Q	330.6%	26,793	11,789	38,582
Planning Engineering and Design	*Total*	6,222	2,738		8,959		6,331	2,785	9,116				26,793	11,789	38,582
31 Construction Management (S&A)	*10.5%*	2,376	1,045	44.0%	3,421	1.8%	2,417	1,064	3,481		2045-4Q	373.%	11,236	4,944	16,180
Construction Management	*Total*	2,376	1,045		3,421		2,417	1,064	3,481				11,236	4,944	16,180
L-625 Levee FEB Interior Inflow Canal Levee	*Total*	31,221	13,737		44,958		31,684	13,941	45,625				79,748	35,089	114,836

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: C-624 Inflow Canal 1550 CFS West Side of FEB		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
09 CHANNELS & CANALS		8,676	3,817	44.0%	12,493	1.8%	8,831	3,886	12,716		2045-3Q	84.3%	15,986	7,034	23,020
Construction Activities	Total	8,676	3,817		12,493		8,831	3,886	12,716				15,986	7,034	23,020
30 Planning Engineering and Design	27.5%	2,386	1,050	44.0%	3,436	1.8%	2,428	1,068	3,496		2044-1Q	330.6%	10,275	4,521	14,796
Planning Engineering and Design	Total	2,386	1,050		3,436		2,428	1,068	3,496				10,275	4,521	14,796
31 Construction Management (S&A)	10.5%	911	401	44.0%	1,312	1.8%	927	408	1,335		2045-3Q	366.7%	4,251	1,871	6,122
Construction Management	Total	911	401		1,312		927	408	1,335				4,251	1,871	6,122
C-624 Inflow Canal 1550 CFS West Side of FEB	Total	11,973	5,268		17,241		12,185	5,362	17,547				30,512	13,425	43,938

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: C-624E Spreader Canal Northern Boundary of FEB		Est Preparation Date: 01-Jul-13; Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014; Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
09 CHANNELS & CANALS		76,900	33,836	44.0%	110,736	1.8%	78,272	34,440	112,712		2039-3Q	64.6%	126,564	55,688	182,252
Construction Activities	*Total*	76,900	33,836		110,736		78,272	34,440	112,712				126,564	55,688	182,252
30 Planning Engineering and Design	*27.5%*	21,148	9,305	44.0%	30,452	1.8%	21,518	9,468	30,986		2036-3Q	188.2%	60,953	26,819	87,772
Planning Engineering and Design	*Total*	21,148	9,305		30,452		21,518	9,468	30,986				60,953	26,819	87,772
31 Construction Management (S&A)	*10.5%*	8,075	3,553	44.0%	11,627	1.8%	8,216	3,615	11,831		2039-3Q	238.4%	27,328	12,024	39,352
Construction Management	*Total*	8,075	3,553		11,627		8,216	3,615	11,831				27,328	12,024	39,352
C-624E Spreader Canal Northern Boundary of FEB	*Total*	106,122	46,694		152,816		108,006	47,523	155,529				214,844	94,532	309,376

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: C-625E Collection Canal 400 CFS FEB Interior Collection Canal Along Southern Perimeter		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
09 CHANNELS & CANALS		6,299	2,772	44.0%	9,071	1.8%	6,411	2,821	9,232		2037-2Q	57.8%	9,937	4,372	14,309
Construction Activities	*Total*	6,299	2,772		9,071		6,411	2,821	9,232				9,937	4,372	14,309
30 Planning Engineering and Design	*27.5%*	1,732	762	44.0%	2,494	1.8%	1,763	776	2,538		2036-1Q	180.6%	4,861	2,139	7,000
Planning Engineering and Design	*Total*	1,732	762		2,494		1,763	776	2,538				4,861	2,139	7,000
31 Construction Management (S&A)	*10.5%*	661	291	44.0%	952	1.8%	673	296	969		2037-2Q	200.%	1,984	873	2,857
Construction Management	*Total*	661	291		952		673	296	969				1,984	873	2,857
C-625E Collection Canal 400 CFS FEB Interior Collection Canal Along Southern Perimeter	*Total*	8,693	3,825		12,517		8,847	3,893	12,740				16,781	7,384	24,165

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: C-625W Outflow Canal FEB exterior Outflow Canal between S-625 and G-372 HW		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
09 CHANNELS & CANALS		7,258	3,194	44.0%	10,452	1.8%	7,387	3,250	10,638		2037-3Q	58.5%	11,504	5,062	16,566
Construction Activities	*Total*	7,258	3,194		10,452		7,387	3,250	10,638				11,504	5,062	16,566
30 Planning Engineering and Design	*27.5%*	1,996	878	44.0%	2,874	1.8%	2,031	894	2,925		2036-1Q	180.6%	5,601	2,464	8,065
Planning Engineering and Design	*Total*	1,996	878		2,874		2,031	894	2,925				5,601	2,464	8,065
31 Construction Management (S&A)	*10.5%*	762	335	44.0%	1,097	1.8%	775	341	1,117		2037-3Q	204.1%	2,317	1,020	3,337
Construction Management	*Total*	762	335		1,097		775	341	1,117				2,317	1,020	3,337
C-625W Outflow Canal FEB exterior Outflow Canal between S-625 and G-372 HW	*Total*	10,016	4,407		14,423		10,194	4,485	14,679				19,422	8,546	27,968

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl   District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: C-626 Seepage Canal 400 CFS West and Northern Exterior Perimeter of FEB		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
09 CHANNELS & CANALS		26,747	11,769	44.0%	38,516	1.8%	27,224	11,979	39,203		2034-2Q	49.1%	39,877	17,546	57,423
Construction Activities	*Total*	26,747	11,769		38,516		27,224	11,979	39,203				39,877	17,546	57,423
30 Planning Engineering and Design	*27.5%*	7,355	3,236	44.0%	10,592	1.8%	7,484	3,293	10,777		2032-1Q	126.8%	16,684	7,341	24,026
Planning Engineering and Design	*Total*	7,355	3,236		10,592		7,484	3,293	10,777				16,684	7,341	24,026
31 Construction Management (S&A)	*10.5%*	2,808	1,236	44.0%	4,044	1.8%	2,858	1,257	4,115		2034-2Q	155.4%	7,174	3,157	10,331
Construction Management	*Total*	2,808	1,236		4,044		2,858	1,257	4,115				7,174	3,157	10,331
C-626 Seepage Canal 400 CFS West and Northern Exterior Perimeter of FEB	*Total*	36,911	16,241		53,152		37,566	16,529	54,095				63,736	28,044	91,779

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl   District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-620 Gated Culvert 500 CFS In L-6 Canal		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	Risk Based CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.		10,041	4,418	44.0%	14,459	1.3%	10,167	4,474	14,641		2019-2Q	11.8%	11,230	4,941	16,171
Construction Activities	*Total*	10,041	4,418		14,459		10,167	4,474	14,641				11,230	4,941	16,171
30 Planning Engineering and Design	*27.5%*	2,761	1,215	44.0%	3,976	1.8%	2,810	1,236	4,046		2018-1Q	19.5%	3,301	1,452	4,753
Planning Engineering and Design	*Total*	2,761	1,215		3,976		2,810	1,236	4,046				3,301	1,452	4,753
31 Construction Management (S&A)	*10.5%*	1,054	464	44.0%	1,518	1.8%	1,073	472	1,545		2019-2Q	26.%	1,328	584	1,912
Construction Management	*Total*	1,054	464		1,518		1,073	472	1,545				1,328	584	1,912
S-620 Gated Culvert 500 CFS In L-6 Canal	*Total*	13,857	6,097		19,953		14,050	6,182	20,232				15,858	6,978	22,836

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-621 Gated Spillway 2500 CFS On STA 3/4 Outflow Canal		Est Preparation Date: 01-Jul-13; Est Price Level: 2013-1Q				Program Yr: 2014; Prog Level Date: 2014-1Q				as of:					
				Risk Based											
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.		22,205	9,770	44.0%	31,975	1.3%	22,485	9,893	32,378		2022-2Q	18.3%	26,276	11,562	37,838
Construction Activities	*Total*	22,205	9,770		31,975		22,485	9,893	32,378				26,276	11,562	37,838
30 Planning Engineering and Design	*27.5%*	6,106	2,687	44.0%	8,793	1.8%	6,213	2,734	8,947		2020-3Q	32.8%	8,109	3,568	11,677
Planning Engineering and Design	*Total*	6,106	2,687		8,793		6,213	2,734	8,947				8,109	3,568	11,677
31 Construction Management (S&A)	*10.5%*	2,332	1,026	44.0%	3,357	1.8%	2,372	1,044	3,416		2022-2Q	43.1%	3,336	1,468	4,803
Construction Management	*Total*	2,332	1,026		3,357		2,372	1,044	3,416				3,336	1,468	4,803
S-621 Gated Spillway 2500 CFS On STA 3/4 Outflow Canal	*Total*	30,643	13,483		44,126		31,070	13,671	44,741				37,721	16,597	54,318

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl   District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-622 Gated Spillway 500 CFS In L-5 Canal		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.		13,764	6,056	44.0%	19,820	1.3%	13,937	6,132	20,070		2021-1Q	15.6%	15,908	6,999	22,907
Construction Activities	*Total*	13,764	6,056		19,820		13,937	6,132	20,070				15,908	6,999	22,907
30 Planning Engineering and Design	*27.5%*	3,785	1,665	44.0%	5,451	1.8%	3,851	1,695	5,546		2019-3Q	27.3%	4,819	2,121	6,940
Planning Engineering and Design	*Total*	3,785	1,665		5,451		3,851	1,695	5,546				4,819	2,121	6,940
31 Construction Management (S&A)	*10.5%*	1,445	636	44.0%	2,081	1.8%	1,471	647	2,118		2021-1Q	35.6%	1,960	862	2,822
Construction Management	*Total*	1,445	636		2,081		1,471	647	2,118				1,960	862	2,822
S-622 Gated Spillway 500 CFS In L-5 Canal	*Total*	18,994	8,358		27,352		19,259	8,474	27,733				22,687	9,982	32,670

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: New S-8A Gated Culverts w. Canal 3080 and 1020 CFS In Miami and L-4 Canal		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC. **1020 CFS Structure and 3080 CFS Structure.. Short canal to connect**		49,033	21,575	44.0%	70,608	1.3%	49,650	21,846	71,497		2020-1Q	13.4%	55,613	24,470	80,083
Construction Activities	*Total*	49,033	21,575		70,608		49,650	21,846	71,497				55,613	24,470	80,083
30 Planning Engineering and Design	*27.5%*	13,484	5,933	44.0%	19,417	1.8%	13,720	6,037	19,757		2018-1Q	19.5%	16,118	7,092	23,209
Planning Engineering and Design	*Total*	13,484	5,933		19,417		13,720	6,037	19,757				16,118	7,092	23,209
31 Construction Management (S&A)	*10.5%*	5,148	2,265	44.0%	7,414	1.8%	5,239	2,305	7,544		2020-1Q	30.%	6,695	2,946	9,640
Construction Management	*Total*	5,148	2,265		7,414		5,239	2,305	7,544				6,695	2,946	9,640
New S-8A Gated Culverts w. Canal 3080 and 1020 CFS In Miami and L-4 Canal	*Total*	67,666	29,773		97,438		68,609	30,188	98,797				78,425	34,507	112,933

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-630 Pump Station 360 CFS in L-4 Canal		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
13 PUMPING PLANT		30,424	13,387	44.0%	43,811	.9%	30,694	13,506	44,200		2021-1Q	15.2%	35,034	15,415	50,449
Construction Activities	*Total*	30,424	13,387		43,811		30,694	13,506	44,200				35,034	15,415	50,449
30 Planning Engineering and Design	*27.5%*	8,367	3,681	44.0%	12,048	1.8%	8,513	3,746	12,259		2019-3Q	27.3%	10,653	4,687	15,340
Planning Engineering and Design	*Total*	8,367	3,681		12,048		8,513	3,746	12,259				10,653	4,687	15,340
31 Construction Management (S&A)	*10.5%*	3,195	1,406	44.0%	4,600	1.8%	3,250	1,430	4,681		2021-1Q	35.6%	4,333	1,906	6,239
Construction Management	*Total*	3,195	1,406		4,600		3,250	1,430	4,681				4,333	1,906	6,239
S-630 Pump Station 360 CFS in L-4 Canal	*Total*	41,985	18,473		60,459		42,458	18,682	61,140				50,019	22,009	72,028

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-4 Levee Removal L-4 Interior Levee		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS		2,410	1,060	44.0%	3,470	1.4%	2,443	1,075	3,518		2020-4Q	15.2%	2,776	1,221	3,997
Construction Activities	*Total*	2,410	1,060		3,470		2,443	1,075	3,518				2,776	1,221	3,997
30 Planning Engineering and Design	*27.5%*	663	292	44.0%	954	1.8%	674	297	971		2019-3Q	27.3%	844	371	1,215
Planning Engineering and Design	*Total*	663	292		954		674	297	971				844	371	1,215
31 Construction Management (S&A)	*10.5%*	253	111	44.0%	364	1.8%	257	113	371		2020-4Q	34.2%	340	149	489
Construction Management	*Total*	253	111		364		257	113	371				340	149	489
L-4 Levee Removal L-4 Interior Levee	*Total*	3,326	1,463		4,789		3,375	1,485	4,860				3,959	1,742	5,702

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS	ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: Miami Canal Backfill	Est Preparation Date: 01-Jul-13				Program Yr: 2014				as of:					
	Est Price Level: 2013-1Q				Prog Level Date: 2014-1Q									
		Risk Based												
	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
09 CHANNELS & CANALS	94,138	41,421	44.0%	135,559	1.8%	95,818	42,160	137,977		2024-1Q	22.9%	115,717	50,916	166,633
14 RECREATION FACILITIES	577	254	44.0%	831	.9%	582	256	838		2024-1Q	21.8%	703	309	1,012
Construction Activities *Total*	94,715	41,675		136,390		96,400	42,416	138,816				116,421	51,225	167,646
30 Planning Engineering and Design *27.5%*	26,047	11,461	44.0%	37,507	1.8%	26,503	11,661	38,164		2021-4Q	40.1%	36,478	16,050	52,529
Planning Engineering and Design *Total*	26,047	11,461		37,507		26,503	11,661	38,164				36,478	16,050	52,529
31 Construction Management (S&A) *10.5%*	9,945	4,376	44.0%	14,321	1.8%	10,119	4,452	14,572		2024-1Q	54.5%	15,370	6,763	22,133
Construction Management *Total*	9,945	4,376		14,321		10,119	4,452	14,572				15,370	6,763	22,133
Miami Canal Backfill *Total*	130,707	57,511		188,218		133,022	58,530	191,552				168,269	74,038	242,307

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: Tree Islands Mounds Miami Canal		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
09 CHANNELS & CANALS		6,993	3,077	44.0%	10,070	1.8%	7,118	3,132	10,250		2025-3Q	26.5%	8,843	3,891	12,734
Construction Activities	*Total*	6,993	3,077		10,070		7,118	3,132	10,250				8,843	3,891	12,734
30 Planning Engineering and Design	*27.5%*	1,923	846	44.0%	2,769	1.8%	1,957	861	2,818		2024-1Q	54.5%	2,972	1,308	4,280
Planning Engineering and Design	*Total*	1,923	846		2,769		1,957	861	2,818				2,972	1,308	4,280
31 Construction Management (S&A)	*10.5%*	734	323	44.0%	1,057	1.8%	747	329	1,076		2025-3Q	65.3%	1,214	534	1,748
Construction Management	*Total*	734	323		1,057		747	329	1,076				1,214	534	1,748
Tree Islands Mounds Miami Canal	*Total*	9,650	4,246		13,896		9,822	4,322	14,143				13,029	5,733	18,762

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-5 East Canal 500 CFS Remnant L-5 Canal East		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
09 CHANNELS & CANALS		11,437	5,032	44.0%	16,469	1.8%	11,641	5,122	16,763		2022-2Q	18.9%	13,604	5,986	19,590
Construction Activities	*Total*	11,437	5,032		16,469		11,641	5,122	16,763				13,604	5,986	19,590
30 Planning Engineering and Design	*27.5%*	3,145	1,384	44.0%	4,529	1.8%	3,200	1,408	4,608		2020-3Q	32.8%	4,177	1,838	6,015
Planning Engineering and Design	*Total*	3,145	1,384		4,529		3,200	1,408	4,608				4,177	1,838	6,015
31 Construction Management (S&A)	*10.5%*	1,201	528	44.0%	1,729	1.8%	1,222	538	1,760		2022-2Q	43.1%	1,718	756	2,474
Construction Management	*Total*	1,201	528		1,729		1,222	538	1,760				1,718	756	2,474
L-5 East Canal 500 CFS Remnant L-5 Canal East	*Total*	15,783	6,945		22,728		16,063	7,068	23,131				19,499	8,580	28,078

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS					SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-5 West Canal 3000 CFS L-5 Canal West		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q					as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)		*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
09 CHANNELS & CANALS		14,278	6,282	44.0%	20,560	1.8%	14,533	6,394	20,927			2023-1Q	20.6%	17,224	7,578	24,802
Construction Activities	*Total*	14,278	6,282		20,560		14,533	6,394	20,927					17,224	7,578	24,802
30 Planning Engineering and Design	*27.5%*	3,926	1,728	44.0%	5,654	1.8%	3,995	1,758	5,753			2021-2Q	37.%	5,381	2,367	7,748
Planning Engineering and Design	*Total*	3,926	1,728		5,654		3,995	1,758	5,753					5,381	2,367	7,748
31 Construction Management (S&A)	*10.5%*	1,499	660	44.0%	2,159	1.8%	1,525	671	2,197			2023-1Q	47.9%	2,217	976	3,193
Construction Management	*Total*	1,499	660		2,159		1,525	671	2,197					2,217	976	3,193
L-5 West Canal 3000 CFS L-5 Canal West	*Total*	19,704	8,670		28,373		20,053	8,824	28,877					24,822	10,922	35,743

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl   District: SAJ -Jacksonville District

Contract Summary

WBS	ESTIMATED COST				PROJECT FIRST COST *CONSTANT DOLLAR BASIS*				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-333N Gated Spillway w/ New Canal 1150 CFS Just North of Existing S-333	Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
14 RECREATION FACILITIES	951	418	44.0%	1,369	.9%	959	422	1,382		2025-3Q	25.3%	1,192	524	1,717
15 FLOODWAY CONTROL & DIVERSION STRUC. include connection canal	11,494	5,057	44.0%	16,551	1.3%	11,639	5,121	16,760		2025-3Q	25.8%	14,460	6,362	20,822
Construction Activities *Total*	12,445	5,476		17,921		12,598	5,543	18,141				15,652	6,887	22,539
30 Planning Engineering and Design *27.5%*	3,422	1,506	44.0%	4,928	1.8%	3,482	1,532	5,015		2024-1Q	54.5%	5,289	2,327	7,617
Planning Engineering and Design *Total*	3,422	1,506		4,928		3,482	1,532	5,015				5,289	2,327	7,617
31 Construction Management (S&A) *10.5%*	1,307	575	44.0%	1,882	1.8%	1,330	585	1,915		2025-3Q	65.3%	2,161	951	3,111
Construction Management *Total*	1,307	575		1,882		1,330	585	1,915				2,161	951	3,111
S-333N Gated Spillway w/ New Canal 1150 CFS Just North of Existing S-333 *Total*	17,174	7,557		24,731		17,410	7,660	25,071				23,102	10,165	33,267

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: New S-356 Pump Station 1000 CFS In Vicinity of Existing S-356		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
13 PUMPING PLANT		34,993	15,397	44.0%	50,390	.9%	35,304	15,534	50,838		2026-1Q	26.5%	44,272	19,480	63,751
Construction Activities	*Total*	34,993	15,397		50,390		35,304	15,534	50,838				44,272	19,480	63,751
30 Planning Engineering and Design	*27.5%*	9,623	4,234	44.0%	13,857	1.8%	9,792	4,308	14,100		2024-1Q	54.5%	14,872	6,544	21,416
Planning Engineering and Design	*Total*	9,623	4,234		13,857		9,792	4,308	14,100				14,872	6,544	21,416
31 Construction Management (S&A)	*10.5%*	3,674	1,617	44.0%	5,291	1.8%	3,739	1,645	5,384		2026-1Q	69.2%	6,216	2,735	8,951
Construction Management	*Total*	3,674	1,617		5,291		3,739	1,645	5,384				6,216	2,735	8,951
New S-356 Pump Station 1000 CFS In Vicinity of Existing S-356	*Total*	48,290	21,248		69,538		48,834	21,487	70,321				65,360	28,758	94,118

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-631 Gated Culvert 500 CFS in L-67A		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.		6,910	3,040	44.0%	9,950	1.3%	6,997	3,079	10,076		2025-3Q	25.8%	8,693	3,825	12,518
Construction Activities	*Total*	6,910	3,040		9,950		6,997	3,079	10,076				8,693	3,825	12,518
30 Planning Engineering and Design	*27.5%*	1,900	836	44.0%	2,736	1.8%	1,934	851	2,784		2024-1Q	54.5%	2,937	1,292	4,229
Planning Engineering and Design	*Total*	1,900	836		2,736		1,934	851	2,784				2,937	1,292	4,229
31 Construction Management (S&A)	*10.5%*	726	319	44.0%	1,045	1.8%	738	325	1,063		2025-3Q	65.3%	1,200	528	1,727
Construction Management	*Total*	726	319		1,045		738	325	1,063				1,200	528	1,727
S-631 Gated Culvert 500 CFS in L-67A	*Total*	9,536	4,196		13,732		9,669	4,254	13,923				12,830	5,645	18,475

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-632 Gated Culvert 500 CFS in L-67A		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.		6,953	3,059	44.0%	10,012	1.3%	7,041	3,098	10,138		2027-3Q	30.6%	9,083	3,996	13,079
Construction Activities	*Total*	6,953	3,059		10,012		7,041	3,098	10,138				9,083	3,996	13,079
30 Planning Engineering and Design	*27.5%*	1,912	841	44.0%	2,753	1.8%	1,946	856	2,802		2026-1Q	69.2%	3,235	1,423	4,658
Planning Engineering and Design	*Total*	1,912	841		2,753		1,946	856	2,802				3,235	1,423	4,658
31 Construction Management (S&A)	*10.5%*	730	321	44.0%	1,051	1.8%	743	327	1,070		2027-3Q	81.5%	1,325	583	1,908
Construction Management	*Total*	730	321		1,051		743	327	1,070				1,325	583	1,908
S-632 Gated Culvert 500 CFS in L-67A	*Total*	9,595	4,222		13,817		9,729	4,281	14,010				13,643	6,003	19,645

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-633 Gated Culvert 500 CFS in L-67A		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
14 RECREATION FACILITIES		1,660	730	44.0%	2,390	.9%	1,675	737	2,412		2027-3Q	30.2%	2,161	951	3,111
15 FLOODWAY CONTROL & DIVERSION STRUC.		6,992	3,076	44.0%	10,068	1.3%	7,080	3,115	10,195		2027-3Q	30.6%	9,134	4,019	13,152
Construction Activities	*Total*	8,652	3,807		12,459		8,755	3,852	12,607				11,294	4,969	16,264
30 Planning Engineering and Design	*27.5%*	2,379	1,047	44.0%	3,426	1.8%	2,421	1,065	3,486		2026-1Q	69.2%	4,025	1,771	5,796
Planning Engineering and Design	*Total*	2,379	1,047		3,426		2,421	1,065	3,486				4,025	1,771	5,796
31 Construction Management (S&A)	*10.5%*	908	400	44.0%	1,308	1.8%	924	407	1,331		2027-3Q	81.5%	1,649	726	2,374
Construction Management	*Total*	908	400		1,308		924	407	1,331				1,649	726	2,374
S-633 Gated Culvert 500 CFS in L-67A	*Total*	11,940	5,253		17,193		12,100	5,324	17,424				16,968	7,466	24,434

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-67C Gap Levee Removal Gap In L-67C		Est Preparation Date: 01-Jul-13; Est Price Level: 2013-1Q; Risk Based				Program Yr: 2014; Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS		800	352	44.0%	1,152	1.4%	811	357	1,168		2027-1Q	29.5%	1,036	456	1,492
Construction Activities	*Total*	800	352		1,152		811	357	1,168				1,036	456	1,492
30 Planning Engineering and Design	*27.5%*	220	97	44.0%	317	1.8%	224	98	322		2026-1Q	69.2%	372	164	536
Planning Engineering and Design	*Total*	220	97		317		224	98	322				372	164	536
31 Construction Management (S&A)	*10.5%*	84	37	44.0%	121	1.8%	85	38	123		2027-1Q	77.3%	149	66	214
Construction Management	*Total*	84	37		121		85	38	123				149	66	214
L-67C Gap Levee Removal Gap In L-67C	*Total*	1,104	486		1,590		1,120	493	1,613				1,557	685	2,243

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS	ESTIMATED COST				PROJECT FIRST COST *CONSTANT DOLLAR BASIS*				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-67D New Levee In WCA 3B	Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS	82,090	36,120	44.0%	118,210	1.4%	83,223	36,618	119,840		2030-2Q	37.7%	113,062	49,747	162,809
14 RECREATION FACILITIES	163	72	44.0%	235	.9%	164	72	237		2030-2Q	37.1%	223	98	322
Construction Activities *Total*	82,253	36,191		118,444		83,387	36,690	120,077				113,285	49,846	163,131
30 Planning Engineering and Design *27.5%*	22,620	9,953	44.0%	32,572	1.8%	23,016	10,127	33,143		2028-2Q	88.1%	42,547	18,721	61,267
Planning Engineering and Design *Total*	22,620	9,953		32,572		23,016	10,127	33,143				42,547	18,721	61,267
31 Construction Management (S&A) *10.5%*	8,637	3,800	44.0%	12,437	1.8%	8,788	3,867	12,655		2030-2Q	107.4%	17,910	7,880	25,791
Construction Management *Total*	8,637	3,800		12,437		8,788	3,867	12,655				17,910	7,880	25,791
L-67D New Levee In WCA 3B *Total*	113,509	49,944		163,453		115,191	50,684	165,875				173,742	76,447	250,189

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-67C Levee Removal L-67C Levee		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS		4,489	1,975	44.0%	6,464	1.4%	4,551	2,002	6,553		2027-1Q	29.5%	5,815	2,559	8,374
Construction Activities	*Total*	4,489	1,975		6,464		4,551	2,002	6,553				5,815	2,559	8,374
30 Planning Engineering and Design	*27.5%*	1,234	543	44.0%	1,778	1.8%	1,256	553	1,809		2026-1Q	69.2%	2,088	919	3,007
Planning Engineering and Design	*Total*	1,234	543		1,778		1,256	553	1,809				2,088	919	3,007
31 Construction Management (S&A)	*10.5%*	471	207	44.0%	679	1.8%	480	211	691		2027-1Q	77.3%	835	368	1,203
Construction Management	*Total*	471	207		679		480	211	691				835	368	1,203
L-67C Levee Removal L-67C Levee	*Total*	6,195	2,726		8,921		6,287	2,766	9,053				8,739	3,845	12,585

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl   District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: S-355W Gated Spillway 1230 CFS in L29 Canal, East of L-67D Levee Terminus and 2.6 mile Bridge		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.		19,081	8,396	44.0%	27,477	1.3%	19,321	8,501	27,823		2027-3Q	30.6%	24,926	10,967	35,893
Construction Activities	*Total*	19,081	8,396		27,477		19,321	8,501	27,823				24,926	10,967	35,893
30 Planning Engineering and Design	*27.5%*	5,247	2,309	44.0%	7,556	1.8%	5,339	2,349	7,688		2026-1Q	69.2%	8,877	3,906	12,783
Planning Engineering and Design	*Total*	5,247	2,309		7,556		5,339	2,349	7,688				8,877	3,906	12,783
31 Construction Management (S&A)	*10.5%*	2,004	882	44.0%	2,885	1.8%	2,039	897	2,936		2027-3Q	81.5%	3,637	1,600	5,237
Construction Management	*Total*	2,004	882		2,885		2,039	897	2,936				3,637	1,600	5,237
S-355W Gated Spillway 1230 CFS in L29 Canal, East of L-67D Levee Terminus and 2.6 mile Bridge	*Total*	26,332	11,586		37,918		26,699	11,748	38,447				37,439	16,473	53,913

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl   District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-29 Levee Removal in L-29 Levee		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS		10,036	4,416	44.0%	14,452	1.4%	10,174	4,477	14,651		2031-2Q	40.3%	14,085	6,197	20,283
14 RECREATION FACILITIES		77	34	44.0%	111	.9%	78	34	112		2031-2Q	39.7%	108	47	155
Construction Activities	*Total*	10,113	4,450		14,563		10,252	4,511	14,763				14,193	6,245	20,437
30 Planning Engineering and Design	*27.5%*	2,781	1,224	44.0%	4,005	1.8%	2,830	1,245	4,075		2030-1Q	104.9%	5,697	2,507	8,204
Planning Engineering and Design	*Total*	2,781	1,224		4,005		2,830	1,245	4,075				5,697	2,507	8,204
31 Construction Management (S&A)	*10.5%*	1,062	467	44.0%	1,529	1.8%	1,080	475	1,556		2031-2Q	118.2%	2,317	1,019	3,336
Construction Management	*Total*	1,062	467		1,529		1,080	475	1,556				2,317	1,019	3,336
L-29 Levee Removal in L-29 Levee	*Total*	13,956	6,141		20,097		14,162	6,231	20,394				22,207	9,771	31,977

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: Remove TT Road Removal Old Tamiami Trail (From L-67 Ext West to ENP Tram Rd)		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS		5,918	2,604	44.0%	8,522	1.4%	6,000	2,640	8,639		2031-3Q	41.%	8,345	3,672	12,017
Construction Activities	*Total*	5,918	2,604		8,522		6,000	2,640	8,639				8,345	3,672	12,017
30 Planning Engineering and Design	*27.5%*	1,627	716	44.0%	2,344	1.8%	1,656	729	2,385		2030-1Q	104.9%	3,334	1,467	4,801
Planning Engineering and Design	*Total*	1,627	716		2,344		1,656	729	2,385				3,334	1,467	4,801
31 Construction Management (S&A)	*10.5%*	621	273	44.0%	895	1.8%	632	278	910		2031-3Q	121.1%	1,374	604	1,978
Construction Management	*Total*	621	273		895		632	278	910				1,374	604	1,978
Remove TT Road Removal Old Tamiami Trail (From L-67 Ext West to ENP Tram Rd)	*Total*	8,167	3,593		11,760		8,288	3,647	11,935				13,053	5,743	18,796

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-67 EXT Levee Removal and Canal Backfill in L-67 Ext Levee		Est Preparation Date: 01-Jul-13; Est Price Level: 2013-1Q; Risk Based				Program Yr: 2014; Prog Level Date: 2014-1Q				as of:					
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS		9,239	4,065	44.0%	13,304	1.4%	9,366	4,121	13,488		2031-2Q	40.3%	12,967	5,705	18,672
Construction Activities	*Total*	9,239	4,065		13,304		9,366	4,121	13,488				12,967	5,705	18,672
30 Planning Engineering and Design	*27.5%*	2,541	1,118	44.0%	3,659	1.8%	2,585	1,138	3,723		2030-1Q	104.9%	5,205	2,290	7,495
Planning Engineering and Design	*Total*	2,541	1,118		3,659		2,585	1,138	3,723				5,205	2,290	7,495
31 Construction Management (S&A)	*10.5%*	970	427	44.0%	1,397	1.8%	987	434	1,421		2031-2Q	118.2%	2,116	931	3,048
Construction Management	*Total*	970	427		1,397		987	434	1,421				2,116	931	3,048
L-67 EXT Levee Removal and Canal Backfill in L-67 Ext Levee	*Total*	12,750	5,610		18,360		12,939	5,693	18,632				20,288	8,927	29,214

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: L-31N Seepage Barrier Cutoff Wall In L-31N Levee just South of Tamiami Trail		Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
			Risk Based												
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS		21,661	9,531	44.0%	31,192	1.4%	21,960	9,662	31,622		2032-4Q	44.4%	31,273	13,760	45,033
Construction Activities	*Total*	21,661	9,531		31,192		21,960	9,662	31,622				31,273	13,760	45,033
30 Planning Engineering and Design	*27.5%*	5,957	2,621	44.0%	8,578	1.8%	6,061	2,667	8,728		2031-1Q	115.5%	12,835	5,647	18,482
Planning Engineering and Design	*Total*	5,957	2,621		8,578		6,061	2,667	8,728				12,835	5,647	18,482
31 Construction Management (S&A)	*10.5%*	2,274	1,001	44.0%	3,275	1.8%	2,314	1,018	3,333		2032-4Q	135.9%	5,366	2,361	7,727
Construction Management	*Total*	2,274	1,001		3,275		2,314	1,018	3,333				5,366	2,361	7,727
L-31N Seepage Barrier Cutoff Wall In L-31N Levee just South of Tamiami Trail	*Total*	29,892	13,153		43,045		30,335	13,347	43,683				49,474	21,768	71,242

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS	ESTIMATED COST				PROJECT FIRST COST *CONSTANT DOLLAR BASIS*				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: **S-346 2-72” metal culvert w/Flash Board Removal 165 CFS in Old Tamiami Trail**	Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
15 FLOODWAY CONTROL & DIVERSION STRUC.	108	48	44.0%	156	1.3%	109	48	157		2031-1Q	39.5%	151	66	217
Construction Activities *Total*	108	48		156		109	48	157				151	66	217
30 Planning Engineering and Design *27.5%*	30	13	44.0%	43	1.8%	30	13	44		2030-1Q	104.9%	61	27	88
Planning Engineering and Design *Total*	30	13		43		30	13	44				61	27	88
31 Construction Management (S&A) *10.5%*	11	5	44.0%	16	1.8%	12	5	17		2031-1Q	115.5%	24	11	35
Construction Management *Total*	11	5		16		12	5	17				24	11	35
S-346 2-72” metal culvert w/Flash Board Removal 165 CFS in Old Tamiami Trail *Total*	149	66		215		151	66	218				236	104	340

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS		ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: **L-67A Spoil Mounds in the Vacinity of S-631, 632, 633**		Est Preparation Date: 01-Jul-13; Est Price Level: 2013-1Q				Program Yr: 2014; Prog Level Date: 2014-1Q				as of:					
				Risk Based											
		COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
11 LEVEES & FLOODWALLS		3,106	1,367	44.0%	4,473	1.4%	3,149	1,385	4,534		2025-2Q	25.4%	3,894	1,713	5,607
Construction Activities	Total	3,106	1,367		4,473		3,149	1,385	4,534				3,894	1,713	5,607
30 Planning Engineering and Design	*27.5%*	854	376	44.0%	1,230	1.8%	869	382	1,252		2024-1Q	54.5%	1,320	581	1,901
Planning Engineering and Design	Total	854	376		1,230		869	382	1,252				1,320	581	1,901
31 Construction Management (S&A)	*10.5%*	326	143	44.0%	470	1.8%	332	146	478		2025-2Q	63.4%	533	234	767
Construction Management	Total	326	143		470		332	146	478				533	234	767
L-67A Spoil Mounds in the Vacinity of S-631, 632, 633	Total	4,286	1,886		6,172		4,350	1,914	6,264				5,747	2,529	8,275

Contract Footnote: All costs were rounded up to the nearest $1,000 prior to entering into the TPCS.

Location: Central and Southern Fl   District: SAJ -Jacksonville District

Contract Summary

WBS	ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS					SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: Cultural Resource	Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q Risk Based				Program Yr: 2014 Prog Level Date: 2014-1Q					as of:					
	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)		SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
18 CULTURAL RESOURCE PRESERVATION Construction	830	365	44.0%	1,195	.9%	837	368	1,206			2032-3Q	43.%	1,187	522	1,709
18 CULTURAL RESOURCE PRESERVATION Mitigation	17,235	7,583	44.0%	24,818	.9%	17,388	7,651	25,039			2032-3Q	43.%	24,645	10,844	35,489
Construction Activities *Total*	18,065	7,949		26,014		18,226	8,019	26,245					25,832	11,366	37,198
31 Construction Management (S&A) *10.5%*	1,897	835	44.0%	2,731	1.8%	1,930	849	2,779			2032-3Q	132.8%	4,416	1,943	6,359
Construction Management *Total*	1,897	835		2,731		1,930	849	2,779					4,416	1,943	6,359
Cultural Resource *Total*	19,962	8,783		28,745		20,156	8,868	29,024					30,249	13,309	43,558

Contract Footnote: Assume all Cultural Resource work is completed evenly throughout the project prior to construction starting. Amounts provided from Amro Habib Jacksonville District e-mail dated 5/31/2013 at 1:44 PM.
All costs were rounded up to the n

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS	ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: HTRW Investigation	Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
		Risk Based												
	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	*SPENT* ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
32 HTRW Investigation	625	275	44.0%	900	1.3%	633	278	911		2032-3Q	43.5%	897	395	1,292
HTRW Investigation *Total*	625	275		900		633	278	911				897	395	1,292
HTRW Investigation *Total*	625	275		900		633	278	911				897	395	1,292

Contract Footnote: Assume all HTRW is completed evenly throughout the project prior to construction starting. Amounts provided from Lisa Gued Jacksonville District e-mail dated 5/23/2013 at 10:08 AM. All costs were rounded up to the nearest $1,000 pri

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS	ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: Adaptive Management	Est Preparation Date: 01-Jul-13 Est Price Level: 2013-1Q				Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
	COST ($K)	CNTG ($K)	Risk Based CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
Adaptive Management AM and BO	72,516	31,907	44.0%	104,423	1.3%	73,429	32,309	105,738		2032-3Q	43.5%	104,076	45,793	149,869
Construction Activities *Total*	72,516	31,907		104,423		73,429	32,309	105,738				104,076	45,793	149,869
Adaptive Management *Total*	72,516	31,907		104,423		73,429	32,309	105,738				104,076	45,793	149,869

Contract Footnote: Assume all adaptive management spent evenly throughout construction. Amounts provided from Amro Habib Jacksonville District e-mail dated 12/19/2013 at 1:53 PM. All costs were rounded up to the nearest $1,000 prior to entering into th

Location: Central and Southern Fl District: SAJ -Jacksonville District

Contract Summary

WBS	ESTIMATED COST				PROJECT FIRST COST CONSTANT DOLLAR BASIS				SPENT	TOTAL PROJECT COST (FULLY FUNDED)				
Contract: Real Estate	Est Preparation Date: 01-Jul-13 Est Price Level: 2014-1Q		Risk Based		Program Yr: 2014 Prog Level Date: 2014-1Q				as of:					
	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	SPENT ($K)	MID-PT (DATE)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
01 LANDS AND DAMAGES	32,341			32,341	.%	32,341		32,341		2014-1Q	.%	32,341		32,341
01 LANDS AND DAMAGES	2,987	1,314	44.0%	4,301	.%	2,987	1,314	4,301		2035-4Q	50.7%	4,501	1,980	6,481
Lands and Damages Total	35,328	1,314		36,642		35,328	1,314	36,642				36,842	1,980	38,822
Real Estate Total	35,328	1,314		36,642		35,328	1,314	36,642				36,842	1,980	38,822

Contract Footnote: Assume all real estate is acquired evenly throughout the project prior to construction starting. Amounts provided from Donald Nelson Jacksonville District e-mail dated 1/16/2014 at 5:24 AM. All costs were rounded up to the nearest $1

Location: Central and Southern Fl District: SAJ -Jacksonville District

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RISK MANAGEMENT PLAN (RMP)

Central and Southern Florida Comprehensive Everglades Restoration Program

CENTRAL EVERGLADES PLANNING PROJECT FLORIDA

Prepared by:

U.S. Army Corps of Engineers
Cost Engineering, Jacksonville, FL

April 2014

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1. INTRODUCTION

1.1 Purpose:

This Risk Management Plan (RMP) presents the process for implementing the comprehensive and proactive management of risk as part of the overall management of the Central Everglades Planning Project Feasibility Report. Project Risk management is a project management tool to handle events that might adversely impact the program, thereby increasing the probability/likelihood of success. This RMP describes a management tool that will:

- Serve as a basis for identifying alternatives to achieve cost, schedule, and performance goals,
- Assist in making decisions on budget and funding priorities,
- Provide risk information for Milestone decisions, and
- Allow monitoring the health of the program as it proceeds.

The RMP describes methods for assessing (identifying and analyzing), prioritizing, and monitoring risk drivers; developing risk-handling approaches, and applying adequate resources to handle risk. It assigns specific responsibilities for these functions, and prescribes the documenting, monitoring, and reporting processes to be followed.

The four main building blocks of the risk management process are identification, assessment, response, and documentation. The CSRA process addresses the "identification" and "assessment" portions of the risk management process. The activities of "response" and "documentation" are PM and PDT management efforts to mitigate, monitor, and manage the risks throughout the life cycle of the project.

If necessary, this RMP will be updated at the following milestones: (1) following approval of the FCSA; (2) Congressional authorization for construction; (3) receipt of Construction General funding; or (4) concurrent with the review and update of other program plans.

1.2 Objectives:

The objectives of the risk management plan are:

To focus attention on minimizing threats to achievement of the project objectives.

To provide an approach for:

- Identifying and assessing risks.
- Determining cost-effective risk reduction actions.
- Monitoring and reporting progress in reducing risk.

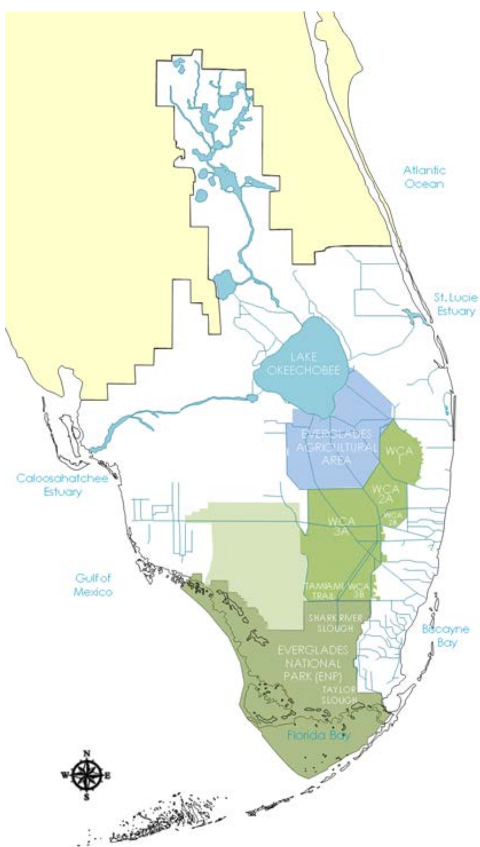
The overall goal of this process is to progressively reduce the project's exposure to events that threaten the accomplishment of its objectives by:

- Incorporating approaches into the project plans that minimize or avoid identified risks,
- Developing proactive, contingent risk response actions, and
- Rapidly implementing risk responses based on timely identification of risk occurrence.

2. PROJECT SUMMARY

2.1 Project Area Description

The study area for the CEPP encompasses the Northern Estuaries (St. Lucie River and Indian River Lagoon and the Caloosahatchee River and Estuary), Lake Okeechobee, the Everglades Agricultural Area (EAA), the Water Conservation Areas (specifically WCAs 2 and 3); ENP, the Southern Estuaries (specifically focused on Florida Bay), and portions of the Lower East Coast (LEC). Adjacent areas were also evaluated. For purposes of this study, the term Greater Everglades is defined as the region encompassing WCA 3 and ENP.



2.2 Project Scope

Features in the EAA include construction of the 14,000 acre A-2 FEB (L-624 perimeter levee and L-625 interior levee; C-624, C-624E, C-626 internal distribution channels; S-623, S-624, S-628 inlet structures; S-625 outlet structures, and C-625E, C-625W canals and channels connecting the FEB to the Miami Canal). Operation of the A-2 FEB would be integrated with the operation of the A-1 FEB, a state-funded and state-constructed FEB.

Conveyance features in WCA 2A and northern WCA 3A include: S-620 a gated culvert to deliver water from the L-6 Canal to the remnant L-5 Canal, S-622 a new gated spillway to deliver water from the remnant L-5 canal to the western L-5 canal (during L-6 diversion operations), S-621 a new gated spillway to deliver water from STA 3/4 to the S-7 pump station during peak discharge events (eastern flow route is not typically used during normal operations, including L-6 diversion operations, enlarge approximately 13.6 miles of the L-5 Canal, degrade approximately 2.9 miles of the southern L-4 Levee along the northwest boundary of WCA-3A, S-630 a 360 cfs pump station to maintain water supply deliveries west of the L-4 Canal, S-8A new gated culverts to deliver water from the Miami Canal (downstream of S-8, which pulls water from the L-5 Canal) to the L-4 Canal, and backfill approximately 13.5 miles of the Miami Canal and include upland mounds between a point approximately 1.5 miles south of the S-8 pump station and Interstate Highway I-75.

Additional conveyance features that would be located in southern WCA 3A, WCA 3B, and the northern edge of ENP include: S-333N a 1,150 cfs gated spillway adjacent to S-333, S-631 a 500 cfs gated culvert in L-67A Levee and an associated 6,000 foot gap in the L-67C Levee, a flowway through the western end of WCA 3B (S-632 and S-633 2 gated culverts in L-67A Levee, removal of approximately 8 miles of L-67C Levee, removal of approximately 4.3 miles of L-29 Levee, construct L-67D a new approximately 8.5 mile levee), S-355W a gated spillway in the L-29 Canal to maintain water deliveries in the L-29 Canal to the eastern Modified Water Deliveries (MWD) 1-mile bridge and maintain western access to the L-29 Levee, remove approximately 5.5 miles of the L-67 Extension Levee, and remove approximately 6 miles of Old Tamiami Trail between the Everglades National Park (ENP) Tram Road and the L-67 Extension Levee.

Features primarily for seepage management, which are required to mitigate for increased seepage include: S-356 a new 1,000 cfs pump station to replace the existing temporary S-356 pump station and a ~4.2 mile long, 35 feet deep tapering seepage barrier cutoff wall along the L-31N Levee just south of Tamiami Trail.

3. RISK-RELATED DEFINITIONS

The U.S. Army Corps of Engineers Cost Engineering Directory of Expertise for Civil Works (Cost Dx) recommends the following definitions for risk, as contained in current project and risk management guidance and literature, as noted.

3.1 **Risk:** An uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives (source: PMBoK® Guide, p. 373).

3.1.1 Technical Risk: Risks having to do with product, process, or "technique" issues involved with designing and producing the deliverable (source: Project Risk Management, p. 78).

3.1.2 Cost Risk: The risk associated with the ability of the program to achieve its life cycle cost objectives (source: Defense Acquisition Deskbook).

3.1.3 Schedule Risk: Events or conditions that may have a negative influence on the project's timing (source: Risk Management Concepts and Guidance, p. 376).

3.1.4 Life-Safety Risk: Risk relating to the safety and/or security of human interests.

3.1.5 Reliability Risk: Risk relating to the performance and/or reliability of the system, product, or project feature being acquired.

3.1.6 Non-Technical Risk: Any risk that is not technical in nature and does not directly influence cost growth. Such risks would include organizational risks, political exposure, public relations issues, or potential loss of "goodwill" (public trust).

3.1.7 Internal Risk: An item or activity upon which the PDT has control or influence.

3.1.8 External Risk: An item or activity upon which the PDT has no control or influence.

3.2 **Risk Management:** Project Risk Management includes the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control on a project; most of these processes are updated throughout the project (source: PMBoK® Guide, 3rd edition, p. 237).

3.3 **Risk Analysis:** Qualitative or quantitative evaluations of the potential impact and probability of project risk events (source: Risk Management Concepts and Guidance, p. 373).

3.3.1 Qualitative Risk Analysis: Prioritizing risks for subsequent further analysis or action by assessing and combining their probability of occurrence and impact (source: PMBoK® Guide, 3rd edition, p. 237).

3.3.2 Quantitative Risk Analysis: Numerically analyzing the effect on overall project objectives of identified risks (source: PMBoK® Guide, 3rd edition, p. 237).

3.3.3 Cost and Schedule Risk Analysis (CSRA): Technique used to improve the development of contingencies by studying the variance of project cost caused by the effects of cost and schedule risk events. This process relies on qualitative and quantitative (e.g. Monte Carlo simulation) risk analysis techniques. CSRA is required on projects costs anticipated to be $40 Million or higher.

3.4 **Risk Communication:** Exchange or sharing of information about risk between the decision-maker, often the project manager, and other stakeholders (source: Project Risk Management Guidelines, p. 372).

3.5 **Risk Response Planning/Mitigation:** Developing options and actions to enhance opportunities, and to reduce threats to project objectives (source: PMBoK® Guide, 3rd edition, p. 237).

3.6 **Risk Monitoring and Control:** Tracking identified risks, monitoring residual risks, identifying new risks, executing risk response plans, and evaluating their effectiveness throughout the project life cycle (source: PMBoK® Guide, 3rd edition, p. 237).

3.7 **Risk Register:** The document containing the results of the qualitative risk analysis, quantitative risk analysis and risk response planning. The risk register details all identified risks, including description, category, cause, probability of occurring, impact(s) on objectives, proposed responses, owners, and current status (source: PMBoK® Guide, 4th edition, p. 439).

3.8 **Risk Trigger:** An indicator of the imminent occurrence of a given risk event that serves as an immediate precursor to the occurrence of the risk. Often used to initiate specific actions, behaviors, or responses (source: Risk Management Concepts and Guidance, p. 376).

3.9 **Watch List:** A list of major risks examined at each project risk review meeting (source: Project Risk Management Guidelines, p. 372).

4. RISK MANAGEMENT STRATEGY

The *Central Everglades Planning Project* risk management strategy is to handle program risks, both technical and non-technical, before they become problems, causing serious cost, schedule, or performance impacts. This strategy is an integral part of project success, and will be executed primarily through the Government Project Delivery Team (PDT). The PDT will continuously and proactively assess critical areas to identify and analyze specific risks and will develop options to mitigate all risks designated as moderate and high.

The PDT will keep risk information current by maintaining the risk register described in paragraph 6.2.4. Risk status will be reported at all project milestone reviews.

5. RESPONSIBILITIES AND ASSIGNMENTS

Over the course of the project, the Project manager may make specific assignments to individual members of the PDT, within their functional areas, to provide updates or input to the risk register. Table 1 below lists the general assignments and responsibilities:

Table 1-Risk Management Responsibilities

Task	Lead	Support
Risk Management Planning	PM	Cost Dx
Risk Identification	PM	PDT
Risk Analysis and Quantification	Cost Dx	PDT
Risk Response/Mitigation Plan	PM	PDT
Risk Monitoring and Control	PM	PDT
Risk Communication	PM	PDT
Risk Documentation/Closeout	PM	PDT

6. RISK MANAGEMENT PROCESS AND PROCEDURES

Led by the project manager, the PDT will conduct risk management activities to address those risks that are pertinent to the project. The project manager will employ the assistance of members of the PDT, project sponsors/customers and other subject matter experts as appropriate.

Overview of Project Risk Management Activities

- Risk Management Planning
- Risk Identification
- Risk Analysis and Quantification
- Risk Response Planning and Mitigation
- Risk Monitoring and Control
- Risk Communication
- Risk Documentation/Closeout

6.1 Risk Management Planning

Risk Management Planning will occur in conjunction with the development of the Project Management Plan (PMP) and will culminate with the approval of the Risk Management Plan (RMP). The RMP will present the strategy for procedures for identifying, analyzing, responding to, and monitoring risk throughout the project life cycle. The RMP will include treatment for both technical and non-technical risks, as well as risks that affect the project cost and schedule performance. Per ER 1110-2-1302 and ETL 1110-2-573, this project has undergone a formal Cost and Schedule Risk Analysis (CSRA) and the team will perform periodic updates..

6.2 Risk Identification

6.2.1 Initial Risk Discussions

Identification of risks will be accomplished through brainstorming sessions held with the PDT and project stakeholders. The PDT brainstorming session is the initial attempt to develop the risk register that serves as the basis for both the risk register development and the CSRA.

6.2.2 PDT Coordination

The PM will coordinate an initial risk discussion meeting, also referred to as a PDT brainstorming session. This is the first meeting where the PDT attempts to collectively capture the project risks and place them into the risk register. The brainstorming session will include the major PDT members.

6.2.3 PDT Brainstorming Session

The PDT brainstorming session is the opportunity to bring the PDT together to qualitatively define the risk concerns as well as potential opportunities. As the concerns are discussed, the facilitator or risk analyst begins developing the initial risk register, capturing the PDT's concerns and discussions.

6.2.4 Risk Level

Each identified risk will be assigned a risk rating based on the joint consideration of event probability/likelihood and consequence/impact (see the Probability vs. Impact Risk Matrix below in Figure 1). This rating is a reflection of the severity of the risk and provides a starting point for the development of options to handle the risk. Probabilities are described as, VERY UNLIKELY, UNLIKELY, LIKELY, or VERY LIKELY. Impacts are described as, NEGLIGIBLE, MARGINAL SIGNIFICANT, CRITICAL, or CRISIS. Risk levels are described as, LOW, MODERATE, or HIGH.

It is important to consider both the probability/likelihood and consequences/impacts in establishing the rating, as there may be risk events that have a low probability/likelihood, but whose consequences/impacts are so severe that the occurrence of the event would be disastrous to the project.

6.2.5 Completing Initial Risk Register

The risk register will serve as the basis for risk management, including the CSRA process. When referring to the risk register, the PDT should focus on the following:

- Risk/Opportunity – *Event.*
- PDT Event Concerns – *Describe the risk event.*
- PDT Discussions – *List the implications or any relevant background for this risk.*
- Responsibility/POC – *List who should have the action on the status of this risk.*
- Likelihood – *Describe the likelihood of this risk occurring, using VERY UNLIKELY, UNLIKELY, LIKELY, or VERY LIKELY.*
- Impact – *Describe the impact of this risk if it occurs, using NEGLIGIBLE, MARGINAL SIGNIFICANT, CRITICAL, or CRISIS.*
- Risk Level – *Determine the risk level according to the matrix below, using LOW, MODERATE, or HIGH.*

Figure 1-Probability vs. Impact Risk Matrix

Risk Level

Likelihood of Occurrence	Negligible	Marginal	Significant	Critical	Crisis
Very Likely	Low	Moderate	High	High	High
Likely	Low	Moderate	High	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Very Unlikely	Low	Low	Low	Low	High

Impact or Consequence of Occurrence

The PDT should capture all concerns for all project features even if the risk level is considered low. The register serves as an archive of discussions and there is potential that low-level risks may become higher following market studies, more information being made available, or over time during the risk management and mitigation processes.

Within the risk register, the PDT concerns and discussions must be adequately and clearly captured, because the logic presented in those discussions must support the “likelihood” and “impact” decisions reflected within the risk register. While this product is the initial risk register, it has already captured the PDT’s greatest concerns. The PDT can begin using this data to prepare for project risk management.

6.3 Risk Analysis

Risk analysis includes both qualitative and quantitative techniques to determine the key drivers of risk. Qualitative risk analysis shall occur on all risks, both technical and non-technical. The Project Risk “Watch List” will incorporate all risks identified as “Moderate” or “High” by qualitative analysis. All risks determined to have cost and/or schedule impacts and rated as “Moderate” or “High” will be quantitatively studied through the CSRA process. The PDT will enlist the support of the Cost Engineering Dx for completion of the CSRA process.

6.3.1 Qualitative Risk Analysis

Qualitative risk analysis will be conducted on all project risks, utilizing the collective judgment of the PDT and project stakeholders. Qualitative analysis will occur simultaneously to the completion of the initial risk register. Additionally, the qualitative analysis will be updated as the risks change throughout the project life cycle. Changes to the status of risks shall be captured by the project risk register at each monthly risk review meeting.

6.3.2 Quantitative Risk Analysis

Quantitative analysis will be conducted on all risks qualitatively rated as MODERATE or HIGH that affect cost and/or schedule performance. Quantitative analysis shall be conducted using the Monte Carlo technique with the support of the Cost Engineering Dx. Other risks may also be studied quantitatively, as directed. The results of the quantitative analysis will be presented in a final report and will include identification of the key drivers of risk for cost and schedule. The results of the quantitative analysis will include recommended levels for contingency and management reserve for completion of the project through implementation.

6.3.3 Cost and Schedule Risk Analysis (CSRA)

The CSRA will be performed in accordance with ER 1110-2-1302, ETL 1110-2-573, and Cost and Schedule Risk Analysis Guidance published by the Cost Engineering Dx. The project will utilize the Cost Engineering Dx for performance of the CSRA, using Crystal Ball software. At a minimum, the CSRA will include but not be limited to:

Review of planning, design and/or construction contract documents:

- Deliverables and work processes
- Milestones and schedule dates
- Resource estimates/needs/sources
- Performance requirements

Discussions and brainstorming activities with PDT members, appropriate takeholders/sponsor representatives and other qualified/knowledgeable individuals to develop a comprehensive list of risks for this project, referred to as the Risk Register.

Investigation of the various sources and symptoms of risks to aid in subsequent determination of risk controllability and selection of appropriate risk response actions.

The guidance and processes recommended to perform an acceptable cost and schedule risk analysis (CSRA) that meets Headquarters (HQ), U.S. Army Corps of Engineers (USACE) requirements and successfully passes an agency technical review (ATR) can be found at *http://www.nww.usace.army.mil/html/OFFICES/Ed/C/default.asp*.

6.3.4 Risk Prioritization

The PM and the PDT will prioritize the MODERATE and HIGH risks in their disciplines or functional areas. This prioritization will provide the basis for the development of risk handling plans and the allocation of risk management resources. Prioritization will be accomplished using expert opinion within the PDT, and will be based on the following criteria:

- Risk Rating – MODERATE to HIGH
- Consequence/Impact – Within each rating, the highest value of consequence/impact
- Urgency – How much time is available before risk-handling actions must be initiated
- Probability/Likelihood – Within each rating, the highest value

The PDT will review the prioritized list of developed risks, and integrate them into a single list of prioritized project risks, using the same criteria.

6.4 Risk Response Planning and Mitigation

Following initial identification and analysis of risks, the PDT will develop an approach for risk handling for all key drivers of risk, including each MODERATE and HIGH risk. For all such risks, the various handling techniques should be evaluated in terms of feasibility, expected effectiveness, cost and schedule implications, and the effect on the project's performance. Risk responses will also include an accompanying "fallback" plan if the primary treatment strategy is not effective at mitigating the impact of risk. Reducing requirements as a risk avoidance technique will be used only as a last resort, and then only with the participation and approval of District and Division Management.

In addition to developing approaches for handling each MODERATE and HIGH risk, the following will act as risk triggers requiring an immediate response and mitigation plan:

- Cost growth greater than 1% of the estimated project cost
- Schedule delays greater than 3 months
- Potential for significant damage to private or public property
- Potential for injury or loss of life
- Potential to generate media coverage (either positive or negative)
- Potential environmental degradation or release of deleterious substances
- Potential to alter political or stakeholder support

The results of the evaluation and selection will be included and documented. This documentation will include the following elements:

- What must be done,
- List of all assumptions,
- Level of effort and resources required,
- Resources needed that are outside the expertise of the PDT,
- Estimated cost to implement the plan,

- Proposed schedule showing the proposed start date, the time phasing of significant risk reduction activities, the completion date, and their relationship to significant project activities/milestones,
- Recommended metrics for tracking risk-handling activity,
- Considerations for secondary or residual risks implications, and
- Person responsible for implementing and tracking the selected option.

6.5 Risk Monitoring and Control

Risk monitoring is the systematic tracking and evaluation of the progress and effectiveness of risk-handling actions by the comparison of predicted results of planned actions with the results actually achieved to determine status and the need for any change in risk-handling actions. The Project Manager and the PDT will monitor all identified risks in their disciplines or areas, with particular attention to those risks rated as MODERATE OR HIGH.

6.5.1 Monitor Risk Status

As work is performed on the project, the PDT will monitor and assess:

- Progress in reducing risk,
- Occurrence of risks that call for initiation of contingent risk responses,
- Effectiveness of implemented risk reduction actions and any needs to modify these actions.

Risk status will be updated immediately when risks change and upon the completion of a project milestone. The status of the risks and the effectiveness of the risk-handling actions will be agenda items for all design and program reviews, and will be reported to the PM on the following occasions:

- Monthly,
- When the PDT determines that the status of the risk area has changed significantly (as a minimum when the risk changes from high to moderate to low, or vice versa),
- When requested by Management.

There are a number of techniques and tools available for monitoring the effectiveness of risk-handling actions. At a minimum, the PM and PDT will use the Risk Register and Watch List for day-to-day management and monitoring of risks.

MODERATE or HIGH risks will be monitored by the PM until the risk is considered LOW and recommended for “Close Out.” Functional area leads will continue to monitor LOW risk events in their areas to ensure that appropriate risk-handling action can be initiated if there are indications that the rating may change.

6.5.2 Maintenance of Project Risk Register

Throughout the life cycle of the project, the PDT will update the Risk Register to reflect the results of monitoring risk status. This list will also reflect the effect of any project re-planning changes and/or change controls. Updates shall be made monthly to the risk register. Any changes to risk status upon event occurrence or completion of a project milestone will also be captured immediately on the risk register.

The Risk Register will be discussed at project team meetings and specific risks of concern should be elevated to the Pre-PRB, PRB and/or project sponsors as appropriate.

6.5.3 Maintenance of Project Watch List

Throughout the life cycle of the project, the PM and the PDT will maintain a project watch list to reflect the results of monitoring risk status. The watch list, at a minimum, will contain the:

- Potential Risk Event,
- Planned Risk Reduction Actions,
- Point of Contact/Assignment,
- Due Date, and
- Status.

6.6 Risk Communication

Risk communication is essential to actively managing risks throughout the project life cycle. Communication begins with the preparation of the Risk Management Plan and continues through project closeout. Subsequently, the preparation of the project risk register facilitates communication of risks at all levels. The Cost Engineering Dx will also prepare a report regarding the formal CSRA process to be incorporated within the Cost Appendix to the Engineering Appendix of the Feasibility Report.

The PDT will review the risk register monthly to provide visibility of risks and progress in mitigating them. If necessary, risk occurrences will be elevated to the Pre-PRB, PRB and/or project sponsors for their attention (note “internal” vs. “external” risks).

The following risk triggers, as contained in paragraph 6.4 above, shall prompt the immediate communication of risks to Management:

- Cost growth greater than 1% of the estimated project cost
- Schedule delays greater than 3 months
- Potential for significant damage to private or public property
- Potential for injury or loss of life
- Potential to generate media coverage (either positive or negative)
- Potential environmental degradation or release of deleterious substances
- Potential to alter political or stakeholder support

6.7 Risk Documentation and Closeout

When the project reaches the closeout phase, the PM and the PDT will document the final results of the execution of the Risk Management Plan for inclusion in the final project records and the District and/or Enterprise Lessons Learned database. At a minimum, this information will include risk assessment documents (including the risk register), risk-handling plans (including the project watch list), contract deliverables, if appropriate, and any other risk-related reports.

US Army Corps
of Engineers®
Walla Walla District

Central and Southern Florida Comprehensive Everglades Restoration Program - Central Everglades Planning Project

P2 Project Number 370939

Project Cost and Schedule Risk Analysis Report

Prepared in partnership between:

U.S. Army Corps of Engineers,
Jacksonville District

and

U.S. Army Corps of Engineers,
Cost Engineering Technical Center of Expertise for Civil Works (TCX)

Walla Walla District

25 Feb 2014

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EXECUTIVE SUMMARY

Through a partnership between the U.S. Army Corps of Engineers (USACE), Jacksonville District, and the USACE, Cost Engineering TCX, this report presents a recommendation for the total project cost and schedule contingencies for the Central Everglades Planning Project, Florida. In compliance with Engineer Regulation (ER) 1110-2-1302, Civil Works Cost Engineering, dated 15 September 2008, a formal risk analysis study was conducted for the development of contingency on the total project cost. The purpose of this risk analysis study was to establish project contingencies by identifying and measuring the cost and schedule impact of project uncertainties with respect to the estimated total project cost.

Specific to the Central Everglades Planning Project, the most likely total of First Costs cost is estimated at $1,900,269,000. Based on the results of the analysis, the USACE Cost Engineering TCX recommends a contingency value of $570,756,000 for construction or 44 percent.

The Cost Engineering TCX performed risk analysis using the *Monte Carlo* technique, producing the aforementioned contingencies and identifying key risk drivers.

The following Table ES-1 portrays the development of contingencies for the project. The contingency is based on an 80 percent confidence level, as per USACE Civil Works guidance.

Table ES-1 portrays the full costs of the recommended alternative based on the anticipated acquisition approach. The costs are intended to address the congressional request of estimates to implement the project. The contingency is based on an 80 percent confidence level, as per accepted USACE Civil Works guidance. Note that there is approximately $32M in Real Estate costs for lands already acquired with Federal funds that are included in the 01 account.

Table ES-1. Total Project Cost Summary

Notes:
1) Costs include all contingencies and escalation, supported by a risk analysis
2) Costs exclude O&M and Life Cycle Cost estimates

Total Project Cost Summary

Project: **Central Everglades Planning Project - P2 # 370939**
Location: Central and Southern Flordia
District: SAJ -Jacksonville District
POC: Tracy Leeser

Report Type: **LPP**
Contingency Development: Crystal Ball
CWCCIS Issue: **9/1/2013**

Authority: **CG**
TPCS Preparation Date: 25-Feb-14
Program Year: 2014

Scope Synopsis: The recommended plan will provide approximately 200,000 ac-ft per year of additional water flow to the Everglades by redirecting through the EAA water which is currently being discharged to tide via the St. Lucie and Caloosahatchee Estuaries and providing FEB storage to attenuate flow rates, prior to water quality treatment using available, off-peak capacity of the state-operated STA-2 and STA-3/4. Following water quality treatment, this additional flow quantity will be re-distributed as inflows to WCA 2A and WCA 3A, and the recommended plan features will modify the quantity, quality, timing, and spatial distribution of flows into and through WCA 3A, WCA 3B, and ENP to Florida Bay in order to meet the project objectives. This plan would be accomplished by a combination of modifications to the existing Central and South Florida project components, construction of additional components, and modifications to current approved water control manuals. Several proposed or existing levees, canals, and culverts, and pump stations would be constructed, modified, or removed to improve the flow of water through the system.

WBS		ESTIMATED COST				PROJECT FIRST COST *CONSTANT DOLLAR BASIS*				TOTAL PROJECT COST (FULLY FUNDED)			
	Civil Works	Risk Based				Program Price Level Date:			2014-1Q				
WBS	Feature Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	INFLATED (%)	COST ($K)	CNTG ($K)	TOTAL ($K)
06	FISH & WILDLIFE FACILITIES	72,516	31,907	44%	104,423	1%	73,429	32,309	105,738	42%	104,076	45,793	149,869
09	CHANNELS & CANALS	252,726	111,199	44%	363,925	2%	257,235	113,183	370,418	40%	359,257	158,073	517,330
11	LEVEES & FLOODWALLS	273,504	120,342	44%	393,846	1%	277,277	122,002	399,279	55%	430,461	189,403	619,864
13	PUMPING PLANT	91,808	40,396	44%	132,204	1%	92,624	40,754	133,378	28%	118,678	52,218	170,896
14	RECREATION FACILITIES	4,440	1,954	44%	6,394	1%	4,479	1,971	6,450	37%	6,158	2,710	8,868
15	FLOODWAY CONTROL & DIVERSION STRUC	234,173	103,036	44%	337,209	1%	237,122	104,334	341,455	29%	306,864	135,020	441,884
18	CULTURAL RESOURCE PRESERVATION	18,065	7,949	44%	26,014	1%	18,226	8,019	26,245	42%	25,832	11,366	37,198
	S/T	947,232	416,782	44%	1,364,014	1%	960,392	422,572	1,382,965	41%	1,351,327	594,584	1,945,910
01	LANDS AND DAMAGES	35,328	1,314	4%	36,642		35,328	1,314	36,642	4%	36,842	1,980	38,822
	S/T	35,328	1,314	4%	36,642		35,328	1,314	36,642	4%	36,842	1,980	38,822
30	PLANNING ENGINEERING AND DESIGN	235,579	103,655	44%	339,234	2%	239,706	105,471	345,177	113%	511,128	224,896	736,024
	S/T	235,579	103,655	44%	339,234	2%	239,706	105,471	345,177	113%	511,128	224,896	736,024
31	CONSTRUCTION MANAGEMENT	91,845	40,412	44%	132,257	2%	93,454	41,120	134,574	140%	224,324	98,703	323,027
	S/T	91,845	40,412	44%	132,257	2%	93,454	41,120	134,574	140%	224,324	98,703	323,027
32	HTRW	625	275	44%	900	1%	633	278	911	42%	897	395	1,292
	S/T	625	275	44%	900	1%	633	278	911	42%	897	395	1,292
	Totals	1,310,609	562,438	43%	1,873,047	1%	1,329,513	570,756	1,900,269	60%	2,124,517	920,558	3,045,075

Project: *Central Everglades Planning Project - P2 # 370939* 25-Feb-14

KEY FINDINGS/OBSERVATIONS RECOMMENDATIONS

There are several risks in this project that are beyond the team's ability to assess and identify that cannot be modeled effectively. The complexity of the numerous overlapping projects in the project area and their range of outcomes could result in a complete reformulation of the project based on their results, any changing legal interpretations, and or unforeseen environmental effects of these other projects. These risks are noted to carry in the project risk register for monitoring, but not specifically modeled as their impact could result in a major reformulation of the project.

The key risk drivers well as potential for key cost risk drivers identified through sensitivity analysis are P-PPM-4 Funding Profile, EST-12 Estimate Assumptions/Design of Structures, NR-TL-4 FEB spreader canal length, and SR-TL-7 S-8 Pump station design. Other significant risks are FEB rock porosity and Fuel Costs.

-Discussions:

It should be noted that the Crystal Ball Sensitivity model displays items with the largest potential range of costs as being the most sensitive. However depending on the model construction these items with large ranges may not have as large of contribution to the actual contingency as items with much smaller ranges.

P-PPM-4- Funding Profile- The base funding is on a constant dollar $100M/year expenditure schedule. The project was scheduled in an optimum order to maintain flood control and minimize the requirement of offsite borrow. Changing the funding levels can impact the cost and schedule duration significantly due to changes in the number of contracts, administration costs, borrow/fill balance, and unforeseen intermediate work between project stages.

EST-12 Estimate Assumptions/Design of Like Similar Structures- The estimate utilizes a corollary approach to utilize recently constructed similar features in the area to determine the scope and quantities for the proposed features. As the structures are designed as the project moves forward, the scope and sizing could vary significantly from the assumed structure resulting in cost changes.

NR-TL-4 FEB Spreader Canal Length- The final size and length of the spreader canal could range in cost over 100M depending on the final dimensions. This may not be known until further investigations are conducted specifically in this area, and may be subject to changes due to

S-8 Pump Station Design- The need to update or replace the flood control pump station at S-8 is unclear at this time. The station could require simple modifications to a complete replacement. This uncertainty could cause a $100M increase in the project cost if a new station and associated canals is required.

The key schedule risk driver identified through sensitivity analysis is the Project and Program MGMT Risk P-PPM-4 (Funding Profile), which contributes 58% percent of the statistical schedule variance. Other significant schedule risks include the project size requiring multiple overlapping projects, the risk of getting an approved project report and the corresponding start of the Preconstruction, Engineering, and Design Phase (PED), as well as technical risks regarding the physical construction feature size, cost, and construction duration, I.e. the FEB spreader canal length and the overall design assumptions in the cost estimate.

-Discussions:

P-PPM-4 The base funding is on a $100M/year construction schedule for the assumed project schedule. Changing the annual level of funding amount will change the duration significantly from what is assumed. This could change the assumption in construction order and required a different work approach in some phases of the construction.

The other remaining schedule risks can directly impact the project cost causing the construction to run longer due to the $100m annual cap assumed as well as physically extending the construction duration due to increased quantities.

Recommendations, as detailed within the main report, include the development of an integrated Risk Management Plan, management of design and construction within established contingency ranges as well as and further iterative study of risks throughout the project life cycle to include; potential mitigation throughout the planning, engineering, and design phase; and proactive monitoring and control of risk identified in this study.

1.0 PURPOSE

Through a partnership between the U.S. Army Corps of Engineers (USACE), Jacksonville District, and the USACE, Cost Engineering TCX, this report presents a recommendation for the total project cost and schedule contingencies for the Central Everglades Planning Project, Florida.

2.0 BACKGROUND

The recommended plan will provide approximately 200,000 ac-ft per year of additional water flow to the Everglades by redirecting through the EAA water which is currently being discharged to tide via the St. Lucie and Caloosahatchee Estuaries and providing FEB storage to attenuate flow rates, prior to water quality treatment using available, off-peak capacity of the state-operated STA-2 and STA-3/4. Following water quality treatment, this additional flow quantity will be re-distributed as inflows to WCA 2A and WCA 3A, and the recommended plan features will modify the quantity, quality, timing, and spatial distribution of flows into and through WCA 3A, WCA 3B, and ENP to Florida Bay in order to meet the project objectives. This plan would be accomplished by a combination of modifications to the existing Central and South Florida project components, construction of additional components, and modifications to current approved water control manuals. Several proposed or existing levees, canals, and culverts, and pump stations would be constructed, modified, or removed to improve the flow of water through the system.

As a part of this effort, Jacksonville District requested the USACE Cost Engineering Directory of Expertise for Civil Works (Cost Engineering TCX) to develop the cost estimate and schedule for the recommended project plan. This task also included performing a cost and schedule risk analysis to identify the amount of contingency that must be added to the cost estimate to reduce the uncertainty to an acceptable level to ensure that reasonable costs can be developed for the identified project features.

3.0 REPORT SCOPE

The scope of the project cost and schedule risk analysis report is to calculate and present the cost and schedule contingencies at the 80 percent confidence level using the risk analysis processes, as mandated by U.S. Army Corps of Engineers (USACE) Engineer Regulation (ER) 1110-2-1150, Engineering and Design for Civil Works, ER 1110-2-1302, Civil Works Cost Engineering, and Engineer Technical Letter (ETL) 1110-2-573, Construction Cost Estimating Guide for Civil Works. The report presents the contingency results for cost and schedule risks for all project features, but does not include consideration for life cycle costs. The formal process included extensive involvement of the PDT for risk identification and development of the risk register. The analysis process evaluated the most likely Micro Computer Aided Cost Estimating System (MCACES) cost estimate, schedule, and funding profiles using Crystal Ball software to conduct a *Monte Carlo* simulation and statistical sensitivity analysis, per the guidance in ETL 1110-2-573.

The project technical scope was developed by the Jacksonville District, the estimates, and schedules were developed and presented by the Walla Walla District. These documents serve as the basis for the risk analysis.

The scope of this study addresses the identification of problems, needs, opportunities, and potential solutions that are viable from an economic, environmental, and engineering viewpoint.

3.1 Project Scope

Features in the EAA (North of the Redline) include construction of the 14,000 acre A-2 FEB (L-624 perimeter levee and L-625 interior levee; C-624, C-624E, C-626 internal distribution channels; S-623, S-624, S-628 inlet structures; S-625 outlet structures, and C-625E, C-625W canals and channels connecting the FEB to the Miami Canal). Operation of the A-2 FEB would be integrated with the operation of the A-1 FEB, a state-funded and state-constructed FEB.

Conveyance features in WCA 2A and northern WCA 3A (South of the Redline) include: S-620 a gated culvert to deliver water from the L-6 Canal to the remnant L-5 Canal, S-622 a new gated spillway to deliver water from the remnant L-5 canal to the western L-5 canal (during L-6 diversion operations), S-621 a new gated spillway to deliver water from STA 3/4 to the S-7 pump station during peak discharge events (eastern flow route is not typically used during normal operations, including L-6 diversion operations, enlarge approximately 13.6 miles of the L-5 Canal, degrade approximately 2.9 miles of the southern L-4 Levee along the northwest boundary of WCA-3A, S-630 a 360 cfs pump station to maintain Seminole Tribe water supply deliveries west of the L-4 Canal, S-8A new gated culverts to deliver water from the Miami Canal (downstream of S-8, which pulls water from the L-5 Canal) to the L-4 Canal, and backfill approximately 13.5 miles of the Miami Canal and include upland mounds between a point approximately 1.5 miles south of the S-8 pump station and Interstate Highway I-75.

Additional conveyance features that would be located in southern WCA 3A, WCA 3B, and the northern edge of ENP (Blue Green line) include: S-333N a 1,150 cfs gated spillway adjacent to S-333, S-631 a 500 cfs gated culvert in L-67A Levee and an associated 6,000 foot gap in the L-67C Levee, a flowway through the western end of WCA 3B (S-632 and S-633 2 gated culverts in L-67A Levee, removal of approximately 8 miles of L-67C Levee, removal of approximately 4.3 miles of L-29 Levee, construct L-67D a new approximately 8.5 mile levee), S-355W a gated spillway in the L-29 Canal to maintain water deliveries in the L-29 Canal to the eastern Modified Water Deliveries (MWD) 1-mile bridge and maintain western access to the L-29 Levee, remove approximately 5.5 miles of the L-67 Extension Levee, and remove approximately 6 miles of Old Tamiami Trail between the Everglades National Park (ENP) Tram Road and the L-67 Extension Levee. Work in this area also includes removal of spoil along the western L-67A canal in the vicinity of the new control structures and removal of vegetation along WCA-3B agricultural ditches.

Features primarily for seepage management (Yellowline), which are required to mitigate for increased seepage resultant from the Blue Green line features include: S-356 a new 1,000 cfs pump station to replace the existing temporary S-356 pump station and a ~4.2 mile long, 35 feet deep tapering seepage barrier cutoff wall along the L-31N Levee just south of Tamiami Trail.

To address quality, quantity, timing and distribution of the water through the CEPP project various types of infrastructure were considered during the formulation process such as: Stormwater Treatment Areas (STAs), a Flow Equalization Basin (FEB), deep storage reservoir, spreader canals, pumps, canal backfilling and canal plugs, levee removal and levee gaps, culverts/gated structures, seepage barrier walls, seepage control pumps, hydraulic ridge detention areas, and step down levees.

3.2 USACE Risk Analysis Process

The risk analysis process for this study follows the USACE Headquarters requirements, as well as the guidance provided by the Cost Engineering TCX. The risk analysis process reflected within this report uses probabilistic cost and schedule risk analysis methods within the framework of the Crystal Ball software. Furthermore, the scope of the report includes the identification and communication of important steps, logic, key assumptions, limitations, and decisions to help ensure that risk analysis results can be appropriately interpreted.

Risk analysis results are also intended to provide project leadership with contingency information for scheduling, budgeting, and project control purposes, as well as to provide tools to support decision making and risk management as the project progresses through planning and implementation. To fully recognize its benefits, cost and schedule risk analysis should be considered as an ongoing process conducted concurrent to, and iteratively with, other important project processes such as scope and execution plan development, resource planning, procurement planning, cost estimating, budgeting, and scheduling.

In addition to broadly defined risk analysis standards and recommended practices, this risk analysis was performed to meet the requirements and recommendations of the following documents and sources:

- Cost and Schedule Risk Analysis Guidance prepared by USACE Cost Engineering TCX.

- ER 1110-2-1302, Civil Works Cost Engineering, dated 15 September 2008.

- ETL 1110-2-573, Construction Cost Estimating Guide for Civil Works, dated 30 September 2008.

4.0 METHODOLOGY / PROCESS

The Cost Engineering TCX assembled a team consisting of one senior civil cost engineer with support from other cost engineers from Walla Walla and staff from Jacksonville District to further augment labor, expertise, and information gathering. The Jacksonville staff included cost support from a cost engineering team, as well as coordination support from project management and the assigned PDT.

The Cost Engineering TCX cost engineer facilitated a risk identification and qualitative analysis meeting onsite with Jacksonville District from 4 - 8 February 2013. The initial risk identification meeting also included qualitative analysis to produce a risk register that served as the framework for the risk analysis. Subsequent additions and revisions to the risk register occurred between 18 – 19 April 2013 due to changing project assumptions and conditions. The risk register was sent for review and comments from the PDT and sponsor were incorporated at each revision.

Following multiple iterations of revision and refinement of the baseline estimate the Cost Engineering TCX conducted quantitative analyses for cost and schedule risks. The cost and schedule risk models were completed and results were reported initially on 3 July 2013. Based on Agency Technical Review (ATR) of the technical and cost documents, the risk analysis was revised at each iteration based on comments and revisions to the cost estimate.

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

In simple terms, contingency is an amount added to an estimate to allow for items, conditions, or events for which the occurrence or impact is uncertain and that experience suggests will likely result in additional costs being incurred or additional time being required. The amount of contingency included in project control plans depends, at least in part, on the project leadership’s willingness to accept risk of project overruns. The less risk that project leadership is willing to accept the more contingency should be applied in the project control plans. The risk of overrun is expressed, in a probabilistic context, using confidence levels.

The Cost Engineering TCX guidance for cost and schedule risk analysis generally focuses on the 80 percent level of confidence (P80) for cost contingency calculation. It should be noted that use of P80 as a decision criteria is a risk averse approach (whereas the use of P50 would be a risk neutral approach, and use of levels less than 50 percent would be risk seeking). Thus, a P80 confidence level results in greater contingency as compared to a P50 confidence level. The selection of contingency at a particular confidence level is ultimately the decision and responsibility of the project’s district and/or division management.

The risk analysis process uses *Monte Carlo* techniques to determine probabilities and contingency. The *Monte Carlo* techniques are facilitated computationally by a commercially available risk analysis software package (i.e., Crystal Ball) that is an add-in to Microsoft Excel. Cost estimates are packaged into an Excel format and used directly for cost risk analysis purposes. The level of detail recreated in the Excel-format schedule is sufficient for risk analysis purposes that reflect the established risk register but generally less than that of the native format.

The primary steps, in functional terms, of the risk analysis process are described in the following subsections. Risk analysis results are provided in section 6.0.

4.1 Identify and Assess Risk Factors

Identifying the risk factors via the PDT is considered a qualitative process that results in establishing a risk register that serves as the document for the quantitative study using the Crystal Ball risk software. Risk factors are events and conditions that may influence or drive uncertainty in project performance. They may be inherent characteristics or conditions of the project or external influences, events, or conditions such as weather or economic conditions. Risk factors may have either favorable or unfavorable impacts on project cost and schedule.

Checklists or historical databases of common risk factors are sometimes used to facilitate risk factor identification. However, key risk factors are often unique to a project and not readily derivable from historical information. Therefore, input from the entire PDT is obtained using creative processes such as brainstorming or other facilitated risk assessment meetings. In practice, a combination of professional judgment from the PDT and empirical data from similar projects is desirable and is considered.

Formal PDT meetings are held for the purposes of identifying and assessing risk factors. The meetings should include capable and qualified representatives from multiple project team disciplines and functions, for example:

- Project/Program managers
- Contracting/acquisition
- Real Estate
- Relocations
- Environmental
- Civil and Coastal Design
- Cost and schedule engineers
- Construction
- Key Sponsors

The initial formal meetings should focus primarily on risk factor identification using brainstorming techniques, but also include some facilitated discussions based on risk factors common to projects of similar scope and geographic location. Subsequent meetings should focus primarily on risk factor assessment and quantification.

Additionally, numerous conference calls and informal meetings are conducted throughout the risk analysis process on an as-needed basis to further facilitate risk factor identification, market analysis, and risk assessment.

4.2 Quantify Risk Factor Impacts

The quantitative impacts of risk factors on project plans were analyzed using a combination of professional judgment, empirical data, and analytical techniques. Risk factor impacts were quantified using probability distributions (density functions), because risk factors are entered into the Crystal Ball software in the form of probability density functions.

Similar to the identification and assessment process, risk factor quantification involved multiple project team disciplines and functions. However, the quantification process relied more extensively on collaboration between cost engineering and risk analysis team members with lesser inputs from other functions and disciplines. This process used an iterative approach to estimate the following elements of each risk factor:

- Maximum possible value for the risk factor
- Minimum possible value for the risk factor
- Most likely value (the statistical mode), if applicable
- Nature of the probability density function used to approximate risk factor uncertainty
- Mathematical correlations between risk factors
- Affected cost estimate and schedule elements

The resulting product from the PDT discussions is captured within a risk register as presented in Section 6 for both cost and schedule risk concerns. Note that the risk register records the PDT's risk concerns, discussions related to those concerns, and potential impacts to the current cost and schedule estimates. The concerns and discussions are meant to support the team's decisions related to event likelihood, impact, and the resulting risk levels for each risk event.

4.3 Analyze Cost Estimate and Schedule Contingency

Contingency is analyzed using the Crystal Ball software, an add-in to the Microsoft Excel format of the cost estimate and schedule. *Monte Carlo* simulations are performed by applying the risk factors (quantified as probability density functions) to the appropriate estimated cost and schedule elements identified by the PDT. Contingencies are calculated by applying only the moderate and high level risks identified for each option (i.e., low-level risks are typically not considered, but remain within the risk register to serve historical purposes, as well as support follow-on risk studies as the project and risks evolve).

For the cost estimate, the contingency is calculated as the difference between the P80 cost forecast and the baseline cost estimate. Each option-specific contingency is then allocated on a civil works feature level based on the dollar-weighted relative risk of each feature as quantified by *Monte Carlo* simulation. Standard deviation is used as the feature-specific measure of risk for contingency allocation purposes. This approach results in a relatively larger portion of all the project feature cost contingency being allocated to features with relatively higher estimated cost uncertainty.

5.0 PROJECT ASSUMPTIONS

The following data sources and assumptions were used in quantifying the costs associated with the with- and without-project conditions.

a. The MII MCACES (Micro-Computer Aided Cost Estimating Software) file "CEPP Master July 31 Updates v 4-2" was the basis for the cost and schedule risk analyses. The schedule was developed based on the durations of construction form the MII file durations developed in MS project and a funding limited schedule developed.

b. The cost comparisons and risk analyses performed and reflected within this report are based on early planning level design including like similar structures for scope to develop the estimates.

c. Per the EM 1110-2-1304, Civil Works Construction Cost Index System, historical state adjustment factor, for Florida is 0.93, meaning that this project is not as susceptible to differential between the local market and Office of Management and Budget inflation factors for future construction.

d. The Cost TCX guidance generally focuses on the 80 percent level of confidence (P80) for cost contingency calculation. For this risk analysis, P80 was used. It should be noted that the use of P80 as a decision criteria is a moderate risk adverse approach, generally resulting in higher cost contingencies. However, the P80 level of confidence also assumes a small degree of risk that the recommended contingencies may be inadequate to capture actual project costs.

e. Only high and moderate risk level impacts, as identified in the risk register, were considered for the purposes of calculating cost contingency. Low-level risk impacts were only studied in the case of a schedule impact affecting the cost, although all low impact risks should be maintained in project management documentation and reviewed at each project milestone to determine if they should be placed on the risk "watch list" for further monitoring and evaluation.

6.0 RESULTS

The cost and schedule risk analysis results are provided in the following sections. In addition to contingency calculation results, sensitivity analyses are presented to provide decision makers with an understanding of variability and the key contributors to the cause of this variability.

6.1 Risk Register

A risk register is a tool commonly used in project planning and risk analysis. The actual risk register is provided in Appendix A. The complete risk register includes low-level risks, as well as additional information regarding the nature and impacts of each risk.

It is important to note that a risk register can be an effective tool for managing identified risks throughout the project life cycle. As such, it is generally recommended that risk registers be updated as the designs, cost estimates, and schedule are further refined, especially on large projects with extended schedules. Recommended uses of the risk register going forward include:

- Documenting risk mitigation strategies being pursued in response to the identified risks and their assessment in terms of probability and impact.
- Providing project sponsors, stakeholders, and leadership/management with a documented framework from which risk status can be reported in the context of project controls.
- Communicating risk management issues.
- Providing a mechanism for eliciting feedback and project control input.
- Identifying risk transfer, elimination, or mitigation actions required for implementation of risk management plans.

6.2 Cost Contingency and Sensitivity Analysis

Table 1 provides the construction cost contingencies calculated for the P80 confidence level. The construction cost contingencies for the P50 and P100 confidence levels are also provided for illustrative purposes only.

Contingency was quantified as approximately $422 Million at the P80 confidence level (44 percent of the baseline cost estimate). For comparison, the cost contingency at the P50 and P100 confidence levels was quantified as 33 percent and 78 percent of the baseline cost estimate, respectively.

Table 1. Estimate Cost Contingency Summary

Risk Analysis Forecast	Baseline Estimate (excluding 30/31 accounts)	Total Contingency[1,2] ($)	Total Contingency (%)
50% Confidence Level			
Project Cost	$961,252,700	$317,213,391	33%
80% Confidence Level			
Project Cost	$961,252,700	$422,951,188	44%
100% Confidence Level			
Project Cost	$961,252,700	$749,777,106	78%

Notes:
1) These figures combine uncertainty in the baseline cost estimates and schedule.
2) A P100 confidence level is an abstract concept for illustration only, as the nature of risk and uncertainty (specifically the presence of “unknown unknowns”) makes 100% confidence a theoretical impossibility.

6.2.1 Sensitivity Analysis

Sensitivity analysis generally ranks the relative impact of each risk/opportunity as a percentage of total cost uncertainty. The Crystal Ball software uses a statistical measure (contribution to variance) that approximates the impact of each risk/opportunity contributing to variability of cost outcomes during *Monte Carlo* simulation. It should be noted that the Crystal Ball Sensitivity model displays items with the largest potential range of costs generally as being the most sensitive. However depending on the model construction these items with large ranges may not have as large of contribution to the actual contingency as items with much smaller ranges.

Analysis of the key cost drivers identified in the sensitivity analysis can be used to support development of a risk management plan that will facilitate control of risk factors and their potential impacts throughout the project life cycle. Together with the risk register, sensitivity analysis results can also be used to support development of strategies to eliminate, mitigate, accept, or transfer key risks.

6.2.2 Sensitivity Analysis Results

The risks/opportunities considered as key or primary cost drivers are ranked in order of importance in contribution to variance bar charts. Opportunities that have a potential to reduce project cost are shown with a negative sign; risks are shown with a positive sign to reflect the potential to increase project cost. A longer bar in the sensitivity analysis chart represents a greater potential impact to total project cost.

Figure 1 presents a sensitivity analysis for cost growth risk from the high level cost risks identified in the risk register. Likewise, Figure 2 presents a sensitivity analysis for schedule growth risk from the high level schedule risks identified in the risk register.

6.3 Schedule and Contingency Risk Analysis

Table 2 provides the schedule duration contingencies calculated for the P80 confidence level. The schedule duration contingencies for the P50 and P100 confidence levels are also provided for illustrative purposes.

Schedule duration contingency was quantified as 89 months based on the P80 level of confidence. The schedule contingencies were calculated by applying the high level schedule risks identified in the risk register for each option to the durations of critical path and near critical path tasks.

Table 2. Schedule Duration Contingency Summary

Risk Analysis Forecast	Baseline Schedule Duration (months)	Contingency[1] (months)	Contingency (%)
50% Confidence Level			
Total Project Duration	329	63	19%
80% Confidence Level			
Total Project Duration	329	89	27%
100% Confidence Level			
Total Project Duration	329	162	49%

Notes:
1) A PERT type analysis was not completed on the schedule. The schedule was not resource loaded but was balanced between construction duration and annual funds availability. These issues should be considered as limitations in the utility of the schedule contingency data presented in Table 3.
2) A P100 confidence level is an abstract concept for illustration only, as the nature of risk and uncertainty (specifically the presence of "unknown unknowns") makes 100% confidence a theoretical impossibility.

Figure 1. Cost Sensitivity Analysis

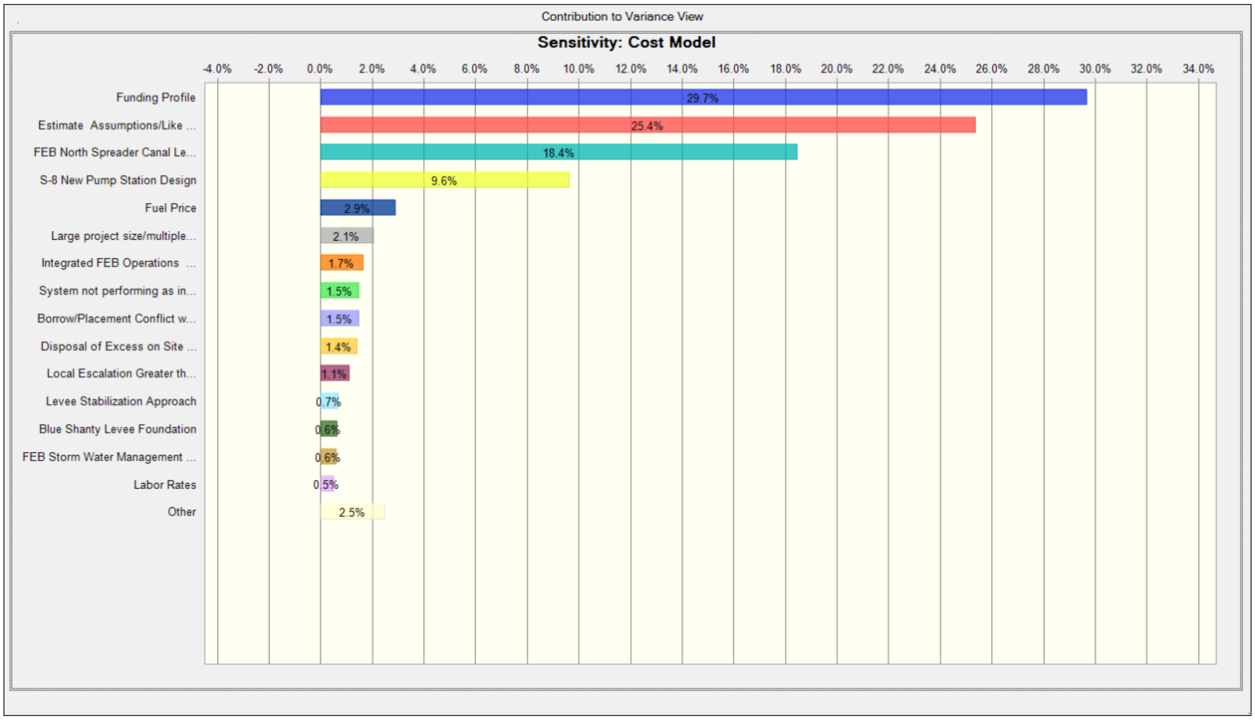
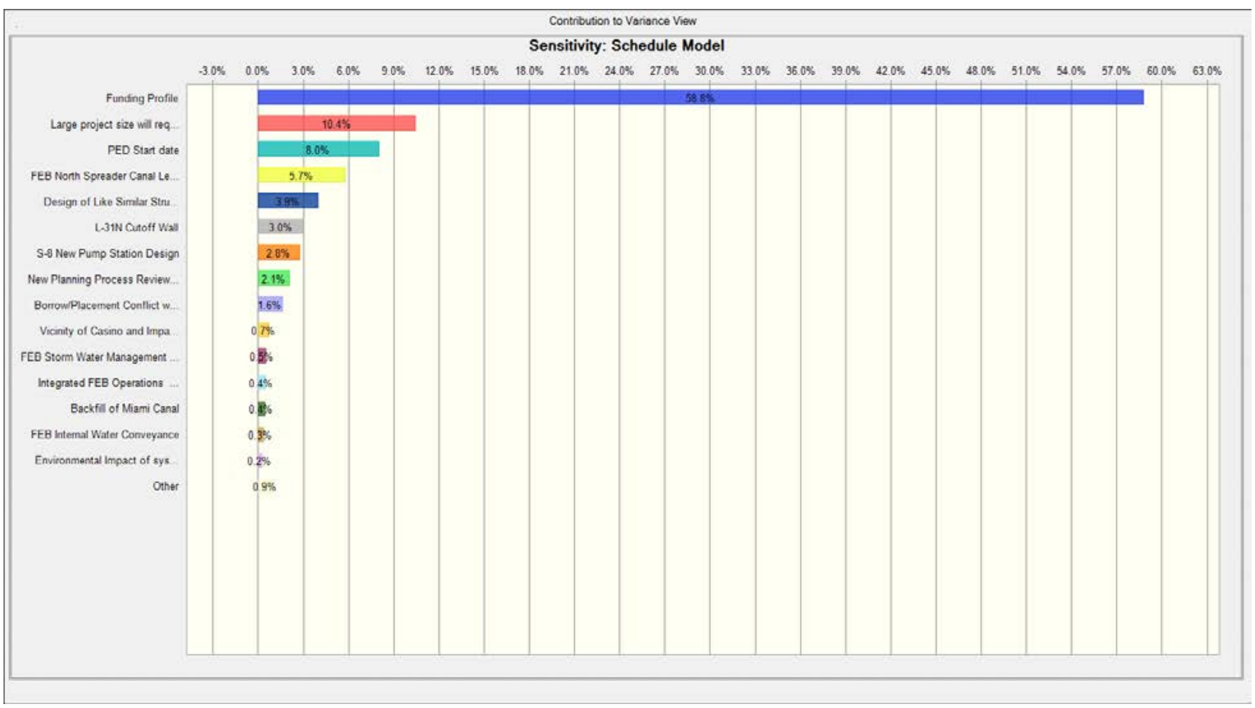


Figure 2. Schedule Sensitivity Analysis



7.0 MAJOR FINDINGS/OBSERVATIONS/RECOMMENDATIONS

This section provides a summary of significant risk analysis results that are identified in the preceding sections of the report. Risk analysis results are intended to provide project leadership with contingency information for scheduling, budgeting, and project control purposes, as well as to provide tools to support decision making and risk management as projects progress through planning and implementation. Because of the potential for use of risk analysis results for such diverse purposes, this section also reiterates and highlights important steps, logic, key assumptions, limitations, and decisions to help ensure that the risk analysis results are appropriately interpreted.

7.1 Major Findings/Observations

Total project cost comparison summaries are provided in Table 3 and Figure 3. Project duration summaries are provided in Figure 4. Operation and maintenance activities were not included in the cost estimate or schedules. Therefore, a full life-cycle risk analysis was not performed. Risk analysis results or conclusions could be significantly different if the necessary operation and maintenance activities were included.

Major findings and observations of the risk analysis are listed below.

7.1.1 COST RISK

There are several risks in this project that are beyond the team's ability to assess and identify that cannot be modeled effectively. The complexity of the numerous overlapping projects in the project area and their range of outcomes could result in a complete reformulation of the project based on their results, changing legal interpretations, and or unforeseen environmental effects from these other projects. These risks are noted to carry on the in the project risk register/ risk management plan for monitoring, but not specifically modeled. Changes in the project as a resultant of these risks should be carefully monitored to ensure the project can be successfully completed within authorized cost limits.

The key cost risk drivers identified through sensitivity analysis are P-PPM-4 Funding Profile, NR-TL-4 FEB spreader canal length, EST-12 Design of like Similar Structures, and SR-TL-7 S-8 Pump station design. Other significant risks are Fuel Cost and Borrow/Placement Conflict with Multiple Contracts.

P-PPM-4 Funding Profile - The base funding is on a $100M/year construction schedule. Changing the funding amount can change the duration significantly and cause the cost to vary due to changes in the number of contracts, administration costs, borrow/fill balance changes, and intermediate work between project stages to maintain flood control or prevent other loss and damage.

NR-TL-4 FEB Spreader Canal Length - The final size and length of the spreader canal could range in cost over 100M depending on the final dimensions. This may not be known until further investigations are conducted specifically in this area.

EST-12 Design of Like Similar Structures - The estimate utilizes a corollary approach to utilize recently constructed similar features in the area to determine the scope and quantities for the proposed features. As the structures are designed as the project moves forward, the scope and sizing could vary from the assumed structure resulting in different costs to execute. With respect to Estimate Development (Estimate and Schedule Risks EST-12), Cost TCX believes this risk will decline during planning, engineering, and design as detailed descriptions of work are developed and refined.

SR-TL-7 S-8 New Pump Station Design - The design of upgrade is unknown at this time. The pump station at a minimum is in need of upgrades to ensure that it will operate in the new system as intended. If not suitable, the station could require a complete replacement as well as a reconfiguration of the canals for intake and discharge. This could cause nearly a $100M impact to the project cost.

Fuel Prices - Fuel prices are ever fluctuating and could have a major impact on the costs. Cost TCX recommends continuing to monitor this risk and update fuel prices and impacts as the project moves forward.

Borrow/Placement Conflict with Multiple Contracts - The Cost TCX believes that this risk will be further understood after investigations of the material required for the backfill of the Miami Canal and the material available from the enlargement of the L-5 canal is better understood. It is also believed that a further developed acquisition plan could allow for a refinement of the estimate and this risk.

7.1.2 Schedule Risk

The key schedule risk driver identified through sensitivity analysis is the Project and Program MGMT Risk P-PPM-4 (Funding Profile), which contributes 92 percent of the statistical schedule variance and causing most of the schedule variation impacts.

P-PPM-4 Funding Profile - The base funding is on a constant $100M/year construction schedule for the assumed project schedule. Changing the annual level of funding amount could change the duration significantly from what is assumed. This could result in a change in the construction order and require a different work approach in some phases of the construction. The Cost TCX recommends management further refine the anticipated annual contributions from both USACE and the local sponsor.

Secondary schedule risk drivers are PED Start date (P-PPM-3) and Large Project Size will Require Multiple Contracts (P-CA-1).

PED Start date – The start of the project is highly dependent on the passing of legislation to specifically authorize the project as well as the success of the current accelerated planning process. Additional design, reviews, and or reformulation prior to the completion to the project Feasibility report could be required delaying the start of the project.

Large Project will Require Multiple Contracts – This is a large and complex project. Though considerable effort was expended to develop a logical sequence and breakout of the construction, there most likely will be some issues with coordination and overlap of multiple successive contracts. The Cost TCX recommends early involvement of contracting as well as close coordination of the Construction Division to ensure that each project can move forward in a timely manner with minimal impacts to the overall schedule.

Table 3. MCACES Estimate Cost Confidence Summary

Contingency Analysis

MCACES Estimate	**$961,252,700***		
Confidence Level	**Project Cost**	**Contingency**	**Contingency %**
0%	**$893,965,011**	**($67,287,689)**	**-7%**
5%	**$1,095,828,078**	**$134,575,378**	**14%**
10%	**$1,134,278,186**	**$173,025,486**	**18%**
15%	**$1,163,115,767**	**$201,863,067**	**21%**
20%	**$1,182,340,821**	**$221,088,121**	**23%**
25%	**$1,201,565,875**	**$240,313,175**	**25%**
30%	**$1,220,790,929**	**$259,538,229**	**27%**
35%	**$1,230,403,456**	**$269,150,756**	**28%**
40%	**$1,249,628,510**	**$288,375,810**	**30%**
45%	**$1,268,853,564**	**$307,600,864**	**32%**
50%	**$1,278,466,091**	**$317,213,391**	**33%**
55%	**$1,297,691,145**	**$336,438,445**	**35%**
60%	**$1,316,916,199**	**$355,663,499**	**37%**
65%	**$1,326,528,726**	**$365,276,026**	**38%**
70%	**$1,345,753,780**	**$384,501,080**	**40%**
75%	**$1,364,978,834**	**$403,726,134**	**42%**
80%	**$1,384,203,888**	**$422,951,188**	**44%**
85%	**$1,403,428,942**	**$442,176,242**	**46%**
90%	**$1,432,266,523**	**$471,013,823**	**49%**
95%	**$1,489,941,685**	**$528,688,985**	**55%**
100%	**$1,711,029,806**	**$749,777,106**	**78%**

*Includes future real estate costs of approx $3M, but excludes 30/31 account costs.

Figure 3. Project Cost Summary Curve

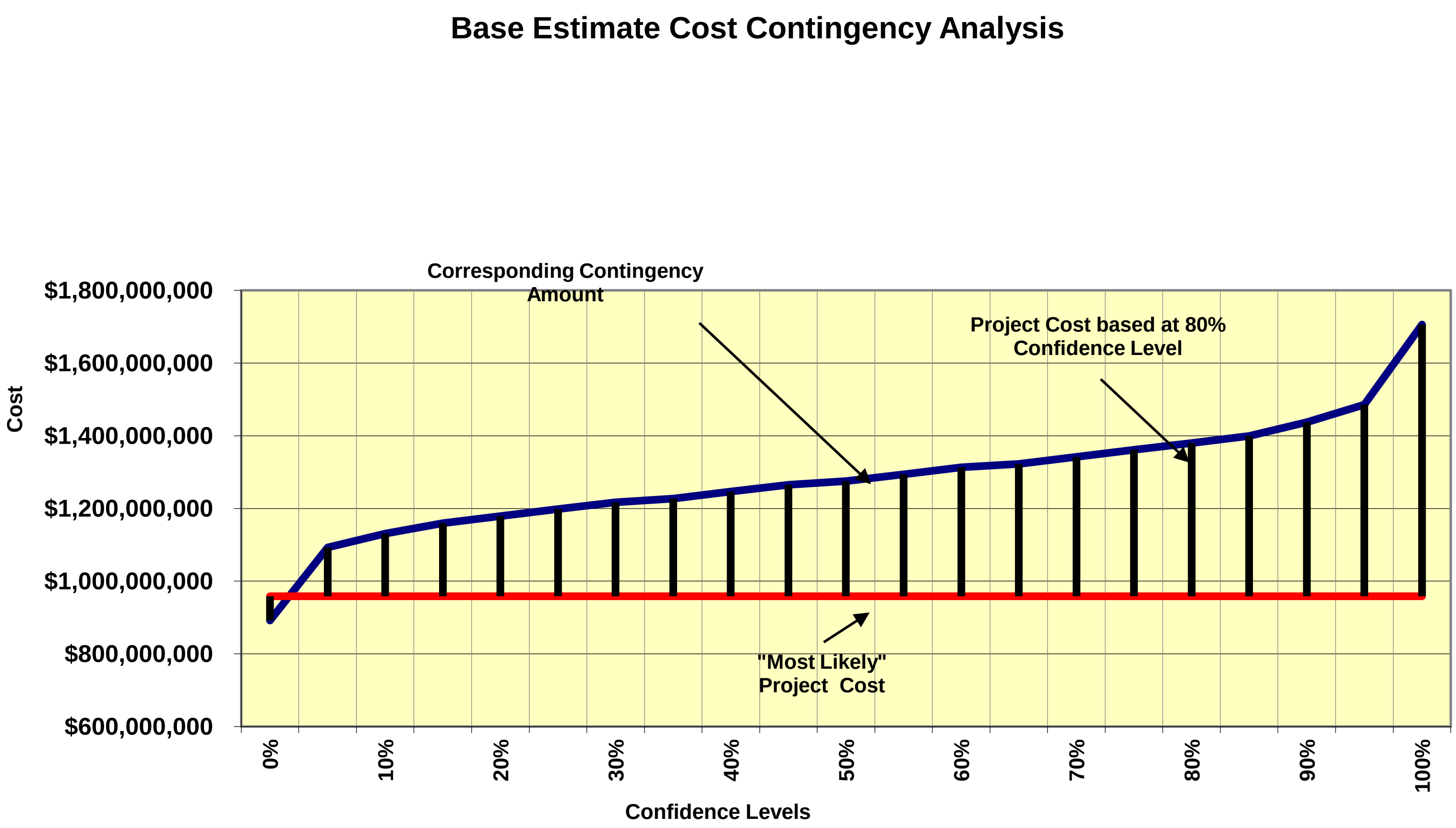


Figure 4. Project Duration Summary

Contingency Analysis

Most Likely Schedule Duration	329.0 Months		
Confidence Level	**Project Duration**	**Contingency**	**Contingency %**
0%	**309.0 Months**	**-20 Months**	**-6%**
5%	**349.0 Months**	**20 Months**	**6%**
10%	**359.0 Months**	**30 Months**	**9%**
15%	**362.0 Months**	**33 Months**	**10%**
20%	**369.0 Months**	**40 Months**	**12%**
25%	**372.0 Months**	**43 Months**	**13%**
30%	**379.0 Months**	**50 Months**	**15%**
35%	**382.0 Months**	**53 Months**	**16%**
40%	**385.0 Months**	**56 Months**	**17%**
45%	**389.0 Months**	**60 Months**	**18%**
50%	**392.0 Months**	**63 Months**	**19%**
55%	**395.0 Months**	**66 Months**	**20%**
60%	**399.0 Months**	**70 Months**	**21%**
65%	**402.0 Months**	**73 Months**	**22%**
70%	**408.0 Months**	**79 Months**	**24%**
75%	**412.0 Months**	**83 Months**	**25%**
80%	**418.0 Months**	**89 Months**	**27%**
85%	**422.0 Months**	**93 Months**	**28%**
90%	**431.0 Months**	**102 Months**	**31%**
95%	**441.0 Months**	**112 Months**	**34%**
100%	**491.0 Months**	**162 Months**	**49%**

* Base schedule based on $100M per year fixed funding

7.2 Recommendations

Risk Management is an all-encompassing, iterative, and life-cycle process of project management. The Project Management Institute's (PMI) *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, *4th edition*, states that "project risk management includes the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control on a project." Risk identification and analysis are processes within the knowledge area of risk management. Its outputs pertinent to this effort include the risk register, risk quantification (risk analysis model), contingency report, and the sensitivity analysis.

The intended use of these outputs is implementation by the project leadership with respect to risk responses (such as mitigation) and risk monitoring and control. In short, the effectiveness of the project risk management effort requires that the proactive management of risks not conclude with the study completed in this report.

Project leadership should review risk items identified in the original risk register and add others, as required, throughout the project life cycle. Risks should be reviewed for status and reevaluation (using qualitative measure, at a minimum) and placed on risk management watch lists if any risk's likelihood or impact significantly increases. Project leadership should also be mindful of the potential for secondary (new risks created specifically by the response to an original risk) and residual risks (risks that remain and must be managed).

Specifically for this project, the risks of changes to the project scope due to biological opinions, interdependency on the completion of other projects in the region, as well as the typical design evolution in the Preconstruction Engineering and Design Phase and Construction General Phase need to be carefully monitored and managed as the project progresses. Annual updating of project costs, schedule, and risk should be conducted in order to monitor changes that could adversely affect the project cost.

APPENDIX A

RISK REGISTER AND MODEL

Project Details

District:	SAJ
Project:	Central Everglades Planning Project (CEPP)
Study Phase:	Accelerated Smart Planning Process for feasability
Document Type:	Engineering Apendix From CEPP Draft PIR and EIS
Document Date:	March 2013 with updates through Dec 2013
Project Scope:	The study area for the Central Everglades Planning Project (CEPP) encompasses the Northern Estuaries (St. Lucie River and Indian River Lagoon and the Caloosahatchee River and Estuary), Lake Okeechobee, a portion of the EAA, the Water Conservation Areas (WCAs), Everglades National Park (ENP), the Southern Estuaries (Florida Bay and Biscayne Bay), and the Lower East Coast. The purpose of CEPP is to improve the quantity, quality, timing and distribution of water flows to the Central Everglades.
Risk Lead:	Nick Emigh/Mike Jacobs
Risk Report (A):	
(B):	
(C):	
(D):	
(E):	

Risk Matrix

	Impact or Consequence of Occurrence				
Likelihood of Occurrence	Negligible	Marginal	Significant	Critical	Crisis
Certain	Moderate	Moderate	High	High	High
Very Likely	Low	Moderate	High	High	High
Likely	Low	Moderate	High	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Very Unlikely	Low	Low	Low	Low	Moderate

Likelihood of Occurrence Table

Any changes to these assumptions will change the assumptions in the models.

Likelihood	Low % Occurrence	High % Occurrence
Certain	90%	100%
Very Likely	70%	90%
Likely	30%	70%
Unlikely	6%	30%
Very Unlikely	0%	5%

Percent's above are based on 10 events, and are considered approximate, judgement should be used for final grouping dependant on # of occurances, project size, flexibility and complexity.

If event occurrence is…	then it's likelihood is thought to be between…
Certain	100%
Very Likely	70% and 90%
Likely	30% and 70%
Unlikely	6% and 30%
Very Unlikely	0% and 5%

Likelihood of Occurrence Tables.

If an event is

Certain: implies the event has a 100% chance of occurrence.

Very Likely: implies the event has a 70% to 90% chance of occurrence.

Likely: implies the event has a 30% to 70% chance of occurrence.

Unlikely: implies the event has a 6% to 30% chance of occurrence.

Very Unlikely: implies the event has a 0% to 5% chance of occurrence.

Impact or Consequence of Occurrence

Any changes to these assumptions will change the assumptions in the models.

	% of Project Cost or Schedule Change		Example (based on the following)	
	per Cost Event Exceeds	per Schedule Event Exceeds	$ 1,276,371,000	329 Months
Negligible	0.000%	2.000%	$ -	6.6 Months
Marginal	0.500%	3.000%	$ 6,381,855	9.9 Months
Significant	2.000%	5.000%	$ 25,527,420	16.5 Months
Critical	3.000%	10.000%	$ 38,291,130	32.9 Months
Crisis	5.000%	20.000%	$ 63,818,550	65.8 Months

Percent's above are based on 10 events, and are considered approximate, judgement should be used for final grouping dependant on # of occurances, project size, flexibility and complexity.

If event occurrence is…	then it's Impact to total project cost is thought to be between…
Negligible	0% and .5%
Marginal	.5% and 2%
Significant	2% and 3.%
Critical	3.% and 5%
Crisis	over 5%

Impact or Consequence of Occurrence

If an event is classified as....

Negligible: implies the event has a 0% to .5% chance of occurrence.

Marginal: implies the event has a .5% to 2% chance of occurrence.

Significant: implies the event has a 2.% to 3% chance of occurrence.

Critical: implies the event has a 3.% to 5% chance of occurrence.

Crisis: implies the event has a greater than 5% to % chance of occurrence.

SAJ - Jacksonville
SAJ - CEPP Cost and Schedule Risk Analysis

Initial Risk Register Development Meeting

Date 2/4/2013 to 2/8/2013

No.	Name	Section
1	Kim Vitek	PM-EO
2	Murika Davis	PD-C
3	Andrew Loschilavo	PD-E
4	Bill Hamel	CD-Q
5	Kelly Keefe	PD-C
6	Dan Crawford	EN-WM
7	Kevin Wittmann	PD-C
8	Amanda Lavigne	EN-WM
9	Jack Fross	EN-DS
10	Manuel Dejesus	EN-DM
11	Donna George	PM-EE
11	Brad Foster	PD-C
12	Kim Brooks Hall	EN-T
12	Tracy Leeser	EN-TC
13	Gwen Nelson	EW-DL
13	Cindy Thomas	PD-C
14	Jonathan Jenkins	OD-MW
14	Jimmy Matthews	EN-Q
15	Nick Emigh	NWW EC-X
15	Mike Jacobs	NWW EC-X
16	Joseph Tavares	CD-Q
16	Scott Thorught	SFWMD
17	Al Shirket	SFWMD
17	Paul Linton	SFWMD
18	Agnes McClean	ENP
18	Kevin Koton	ENP
19	Bob Johnson	ENP
19	Dennis Duke	DOI
20	Inger Hansen	FDEP
20	Miles Myers	FWS
21	Liberta Scotto	FWS
21	Amro Habib	EN-TC
22	Frank Vicidomina	MVN-PM
22	Rob Tucker	EN-H

Project Cost (Less Contingencies and Escalation)

** Construction costs & real estate costs taken from MII.*

*** See "E&D" Excel sheet for E&D/S&A assumptions.*

ACCT	DESCRIPTION		COST ($)	
Construction Costs*				
00	Flood proofing Allowance			
01	Lands & Damages		2,987,000	FROM SAJ(remaining costs only)
02	Relocations			
03	Reservoirs			
04	Dams			
05	Locks			
06	Fish & Wildlife Facilities		72,516,000	FROM SAJ
07	Power Plant			
08	Roads, Railroads, & Bridges			
09	Channels & Canals		252,727,187	FROM MCACES
10	Breakwaters & Seawalls			
11	Levees & Floodwalls		273,503,603	FROM MCACES
12	Navigation Ports & Harbors			
13	Pumping Plants		91,807,997	FROM MCACES
14	Recreation Facilities		4,440,568	FROM MCACES
15	Floodway Control & Diversion Structures		234,171,345	FROM MCACES
16	Bank Stabilization			
17	Beach Replenishment			
18	Cultural Resource Preservation		18,065,000	FROM SAJ
19	Buildings, Grounds, & Utilities			
20	Permanent Operating Equipment			
			856,650,700	MCACES VALUE
	Summary Construction Costs and L&D		**950,218,700**	Excludes spent real estate
Non-construction Costs				
30	Planning, Engineering & Design**	27.5%	235,578,943	
	Project Management	*3.00%*	*25,699,521*	
	Planning & Environmental Compliance	*2.50%*	*21,416,268*	
	Engineering & Design	*11.50%*	*98,514,831*	
	Engineering Tech Review ITR & VE	*2.00%*	*17,133,014*	
	Contracting & Reprographics	*2.50%*	*21,416,268*	
	Engineering During Construction	*3.50%*	*29,982,775*	
	Planning During Construction	*2.50%*	*21,416,268*	
	Port S&A		-	
31	Supervision & Administration**	10.5%	89,948,324	
	Supervision & Assurance:	8.0%	*68,532,056*	
	Project Operation:	1.0%	*8,566,507*	
	Program Management:	1.5%	*12,849,761*	
	Summary 30 & 31 Account		**325,527,266**	
32	HTRW		625,000	
	Summary 32 Account		**625,000**	
ROM First Cost (without cont)			**1,276,371,000**	
		from Oct-2019	to Oct-2046	
Schedule Length (without Contingency)			**329**	Months
Schedule Length			329	Months

SAJ - CEPP Cost and Schedule Risk Analysis

Risk Level

Likelihood of Occurrence	Negligible	Marginal	Significant	Critical	Crisis
Very Likely	Low	Moderate	High	High	High
Likely	Low	Moderate	High	High	High
Unlikely	Low	Low	Moderate	Moderate	High
Very Unlikely	Low	Low	Low	Low	High

Impact or Consequence of Occurrence

Project Scope Narrative: The study area for the Central Everglades Planning Project (CEPP) encompasses the Northern Estuaries (St. Lucie River and Indian River Lagoon and the Caloosahatchee River and Estuary), Lake Okeechobee, a portion of the EAA, the Water Conservation Areas (WCAs), Everglades National Park (ENP), the Southern Estuaries (Florida Bay and Biscayne Bay), and the Lower East Coast. The purpose of CEPP is to improve the quantity, quality, timing and distribution of water flows to the Central Everglades.

Risk No.	Risk/Opportunity Event	Concerns	PDT Discussions & Conclusions	Project Cost Likelihood*	Project Cost Impact*	Project Cost Risk Level*	Project Schedule Likelihood*	Project Schedule Impact*	Project Schedule Risk Level*	Affected Project Component
Contract Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)										
PROJECT & PROGRAM MGMT										
P-PPM-1	New Planning Process Review Revisions	As the project reaches mile stones and HQ revises or asks for changes to the process.	The concern is during the 3x3x3 planning phase HQ revises the anticipated out come of the planning study and delays in the authorization schedule will be encountered.	Very Likely	Negligible	LOW	Likely	Marginal	MODERATE	Project Cost & Schedule
P-PPM-2	Multiple overlapping projects	There are multiple overlapping projects and accounting for costs and benefits may be overlapping. Overall system needs to work together to provide benefits.	There are numerous projects within the area that may have different purposes and overlapping features. This may cause accounting and authorization issues due to cost share and project purposes.	Very Likely	Significant	HIGH	Very Likely	Significant	HIGH	Project Cost & Schedule
P-PPM-3	PED Start date	PED phase will most likely not start until next WRDA is passed.	FY 2016 is probably the earliest authorization would occur. However this could change depending on the next WRDAs actual issuance.	Very Likely	Negligible	LOW	Very Likely	Critical	HIGH	Project Cost & Schedule
P-PPM-4	Funding Profile	Project implimation is dependent on both the federal and sponsor being able to meet finacial obligation to meet the project.	Equal contributions or cost share from the sponsor and from USACE will be needed for future work. Progress could very based on actual finical contributions in funding the project.	Likely	Marginal	MODERATE	Likely	Significant	HIGH	Project Cost & Schedule
NR-PPM-5	Integrated FEB Operations A1 and A2	It is assumed that A1 will be completed prior to construction of A2 (Start FEB 2015 Competed 2018).	Some minor changes in design or assumed operating conditions may result depending on final configuration of A2. This is an opportunity for savings.	Likely	Marginal	MODERATE	Likely	Negligible	LOW	Project Cost & Schedule
PPM-6	Local Escalation Greater than National Average	When dealing with large multiple year projects there are concerns for localized inflation above CWCCIS.	The concern is that due to funding restrictions and multiple contracts that inflation in CWCCIS will be outpaced in future years. This is the possibility that inflation exceeds the CWCCIS tables in future years.	Unlikely	Crisis	HIGH	Likely	Negligible	LOW	Project Cost & Schedule
CONTRACT ACQUISITION RISKS										
P-CA-1	Large project siz/multiple projects	Most likely due to the large size of the project the project will be broken up into small individual contracts.	Coordination and sequencing may change significantly due to acquisition approach. Some thought has been put into contract acquisition into base case estimate. However schedule and cost could change based on actual implementation.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Cost & Schedule
SR-CA-2	Borrow/Placement Conflict with Multiple Contracts	Concern for scoping of projects to ensure that the backfill and excavation and structure modifications are in the same contract.	L6 - L5 must be completed together along with modifications to S-8 and Miami back fill are all required to be completed in series. This could effect construction cost and schedule.	Very Likely	Significant	HIGH	Very Likely	Marginal	MODERATE	Project Cost & Schedule
TECHNICAL RISKS										
P-TL-1	Life Cycle Cost Analysis on Pump stations	Life cycle cost analysis during design may show that electrical pumping is more beneficial.	This could lead to increased unit cost for pump station costs due to infrastructure requirements.	Unlikely	Marginal	LOW	Very Unlikely	Negligible	LOW	Project Cost & Schedule
NR-TL-3	FEB Internal Water Conveyance	There are existing AG canals in the proposed location of the FEB along with roads bordering each side of the canal that may cause issues.	There is the possibility of piping through the proposed location of the perimeter levee. There is also the concern for not allowing sheet flow across the FEB with out backfilling or plugging the AG canals.	Very Likely	Marginal	MODERATE	Very Likely	Marginal	MODERATE	Project Cost & Schedule

NR-TL-4	FEB North Spreader Canal Length	Currently the spreader canal is only on part of the northern end of the FEB.	There is concern that the canal my need to extend along the entire northern end including routing the spreader canal south and east to hydrate the east end of the FEB. This will lengthen the canal add additional costs and based on limited funding stream will add additional time to the schedule.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Cost & Schedule
NR-TL-5	FEB Porosity of Lime Rock is Unknown	There is the concern that the Lime rock is not capable of containing the water.	Unknown geotechnical data. There is concern that there could be a need to be additional work under the FEB perimeter levee. A1 will be constructed prior to A2 and may provide some forewarning of issues.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Cost & Schedule
SR-TL-6	S-8 Flood Control Operations	S-8 needs to provide flood control the entire time until downstream work is complete.	A plan and appropriate costs have been incorporated in the features effected by the operation of the S-8 pump station. This includes the gated culverts down stream of the pump station including diversion canals. If any additional work is needed to ensure flood protection it will cause additional cost and could lengthen the schedule.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Cost & Schedule
SR-TL-7	S-8 New Pump Station Design	The current plan is unclear on the status of S-8 Pump Station. This could require actions ranging form full replacment to minor modifications.	The Engineering appendix does not provided sufficient information to determine what the new design of the S-8 pump station. It is likely that the pump station will need additional work to ensure that the pumps are capable of handling the flood waters. this could range from a new pump station to a rehab of the existing pump station.	Likely	Crisis	HIGH	Likely	Negligible	LOW	Project Cost & Schedule
SR-TL-8	Adverse effects to WCA2	Overall system operation must not impact WCA-2.	The understanding at this time is that there should be no affect to the WCA2 with the operation of the entire system. This could result in delays to NEPA and permitting based on reviews of the overall system.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
SR-TL-9	G-336G Capability to Increase	Usability of existing structure is in question.	There is the possibility that the structure has more capability and will need little to no work. However if additional work is required there would be a need for additional costs.	Likely	Marginal	MODERATE	Likely	Negligible	LOW	Project Cost & Schedule
SR-TL-12	L-4 Pipeline	A known abandoned pipe line exists in the area of the L-4 Degrade.	Currently it is unknown if the previous cleanup was sufficient to ensure that there are any contaminated soils or debris from the pipeline. The current state and location of the pipeline is unknown at this time.	Very Likely	Negligible	LOW	Very Likely	Negligible	LOW	Project Cost & Schedule
SR-TL-13	Miami Canal Pipeline	There is an abandoned pipeline in the vicinity of Miami Canal	Location is known considered Low/Low	Very Likely	Negligible	LOW	Very Likely	Negligible	LOW	
BG-TL-15	Tamiami Trail Bridges and Roads Raise	This work needs to be completed prior to CEPP and needs to be completed for project to operate as designed.	Current scheduled completion dates for these features need to be considered in the implementation schedule for this project. If they are not completed they most likely would delay the CEPP project completion.	Very Unlikely	Negligible	LOW	Unlikely	Crisis	HIGH	Project Cost & Schedule
BG-TL-19	Eastern Flight 401	The new proposed Monument is at the current location of 592 monument.	If this new monument is built in a different location then anticipated there could be minimal impacts to design. There may be momentum to place near Value Jet memorial.	Unlikely	Marginal	LOW	Unlikely	Marginal	LOW	Project Cost & Schedule
BG-TL-20	De-Comp Physical Model Results	There is the possibility that the de-comp model will change the design of some or all features	L-67C could need to be backfilled or plugged as a result of the de-comp model results. There is also the possibility of features changing based on the results of De-Comp study. This may be difficult or impossible to model. Current report is based on best known information. This should be included on the watch list of risks.	Unlikely	Significant	MODERATE	Unlikely	Significant	MODERATE	Project Cost & Schedule
BG-TL-21	Collector Canal at S-355B	There is concern that there could be the need for a collector canal at the location of the current S-355B.	This is not included in the current construction estimate or scope. It will allow for the water to be drained out of the WCA 3B. The cost for a collector canal at S-355B is included in the adaptive management cost estimate. This is not modeled in the risk as the cost is in the adaptave management base costs.	Likely	Marginal	MODERATE	Unlikely	Marginal	LOW	Project Cost & Schedule
Y-TL-22	S-356 Pump Operation	There is currently no water quality permit to operate the existing pumps, there is concern that the same water quality issues may impede design of new pump station.	There are a myriad of issues that could change short/long term usage of the current pump station. Some thought is that it could be used in the short term to validate the size of the final permanent pump station. It is unclear how this outcome could effect the project at this time.	Likely	Negligible	LOW	Very Unlikely	Negligible	LOW	Project Cost & Schedule
Y-TL-24	S-356 Sizing of New Pump	The new pump is currently assumed at 1000 CFS.	There is an uncertainty that the pump size is correct for the anticipated seepage. This may require monitoring and flexibility of sizing of pump station.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
Y-TL-25	Pumping into Canal	There is flexibility to allow for pumping into the canal through S-337 to provide water to the L31 canal.	There is a benefit in the ability to be able to control the water out of WCA3 into the canal to allow a supply of water to Miami. It is unknown if there is a direct relationship between water in the canal and water being sent to the aquifer.	Very Unlikely	Negligible	LOW	Very Unlikely	Negligible	LOW	Project Cost & Schedule

Y-TL-26	S-356 New Pump Station Design	It is unknown about the buy in from the tribes in the design.	Noise, design of structure, and vibrations generated from pumps around tribal lands have been an issue in the past. There is concern for the proximity to the casino owned by the Miccosukee tribes. This may drive the pumps to be electric pumps or require additional aesthetics or soundproofing features.	Very Likely	Marginal	MODERATE	Very Unlikely	Negligible	LOW	Project Cost & Schedule
BG-TL-27	Blue Shanty Levee Foundation	There is little to no data in the area of the levee.	The need for upgrades to the foundation design may be needed, this would ensure that there was minimal piping under the levee. The future design could include the use of filter blankets to ensure the stability of the levee foundation.	Likely	Marginal	MODERATE	Likely	Negligible	LOW	Project Cost & Schedule
TL-28	Global Geo Tech Assumptions	The team used global assumptions for the material strata for entire project although past experience shows that these can vary significantly throughout the region.	Any localized variance in the material type could have an impact in the cost of excavation.	Likely	Significant	HIGH	Likely	Negligible	LOW	Project Cost & Schedule
TL-29	Disposal of Excess on Site Material	Currently there is no design for location or technique of onsite disposal of excess material.	There is likely the chance that additional work will be required to usefully dispose of the material on site. This could range from spreading across areas to increasing the size of earthen features.	Very Likely	Significant	HIGH	Very Likely	Negligible	LOW	Project Cost & Schedule
TL-30	Levee Stabilization Approach	Currently the estimate has seeding as the means of stabilization for the side slope of the levees.	Possibility exists that seeding may not be adequate to ensure the stabilization of the levee. In that case the levee might need to be covered in sod.	Unlikely	Crisis	HIGH	Unlikely	Negligible	LOW	Project Cost & Schedule
TL-31	System not performing as intended	There is a technical risk that the system may not perform as expected and that some additional work may be required	Some minor reformulation, rework or changes may be required due to unforseen issues. This will need to be monitored to ensure the system performs as intended and changes are efficently incorperated into the project	Likely	Critical	HIGH	Unlikely	Negligible	LOW	Project Cost & Schedule
	LANDS AND DAMAGES RISKS									
NR-LD-1	FEB HTRW	There is the possibility that the Farm Land may have HTRW in the area.	There is likely an area or areas that will need additional work to ensure that the area is free of hazardous material prior to starting the construction of the FEB.	Very Likely	Marginal	MODERATE	Very Likely	Negligible	LOW	Project Cost & Schedule
NR-LD-2	Miami Canal Historical status	There is a section of the Miami Canal that is considered historical.	It is listed as a national historical location and is known that portions of the Miami Canal are considered historical and consideration will be needed and documented.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
NR-LD-3	FEB Land ownership	The land is currently owned by the state and leased for AG use.	There is minimal risk that the land will be an issue, it is state owned and leased to the farmers. The land is currently owned and should be considered a positive effect.	Very Unlikely	Negligible	LOW	Very Unlikely	Negligible	LOW	Project Cost & Schedule
NR-LD-4	FEB lands Coordination in Termination of Lease for FEB	The risk is that there will be a delay between the lease being canceled and the start of construction.	There is concern that some species will establish in the site after the land is abandoned by the farmer and the start of construction. These could be an impact if they are protected species or if too much vegetation is established in the area. It is felt that the schedule of progress will allow for proper timing of termination of leases and not allow this to happen.	Very Unlikely	Significant	LOW	Likely	Negligible	LOW	Project Cost & Schedule
SR-LD-5	Effects West of L-28 and North of I-75	Concern from tenants that the cattle pastures to west will be flooded by new system	More studies are needed to ensure that the cattle area is not flooded in normal operation. It is believed that operational changes at S140 may solve the problem.	Unlikely	Negligible	LOW	Unlikely	Negligible	LOW	Project Cost & Schedule
SR-LD-6	Hunting Camps	Hunting Camps in the area between the Miami Canal and the L-5 Levee.	The concern is that there might be kick back from the lease holder of the camp.Issue may arise due to potential changes in water levels and area conditions during backfill of the Miami Canal.	Very Unlikely	Negligible	LOW	Very Unlikely	Negligible	LOW	Project Cost & Schedule
BG-LD-8	Mitigation of Lands	The concern is that not all lands necessary to complete the project will be acquired by other projects along Tamiami trail	There is a risk that some lands targeted to be acquired by other projects may not be timely or be acquired due to funding. This could delay the project.	Unlikely	Marginal	LOW	Unlikely	Significant	MODERATE	Project Cost & Schedule
BG-LD-9	Tribal Community Structures Elevation	There is concern that the two tribal communities along The Tamiami trail may have structures that need to be raised.	Many of the structures have been constructed at higher anticipated water elevations. Although some of the structures may not have been raised in accordance with the specifications it is considered a low risk for cost and schedule.	Unlikely	Marginal	LOW	Unlikely	Marginal	LOW	Project Cost & Schedule
Y-LD-10	Lands for New Pump S356	The current location of the new pump is in the general proximity of the Miccosukee tribal area.	Depending on the future state of S-356 a new location may be beneficial to acquire new lands for construction of the replacement. It is unknown if the temp pump will be used during construction, it also is unknown if the proposed location of the new pump will allow for the pump station to be able to be constructed while still operating the existing S-356 pumps.	Likely	Marginal	MODERATE	Likely	Negligible	LOW	Project Cost & Schedule
Y-LD-11	Cutoff Wall Location	The proposed location of the cutoff wall is along the alignment of the existing levee and within the existing right of way.	Not anticipated to be risky and site access is assumed to be good.	Very Unlikely	Negligible	LOW	Very Unlikely	Negligible	LOW	Project Cost & Schedule

SR-LD-12	Miami Canal Existing Recreation	The current recreation features along the section of the Miami canal need consideration for use after construction.	There are multiple recreation locations and features adjacent to the Miami canal. There is a possibility that these could be impacted during construction. Features such as the bridge just south of the S-339 could impact construction. There are costs to reloacate some recreational/public access sites within the estimate.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
	REGULATORY AND ENVIRONMENTAL RISKS									
P-RE-1	Endangered Species on Levees and constriction sites	Endangered species known to be in area- Snakes, Birds, etc..	Normal endangered species clauses should be included in construction contract to include nesting seasons, work windows, and monitoring plans. This has been taken into account in the cost estimate.	Very Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
RE-2	Water Quality Legal Issues Project Wide	Water quality in system has been challenged before.	It is assumed that this will be resolved and water quality will be acceptable prior to the construction of CEPP. Legal action or delays could significantly delay the project if this is not resolved the project will not move forward, this issue must be resolved prior to authorization of the project.	Very Unlikely	Negligible	LOW	Unlikely	Crisis	HIGH	Project Cost & Schedule
NR-RE-3	FEB Cultural Resources	Due to the nature of the area historical artifacts may be found during excavation.	During excavation there is the possibility of encountering cultural resources. Due to the small qty of top soil and the current usage of the land as agricultural may decrease the likelihood in this area. Although culturally sensitive material has been found in the area previously.	Very Likely	Negligible	LOW	Very Likely	Negligible	LOW	Project Cost & Schedule
SR-RE-4	S-8 National Registry	The S-8 Structure is eligible or potentially eligible for national registry as a historical structure.	The entire area is considered as eligible for the national historic registry any changes will need to be documented prior to construction. This will likely need to happen.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
SR-RE-5	L-4 Archaeological Site	There is an area South of the L-4 Levee and West of the Miami Canal that is eligible or potentially eligible for national registry as an archeological site.	A change of water flows from the area degraded at the intersection of L-4 to the Miami Canal could impact an archeological site. The area may need protection and documentation before construction takes place.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
SR-RE-6	L-6 Structures	The Structures along the L-6 are eligible or potentially eligible for national registry as a historical structure.	It is unknown at this time if these are considered historical. There will need to be further investigations and documentation to ensure that these are not modified with out the appropriate documentation.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
SR-RE-8	Manatees	In 2005 the Miami Canal all the way to lake Okeechobee was listed as possibly having Manatees in the canals.	Blocking of canals was done to ensure that the manatees cannot enter the area. A new study or opinion may be needed to remove the area from the listing. There may be documentation that the Miami canal has been removed from the Manatee list.	Very Likely	Negligible	LOW	Very Likely	Negligible	LOW	Project Cost & Schedule
BG-RE-9	Environmental Impact of system L67C	NEPA Impacts of changing the affected area needs to be considered. It is unclear if the areas and volumes will ensure a net positive effect.	It is unclear if the foot print of impact to the system will be equal after construction. The initial documentation included for removing the L67C and backfilling the canal is compete however actual results could change the plan.	Likely	Significant	HIGH	Likely	Marginal	MODERATE	Project Cost & Schedule
BG-RE-10	L67-A Tree Islands	Some of the spoil mounds north and west of L-67A currently have camps utilized by tribal members.	To facilitate stakeholder buy in alignment of structures should be located so that the team can ensure that the islands to be removed do not have camps.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
BG-RE-11	Tree Islands in Blue Shanty Flow way	Currently there are islands in the area that should not be disturbed.	There is concern that the flows will damage the area and additional measures need to be in place to ensure that the islands are not disturbed during construction. The tree islands may need protection for both cultural and biological purposes.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
BG-RE-12	Blue Shanty Levee Location	There is concern that the new Blue Shanty levee will be located on top of existing tree islands.	This will need to be addressed in design and minimal to no disruption of cultural resources should be allowed. Alignment may require change in length and size.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
BG-RE-13	Tree Island North of Osceola	There are historically significant tree islands north of Osceola Camp.	These islands cannot be effected in the construction or operation of the project. There is a potentially sensitive cultural site just north of the Osceola camp.	Likely	Marginal	MODERATE	Likely	Negligible	LOW	Project Cost & Schedule
BG-RE-14	Old Tamiami Trail Removal	The Old Trail is eligible or potentially eligible for national registry as a historical site.	The entire area is considered as eligible for the national historic registry any changes will need to be documented prior to construction. This will likely need to happen.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
Y-RE-15	Miners cutoff wall	The miners are constructing a seepage cutoff wall to mitigate their mining efforts.	Early results suggest that the 2 mile cutoff wall the miners are constructing will not provide additional benefits to this portion of the project.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule

P-RE-16	Costs for cultural resources	Cultural Resource preservation.	Ensure adequate costs for cultural resource preservation are added to estimate.	Very Unlikely	Negligible	LOW	Very Unlikely	Negligible	LOW	Project Cost & Schedule
	CONSTRUCTION RISKS									
P-CON-1	Fuel Price	Due to the large quantity of hauling that will take place on the job there is a chance that fuel prices increasing could impact the job.	It is unknown at this time what the future of fuel prices will do this will be studied and determined what different increases in how fuel prices will effect the job.	Likely	Significant	HIGH	Likely	Negligible	LOW	Project Cost & Schedule
NR-CON-4	Cut Fill Qtys Based on Implementation	Cut/Fill quantities could vary from estimate.	The concern is that you will need off site borrow or to create an excavation pit to ensure that all features have sufficient material. Additional processing of onsite materials as needed. This could also change based on implementation.	Very Likely	Marginal	MODERATE	Very Likely	Negligible	LOW	Project Cost & Schedule
NR-CON-5	Access Roads used for FEB Construction	A1 FEB is assumed available for access to A2 construction.	It is assumed that A-1 will be built prior to the construction of A-2. Consideration for haul roads needs to be accounted for in the estimate. The estimate assumes improving haul roads after usage as needed for the entire project including the FEB.	Unlikely	Negligible	LOW	Unlikely	Negligible	LOW	Project Cost & Schedule
NR-CON-6	FEB Storm Water Management during Construction	The concern is that there will be water influx to the area during a storm.	There is the possibility that the water will need to be pumped or allowed to dry. There is concern that during the process of scheduling the work there will be delays that adversely impact the operations of the features.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Cost & Schedule
SR-CON-8	Maintenance of Vegetation on L4 AREA 3A	There is concern for conveyance along the L-4 Canal and the impact that vegetation would have in the short term on flows into Northern Conservation Area 3A.	There is a need to ensure that during the construction there is removal of vegetation that will ensure the functionality of the features under construction.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
SR-CON-9	Backfill of Miami Canal	There is concern for sequence of construction when backfilling the Miami Canal.	The concern is that the project will extend over multiple years and there will be a need for culverts, plugs, extra work that is not currently in the estimate. Funding and project schedule could impact this considerably.	Very Likely	Marginal	MODERATE	Very Likely	Marginal	MODERATE	Project Cost & Schedule
BG-CON-11	Blue Shanty Levee Construction	Sequencing could cause borrow/fill issues.	Flood protection will be required during construction. It is not likely that L-29 can be removed prior to construction of the blue shanty flow way levee.	Likely	Marginal	MODERATE	Likely	Negligible	LOW	Project Cost & Schedule
Y-CON-12	Vicinity of Casino and Impacts of Construction	Nearby Casino may be sensitive to noise and or vibrations from construction.	This construction contractor may be impacted due to concern of vibrations from the Casino nearby. This could cause restrictive construction windows placed on the contractor.	Likely	Negligible	LOW	Likely	Significant	HIGH	Project Cost & Schedule
CON-13	Pre Construction Survey of Canals	Currently it is unknown what the state of the muck layer in the canals.	It is known from work in the de-comp model that a significant amount of muck is present in some or all of the canals. It is likely that a preconstruction survey will need to be completed prior to construction to ensure that the quantities are verified.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
	ESTIMATE AND SCHEDULE RISKS									
BG-EST-6	L-29 Levee Removal	The a length of levee that will need to be removed can vary based on the final length of the Blue Shanty Levee	This additional cost will need to be added to the estimate if the length changes.	Very Likely	Negligible	LOW	Very Likely	Negligible	LOW	Project Cost & Schedule
BG-EST-7	L-67C Removal	The a length of levee that will need to be removed depending on the location of the blue shanty levee will change.	This additional cost will need to be added to the estimate if the length changes.	Very Likely	Negligible	LOW	Very Likely	Negligible	LOW	Project Cost & Schedule
Y-EST-10	L-31N Cutoff Wall	There is reason to believe that information gathered from the miners cutoff wall will change the implementation of the cutoff wall.	Currently the wall is designed to a 35 ft depth placed on the bench between the levee and the canal. This location may change adding additional depth, based on the results from the miners wall additional depth or length may be required to achieve the proper effects. Quantity could be as little as 2 extra miles of cutoff wall, but could require redoing the mimers cutoff at a deeper depth and adding an additional 2-3 miles of this deeper depth cutoff.	Very Likely	Significant	HIGH	Very Likely	Significant	HIGH	Project Cost & Schedule
EST-11	Labor Rates	Local wage rate assumptions could vary from assumed and impact the estimate	Generally wage rates are low in the area however skilled workers generally can command higher wages similar to those in other areas. Wage rates in estiamte are based on local market research and are current.	Likely	Marginal	MODERATE	Likely	Negligible	LOW	Project Cost & Schedule
EST-12	Estimate Assumptions/Like Similar	That features were estimated using plans from similar structures with minimal design for the CEPP feature.The assumption that local like similar features would be adequate to captrue the necessary scope to construct the feature.	The project has conducted very little design and scoping. Additional scope may be required to successfully complete each feature over what was identified in the simliar feature. Additionally the estimators had to make significant assumptions in the development of the quantities to complete the cost estimate.	Likely	Marginal	MODERATE	Likely	Marginal	MODERATE	Project Cost & Schedule

EST-13	Delays in Fabrication of Equipment	Due to the number of specialty fabricated gates, pumps and motors there could be an impact to the project.	When dealing with specialty materials (gates pumps etc.) there is always concern that the raw materials may not be available. The risk is either that a premium will have to be paid for the material or equipment or a delay to the delivery schedule of the material or equipment will cause a delay to the project.	Unlikely	Negligible	LOW	Unlikely	Marginal	LOW	Project Cost & Schedule
	OTHER RISKS									
NR-FL-1	FEB Recreation Features	Recreation features may be added to in the area of the FEB	Some recreation features are included . It is anticipated that the features will not be a major driver there is already a cost consideration for minimal recreation features in the estimate.	Likely	Negligible	LOW	Likely	Negligible	LOW	Project Cost & Schedule
BG-FL-2	L-67 Recreation Access	Access for existing recreation features may need to be changed due to project construction.	Some costs for relocating the recreation access to the L-67C and L-67A are included in the cost estimate. There is the risk that additional recreation sites may be needed and that improvements to existing levees to allow for vehicle access may be needed.	Likely	Marginal	MODERATE	Likely	Negligible	LOW	Project Cost & Schedule
	Programmatic Risks	(External Risk Items are those that are generated, caused, or controlled exclusively outside the PDT's sphere of influence.)								
BG-PR-5	Gated Structures, Gaps, and levee removal along L67A	There is the possibility that the three gated structures in L67A, levee removal and gaps in L67C and L67 extension removal are included in another authorized project	Costs for 3 gated structures, the gaps along L67C and the Levee removal of the L67 extension are included in the costs of this project. If it is determined that they should not be included, their cost will be considered an opportunity.	Likely	Marginal	MODERATE	Likely	Negligible	LOW	Project Cost & Schedule
PR-6	Close Out of Other Projects	HQ has not provided final confirmation that Mod-Waters will be closed out.	Prioritization and closeout of other projects could effect the start and funding for this project. These effects could substantially change the proejct formulation and execution schedule. This risk will be noted but not modeled.	Likely	Marginal	MODERATE	Likely	Significant	HIGH	Project Cost & Schedule
PR-7	Political or Public Opposition to project	There are many different agencies, orginizations, and stakeholders in the project vicininity that could oppose portions of the project or its impacts real or perceived.	Litigatoin, delays or fundamental projet changes could result. This risk will be noted but not modeled.	Likely	Marginal	MODERATE	Likely	Significant	HIGH	Project Cost & Schedule

*Likelihood, Impact, and Risk Level to be verified through market research and analysis (conducted by cost engineer).

1. Risk/Opportunity identified with reference to the Risk Identification Checklist and through deliberation and study of the PDT.
2. Discussions and Concerns elaborates on Risk/Opportunity Events and includes any assumptions or findings (should contain information pertinent to eventual study and analysis of event's impact to project).
3. Likelihood is a measure of the probability of the event occurring -- **Very Unlikely**, **Unlikely**, **Moderately Likely**, **Likely**, **Very Likely.** The likelihood of the event will be the same for both Cost and Schedule, regardless of impact.
4. Impact is a measure of the event's effect on project objectives with relation to scope, cost, and/or schedule -- **Negligible**, **Marginal**, **Significant**, **Critical**, or **Crisis.** Impacts on Project Cost may vary in severity from impacts on Project Schedule.
5. Risk Level is the resultant of Likelihood and Impact **Low**, **Moderate**, or **High**. Refer to the matrix located at top of page.
6. Variance Distribution refers to the behavior of the individual risk item with respect to its potential effects on Project Cost and Schedule. For example, an item with clearly defined parameters and a solid most likely scenario would probably follow a triangular or normal distribution. A risk item for which the PDT has little data or probability of modeling with respect to effects on cost or schedule (i.e. "anyone's guess") would probably follow a uniform or discrete uniform distribution.
7. The responsibility or POC is the entity responsible as the Subject Matter Expert (SME) for action, monitoring, or information on the PDT for the identified risk or opportunity.
8. Correlation recognizes those risk events that may be related to one another. Care should be given to ensure the risks are handled correctly without a "double counting."
9. Affected Project Component identifies the specific item of the project to which the risk directly or strongly correlates.
10. Project Implications identifies whether or not the risk item affects project cost, project schedule, or both. The PDT is responsible for conducting studies for both Project Cost and for Project Schedule.
11. Results of the risk identification process are studied and further developed by the Cost Engineer, then analyzed through the Monte Carlo Analysis Method for Cost (Contingency) and Schedule (Escalation) Growth.

SAJ - CEPP Cost and Schedule Risk Analysis

								Crystal Ball Simulation							
		Project Cost						Expected Values ($$$)					Expected Values (%s)		
Risk No.	Risk/Opportunity Event	Likelihood*	Impact*	Risk Level*	Variance Distribution	Correlation to Other(s)	Probability of Occurrence	Low	Most Likely	High	Contingency Model	Notes	Low	Most Likely	High
Internal Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)															
	PROJECT & PROGRAM MGMT														
P-PPM-1	New Planning Process Review Revisions	Very Likely	Negligible	LOW	Triangular	None	100%	$ -	$ -	$ 1,000,000	0		0	0	0.001052389
P-PPM-2	Multiple overlapping projects	Very Likely	Significant	HIGH	Triangular	None	100%	$ -	$ -	$ -	0		0	0	0
P-PPM-3	PED Start date	Very Likely	Negligible	LOW	Triangular	None	100%	$ -	$ -	$ 6,381,855	0		0	0	0.006716196
P-PPM-4	Funding Profile	Likely	Marginal	MODERATE	Triangular	None	100%	$ (95,021,870)	$ -	$ 95,021,870	0		-0.1	0	0.1
NR-PPM-5	Integrated FEB Operations A1 and A2	Likely	Marginal	MODERATE	Triangular	None	100%	$ (49,750,000)	$ -	$ -	0		-0.052356368	0	0
PPM-6	Local Escalation Greater than National Average	Unlikely	Crisis	HIGH	Triangular	None	100%	$ -	$ -	$ 32,270,658	0		0	0	0.033961295
	CONTRACT ACQUISITION RISKS														
P-CA-1	Large project size/multiple projects	Likely	Marginal	MODERATE	Triangular	None	100%	$ (9,502,187)	$ -	$ 38,008,748	0		-0.01	0	0.04
SR-CA-2	Borrow/Placement Conflict with Multiple Contracts	Very Likely	Significant	HIGH	Triangular	None	100%	$ -	$ -	$ 45,000,000	0		0	0	0.047357519
	TECHNICAL RISKS														
NR-TL-3	FEB Internal Water Conveyance	Very Likely	Marginal	MODERATE	Beta Pert	None	100%	$ (850,000)	$ -	$ 7,500,000	0		-0.000894531	0	0.00789292
NR-TL-4	FEB North Spreader Canal Length	Likely	Marginal	MODERATE	Triangular	None	100%	$ (65,500,000)	$ -	$ 61,300,000	0		-0.0689315	0	0.064511465
NR-TL-5	FEB Porosity of Lime Rock is Unknown	Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 14,670,000	0		0	0	0.015438551
SR-TL-6	S-8 Flood Control Operations	Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 14,253,281	0		0	0	0.015
SR-TL-7	S-8 New Pump Station Design	Likely	Crisis	HIGH	Triangular	None	100%	$ -	$ -	$ 100,000,000	0		0	0	0.105238931
SR-TL-9	G-336G Capability to Increase	Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 12,500,000	0		0	0	0.013154866
BG-TL-15	Tamiami Trail Bridges and Roads Raise	Very Unlikely	Negligible	LOW	N/A	N/A	0%	$ -	$ -	$ -	0		0	0	0
BG-TL-20	De-Comp Physical Model Results	Unlikely	Significant	MODERATE	Triangular	None	100%	$ -	$ -	$ 15,000,000	0		0	0	0.01578584
BG-TL-21	Collector Canal at S-355B	Likely	Marginal	MODERATE	N/A	N/A	0%	$ -	$ -	$ -	0		0	0	0
Y-TL-26	S-356 New Pump Station Design	Very Likely	Marginal	MODERATE	Triangular	Y-LD-10	100%	$ -	$ -	$ 8,500,000	0		0	0	0.008945309
BG-TL-27	Blue Shanty Levee Foundation	Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 19,300,000	0		0	0	0.020311114
TL-28	Global Geo Tech Assumptions	Likely	Significant	HIGH	Triangular	None	100%	$ (2,520,000)	$ -	$ 11,625,000	0		-0.002652021	0	0.012234026
TL-29	Disposal of Excess on Site Material	Very Likely	Significant	HIGH	Triangular	None	100%	$ -	$ -	$ 39,000,000	0		0	0	0.041043183
TL-30	Levee Stabilization Approach	Unlikely	Crisis	HIGH	Triangular	None	100%	$ -	$ -	$ 29,450,000	0		0	0	0.030992865
TL-31	System not performing as intended	Likely	Marginal	HIGH	Triangular	None	100%	$ -	$ -	$ 42,832,535	0		0	0	0.045076502
	LANDS AND DAMAGES RISKS														
NR-LD-1	FEB HTRW	Very Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 6,000,000	0		0	0	0.006314336
BG-LD-8	Mitigation of Lands	Unlikely	Marginal	LOW	N/A	N/A	0%	$ -	$ -	$ -	0		0	0	0
Y-LD-10	Lands for New Pump S356	Likely	Marginal	MODERATE	Triangular	Y-TL-26	100%	$ -	$ -	$ 3,825,000	0		0	0	0.004025389
	REGULATORY AND ENVIRONMENTAL RISKS														
RE-2	Water Quality Legal Issues Project Wide	Very Unlikely	Negligible	LOW	N/A	N/A	0%	$ -	$ -	$ -	0		0	0	0
BG-RE-9	Environmental Impact of system L67C	Likely	Significant	HIGH	Triangular	None	100%	$ -	$ -	$ 6,250,000	0		0	0	0.006577433
BG-RE-13	Tree Island North of Osceola	Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 8,000,000	0		0	0	0.008419114
	CONSTRUCTION RISKS														
P-CON-1	Fuel Price	Likely	Significant	HIGH	Uniform	None	100%	$ -	$ -	$ 65,900,000	0		0	0	0.069352455
NR-CON-4	Cut Fill Qtys Based on Implementation	Very Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 13,250,000	0		0	0	0.013944158
NR-CON-6	FEB Storm Water Management during Construction	Likely	Marginal	MODERATE	Binomial	None	100%	$ -	$ -	$ 25,000,000	0		0	0	0.026309733
SR-CON-9	Backfill of Miami Canal	Very Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 7,500,000	0		0	0	0.00789292
BG-CON-11	Blue Shanty Levee Construction	Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 16,000,000	0		0	0	0.016838229
Y-CON-12	Vicinity of Casino and Impacts of Construction	Likely	Negligible	LOW	N/A	N/A	0%	$ -	$ -	$ -	0		0	0	0
	ESTIMATE AND SCHEDULE RISKS														
Y-EST-10	L-31N Cutoff Wall	Very Likely	Significant	HIGH	Triangular	None	100%	$ (3,000,000)	$ -	$ 19,000,000	0		-0.003157168	0	0.019995397
EST-11	Labor Rates	Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 17,400,000	0		0	0	0.018311574
EST-12	Estimate Assumptions/Like Similar	Likely	Marginal	MODERATE	Triangular	None	100%	$ (47,510,935)	$ -	$ 95,021,870	0		-0.05	0	0.1
	OTHER RISKS														
BG-FL-2	L-67 Recreation Access	Likely	Marginal	MODERATE	Triangular	None	100%	$ -	$ -	$ 6,000,000	0		0	0	0.006314336
	Programmatic Risks														
BG-PR-5	Gated Structures, Gaps, and levee removal along L67A	Likely	Marginal	MODERATE	Triangular	None	100%	$ (20,300,000)	$ -	$ -	0		-0.021363503	0	0
PR-6	Close Out of Other Projects	Likely	Marginal	MODERATE	N/A	N/A	0%	$ -	$ -	$ -	0		0	0	0
											0				
											Sum Values to Here				

SAJ - CEPP Cost and Schedule Risk Analysis

								Crystal Ball Simulation							
		Project Schedule						Expected Values (Months)					Expected Values (%s)		
Risk No.	Risk/Opportunity Event	Likelihood*	Impact*	Risk Level*	Variance Distribution	Correlation to Other(s)	Probability of Occurrence	Low	Most Likely	High	Contingency Model	Notes	Low	Most Likely	High
Internal Risks (Internal Risk Items are those that are generated, caused, or controlled within the PDT's sphere of influence.)															
	PROJECT & PROGRAM MGMT														
P-PPM-1	New Planning Process Review Revisions	Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	12.0 Months	0		0	0	0.036474164
P-PPM-2	Multiple overlapping projects	Very Likely	Significant	HIGH	Triangular	None	100%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
P-PPM-3	PED Start date	Very Likely	Critical	HIGH	Triangular	None	100%	0.0 Months	0.0 Months	24.0 Months	0		0	0	0.072948328
P-PPM-4	Funding Profile	Likely	Significant	HIGH	BETA P	None	100%	-38.3 Months	0.0 Months	76.5 Months	0		-0.116261398	0	0.232522796
NR-PPM-5	Integrated FEB Operations A1 and A2	Likely	Negligible	LOW	Triangular	None	100%	0.0 Months	0.0 Months	6.0 Months	0		0	0	0.018237082
PPM-6	Local Escalation Greater than National Average	Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
	CONTRACT ACQUISITION RISKS														
P-CA-1	Large project size will require multiple projects	Likely	Marginal	MODERATE	Triangular	None	100%	-8.0 Months	0.0 Months	16.0 Months	0		-0.024316109	0	0.048632219
SR-CA-2	Borrow/Placement Conflict with Multiple Contracts	Very Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	12.0 Months	0		0	0	0.036474164
	TECHNICAL RISKS														
NR-TL-3	FEB Internal Water Conveyance	Very Likely	Marginal	MODERATE	Triangular	None	100%	-1.0 Months	0.0 Months	3.0 Months	0		-0.003039514	0	0.009118541
NR-TL-4	FEB North Spreader Canal Length	Likely	Marginal	MODERATE	Triangular	None	100%	-12.0 Months	0.0 Months	10.0 Months	0		-0.036474164	0	0.030395137
NR-TL-5	FEB Porosity of Lime Rock is Unknown	Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	2.0 Months	0		0	0	0.006079027
SR-TL-6	S-8 Flood Control Operations	Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	1.5 Months	0		0	0	0.004650456
SR-TL-7	S-8 New Pump Station Design	Likely	Negligible	LOW	Triangular	None	100%	0.0 Months	0.0 Months	12.0 Months	0		0	0	0.036474164
SR-TL-9	G-336G Capability to Increase	Likely	Negligible	LOW	Triangular	None	100%	0.0 Months	0.0 Months	3.0 Months	0		0	0	0.009118541
BG-TL-15	Tamiami Trail Bridges and Roads Raise	Unlikely	Crisis	HIGH	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
BG-TL-20	De-Comp Physical Model Results	Unlikely	Significant	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	3.0 Months	0		0	0	0.009118541
BG-TL-21	Collector Canal at S-355B	Unlikely	Marginal	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
Y-TL-26	S-356 New Pump Station Design	Very Unlikely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
BG-TL-27	Blue Shanty Levee Foundation	Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
TL-28	Global Geo Tech Assumptions	Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
TL-29	Disposal of Excess on Site Material	Very Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
TL-30	Levee Stabilization Approach	Unlikely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
	LANDS AND DAMAGES RISKS														
NR-LD-1	FEB HTRW	Very Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
BG-LD-8	Mitigation of Lands	Unlikely	Significant	MODERATE	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
Y-LD-10	Lands for New Pump S356	Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
	REGULATORY AND ENVIRONMENTAL RISKS														
RE-2	Water Quality Legal Issues Project Wide	Unlikely	Crisis	HIGH	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
BG-RE-9	Environmental Impact of system L67C	Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	2.0 Months	0		0	0	0.006079027
BG-RE-13	Tree Island North of Osceola	Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
	CONSTRUCTION RISKS														
P-CON-1	Fuel Price	Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
NR-CON-4	Cut Fill Qtys Based on Implementation	Very Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
NR-CON-6	FEB Storm Water Management during Construction	Likely	Marginal	MODERATE	Binomial	None	100%	0.0 Months	0.0 Months	12.0 Months	0		0	0	0.036474164
SR-CON-9	Backfill of Miami Canal	Very Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	6.0 Months	0		0	0	0.018237082
BG-CON-11	Blue Shanty Levee Construction	Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
Y-CON-12	Vicinity of Casino and Impacts of Construction	Likely	Significant	HIGH	Triangular	None	100%	0.0 Months	0.0 Months	6.0 Months	0		0	0	0.018237082
	ESTIMATE AND SCHEDULE RISKS														
Y-EST-10	L-31N Cutoff Wall	Very Likely	Significant	HIGH	Triangular	None	100%	-3.0 Months	0.0 Months	12.0 Months	0		-0.009118541	0	0.036474164
EST-11	Labor Rates	Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
EST-12	Design of Like Similar Structure	Likely	Marginal	MODERATE	Triangular	None	100%	-6.0 Months	0.0 Months	12.0 Months	0		-0.018237082	0	0.036474164
	OTHER RISKS														
BG-FL-2	L-67 Recreation Access	Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
	Programmatic Risks														
BG-PR-5	Gated Structures, Gaps, and levee removal along L67A	Likely	Negligible	LOW	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
PR-6	Close Out of Other Projects	Likely	Significant	HIGH	N/A	N/A	0%	0.0 Months	0.0 Months	0.0 Months	0		0	0	0
											0				
											Sum Values to Here				

SAJ - CEPP Cost and Schedule Risk Analysis

Contingency on Base Estimate	80% Confidence Project Cost
Baseline Estimate Cost (Most Likely) ->	**$950,218,700**
Baseline Estimate Cost Contingency Amount ->	$418,096,228
Baseline Estimate Construction Cost (80% Confidence) ->	**$1,368,314,928**

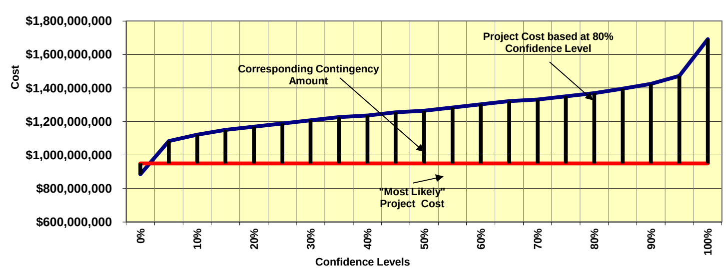
Contingency on Schedule	80% Confidence Project Schedule
Project Schedule Duration (Most Likely) ->	**329.0 Months**
Schedule Contingency Duration ->	89.0 Months
Project Schedule Duration (80% Confidence) ->	**418.0 Months**

- PROJECT CONTINGENCY DEVELOPMENT -

Contingency Analysis

MCACES Estimate	$950,218,700		
Confidence Level	Project Cost	Contingency	Contingency %
0%	$883,703,391	($66,515,309)	-7%
5%	$1,083,249,318	$133,030,618	14%
10%	$1,121,258,066	$171,039,366	18%
15%	$1,149,764,627	$199,545,927	21%
20%	$1,168,769,001	$218,550,301	23%
25%	$1,187,773,375	$237,554,675	25%
30%	$1,206,777,749	$256,559,049	27%
35%	$1,225,782,123	$275,563,423	29%
40%	$1,235,284,310	$285,065,610	30%
45%	$1,254,288,684	$304,069,984	32%
50%	$1,263,790,871	$313,572,171	33%
55%	$1,282,795,245	$332,576,545	35%
60%	$1,301,799,619	$351,580,919	37%
65%	$1,320,803,993	$370,585,293	39%
70%	$1,330,306,180	$380,087,480	40%
75%	$1,349,310,554	$399,091,854	42%
80%	**$1,368,314,928**	**$418,096,228**	**44%**
85%	$1,396,821,489	$446,602,789	47%
90%	$1,425,328,050	$475,109,350	50%
95%	$1,472,838,985	$522,620,285	55%
100%	$1,691,389,286	$741,170,586	78%

Base Estimate Cost Contingency Analysis

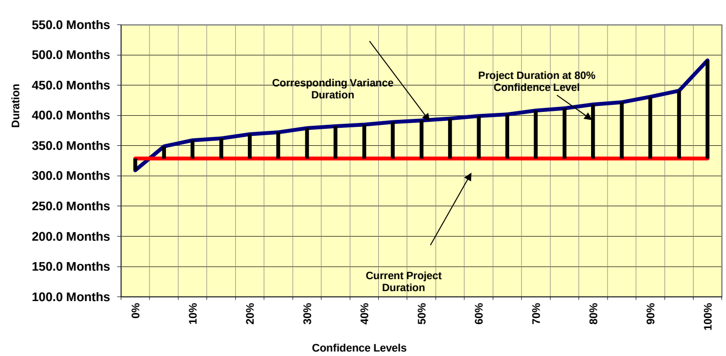


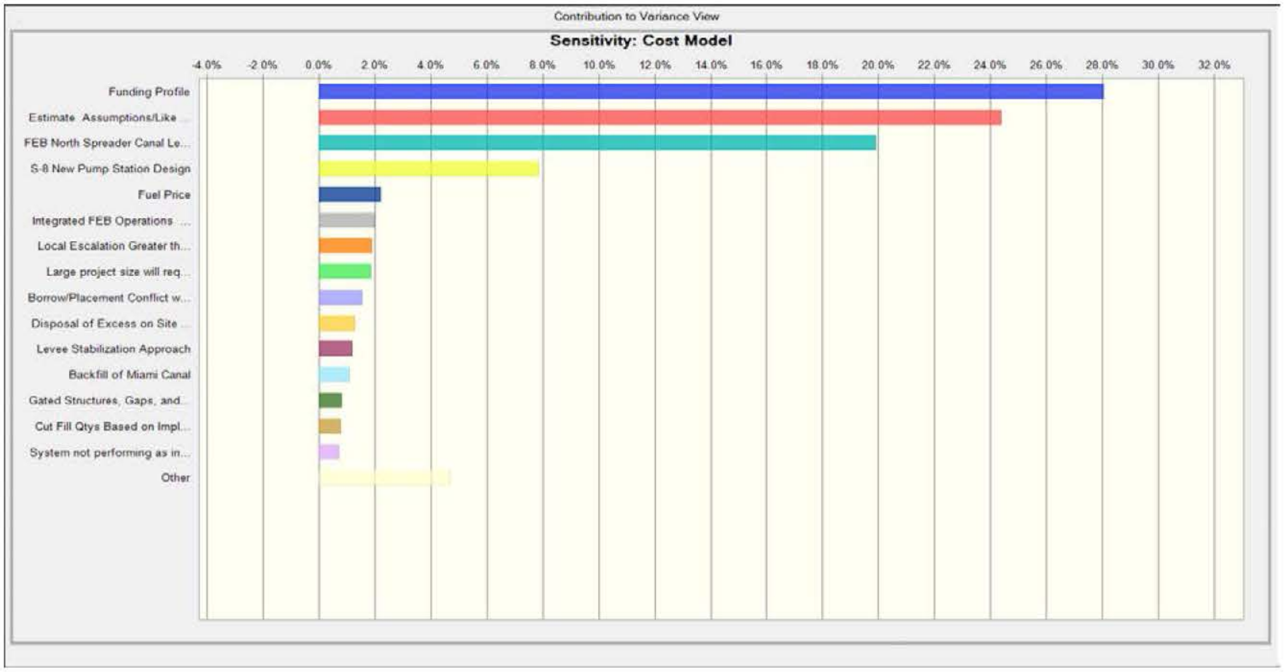
- SCHEDULE CONTINGENCY (DURATION) DEVELOPMENT -

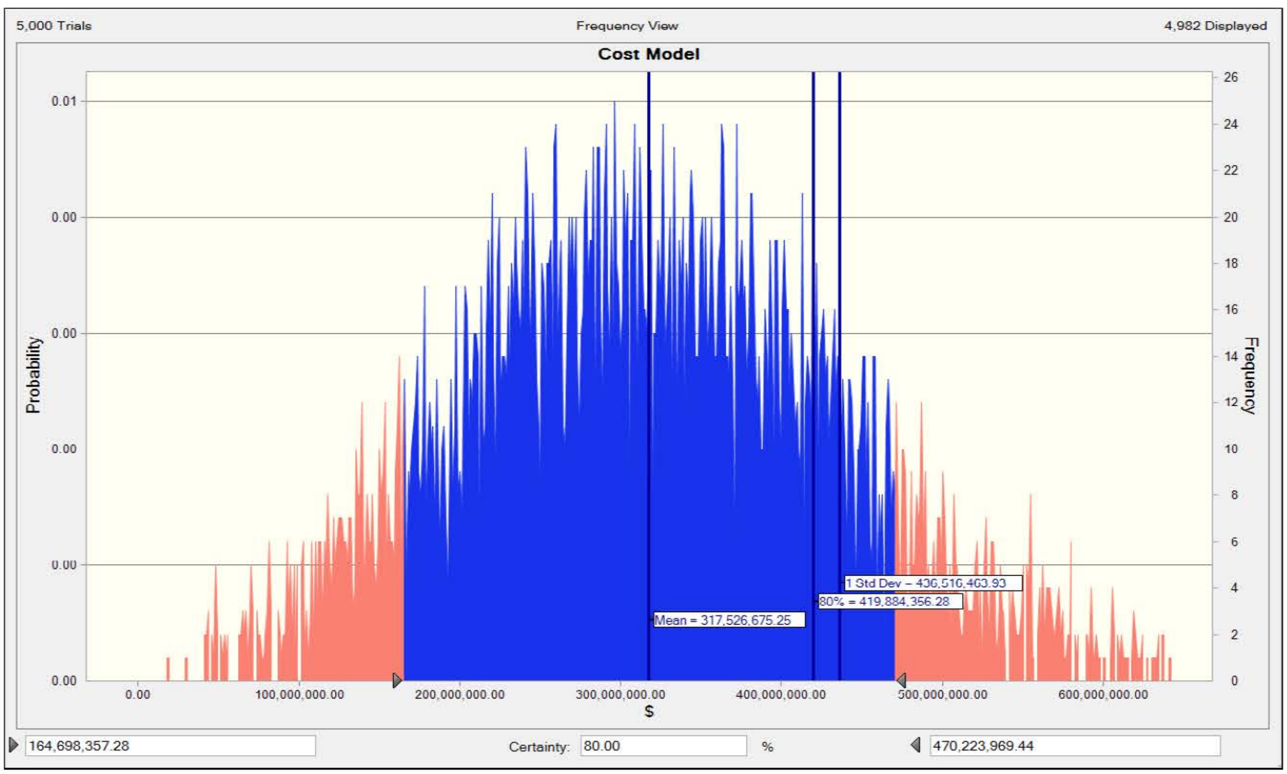
Contingency Analysis

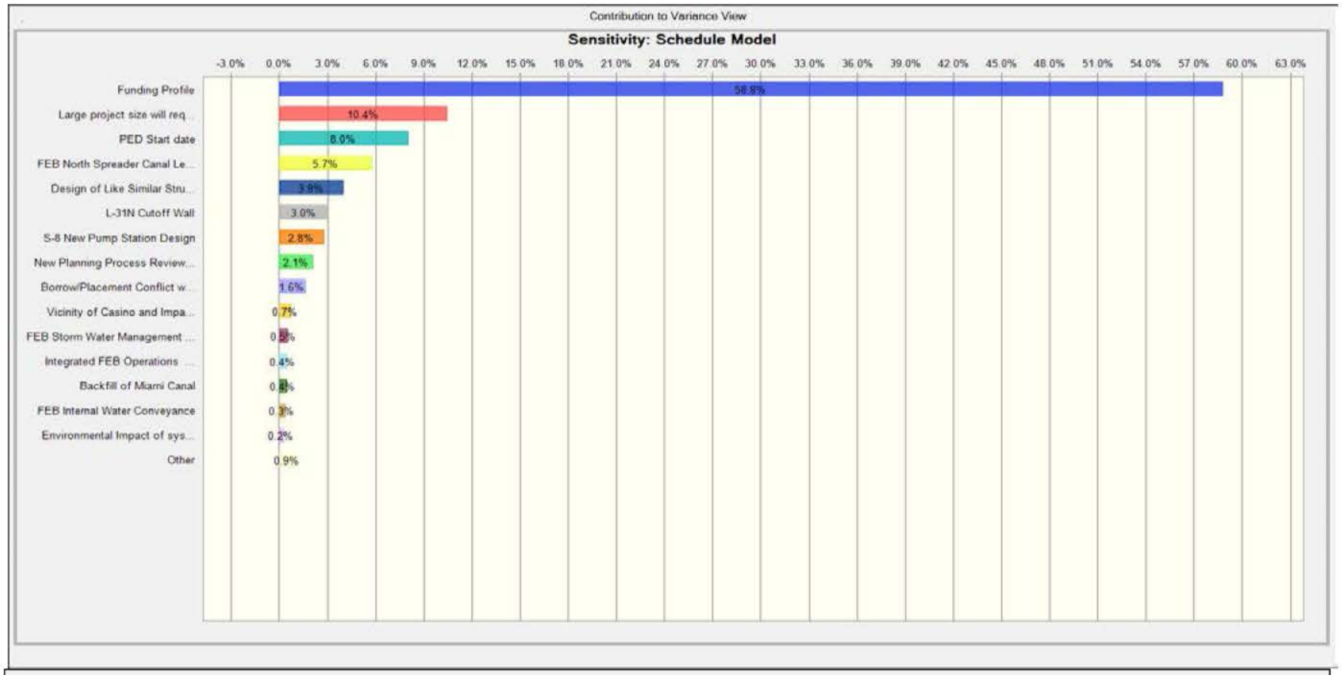
Most Likely Schedule Duration	329.0 Months		
Confidence Level	Project Duration	Contingency	Contingency %
0%	309.0 Months	-20 Months	-6%
5%	349.0 Months	20 Months	6%
10%	359.0 Months	30 Months	9%
15%	362.0 Months	33 Months	10%
20%	369.0 Months	40 Months	12%
25%	372.0 Months	43 Months	13%
30%	379.0 Months	50 Months	15%
35%	382.0 Months	53 Months	16%
40%	385.0 Months	56 Months	17%
45%	389.0 Months	60 Months	18%
50%	392.0 Months	63 Months	19%
55%	395.0 Months	66 Months	20%
60%	399.0 Months	70 Months	21%
65%	402.0 Months	73 Months	22%
70%	408.0 Months	79 Months	24%
75%	412.0 Months	83 Months	25%
80%	**418.0 Months**	**89 Months**	**27%**
85%	422.0 Months	93 Months	28%
90%	431.0 Months	102 Months	31%
95%	441.0 Months	112 Months	34%
100%	491.0 Months	162 Months	49%

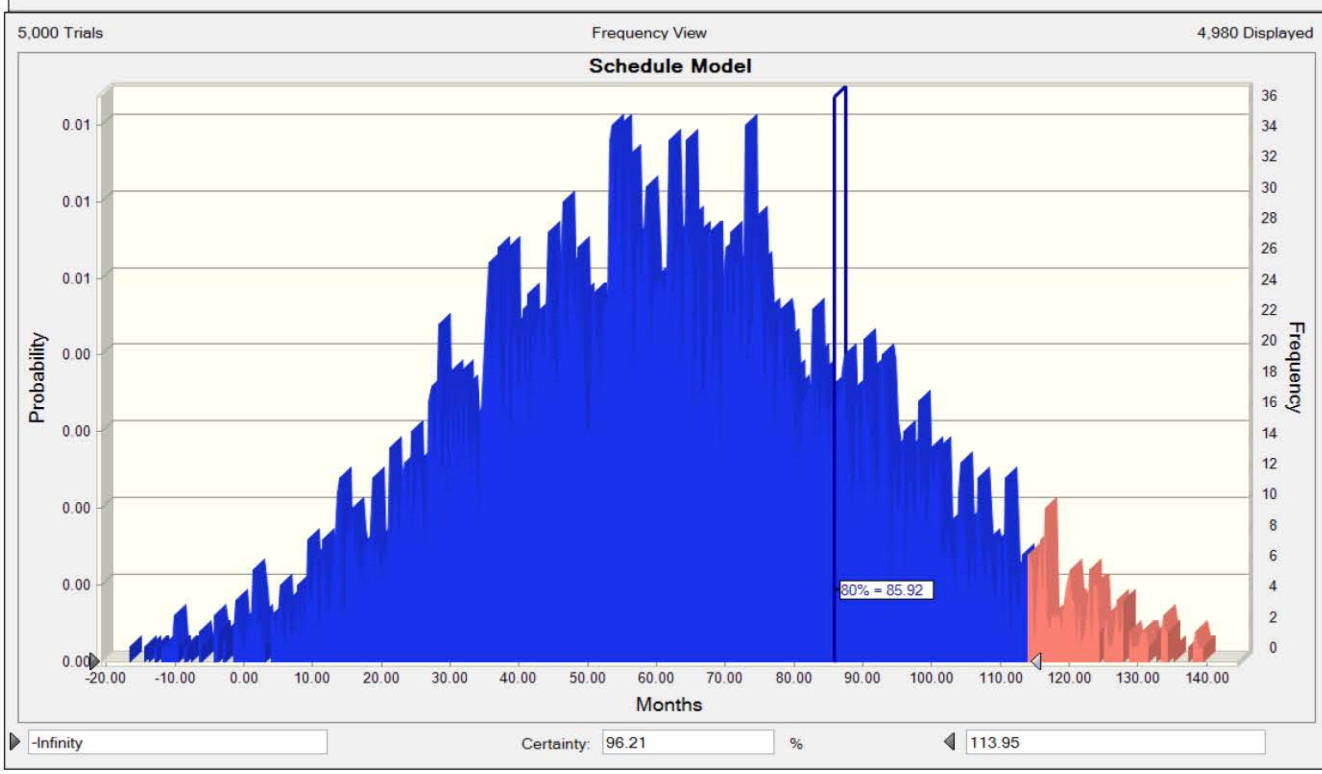
Schedule Contingency (Duration) Analysis




Contribution to Variance View
Sensitivity: Cost Model
-4.0% -2.0% 0.0% 2.0% 4.0% 6.0% 8.0% 10.0% 12.0% 14.0% 16.0% 18.0% 20.0% 22.0% 24.0% 26.0% 28.0% 30.0% 32.0%
Funding Profile
Estimate Assumptions/Like ...
FEB North Spreader Canal Le...
S-8 New Pump Station Design
Fuel Price
Integrated FEB Operations ...
Local Escalation Greater th...
Large project size will req...
Borrow/Placement Conflict w...
Disposal of Excess on Site ...
Levee Stabilization Approach
Backfill of Miami Canal
Gated Structures, Gaps, and...
Cut Fill Qtys Based on Impl...
System not performing as in...
Other


5,000 Trials
Frequency View
4,982 Displayed
Cost Model
Probability
Frequency
0.01
0.00
1 Std Dev = 436,516,403.93
80% = 419,884,356.28
Mean = 317,526,675.25
0.00
100,000,000.00
200,000,000.00
300,000,000.00
400,000,000.00
500,000,000.00
600,000,000.00
$
164,698,357.28
Certainty: 80.00 %
470,223,969.44


Contribution to Variance View
Sensitivity: Schedule Model
Funding Profile 58.8%
Large project size will req... 10.4%
PED Start date 8.0%
FEB North Spreader Canal Le... 5.7%
Design of Like Similar Stru... 3.9%
L-31N Cutoff Wall 3.0%
S-8 New Pump Station Design 2.8%
New Planning Process Review... 2.1%
Borrow/Placement Conflict w... 1.6%
Vicinity of Casino and Impa... 0.7%
FEB Storm Water Management ... 0.5%
Integrated FEB Operations ... 0.4%
Backfill of Miami Canal 0.3%
FEB Internal Water Conveyance 0.3%
Environmental Impact of sys... 0.2%
Other 0.9%


5,000 Trials
Frequency View
4,980 Displayed
Schedule Model
Probability
Frequency
Months
80% = 85.92
-Infinity
Certainty: 96.21 %
113.95

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

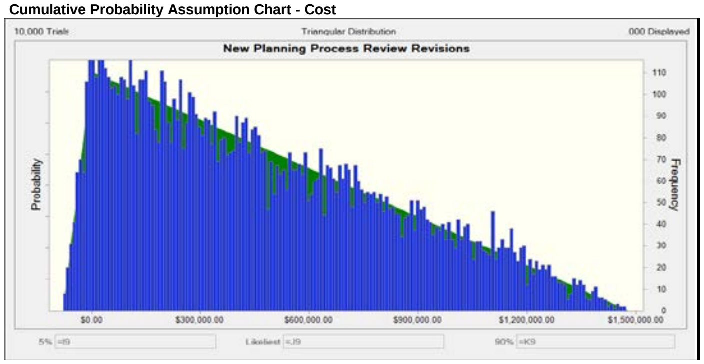
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
P-PPM-1	New Planning Process Review Revisions	Very Likely	Negligible	LOW	Triangular	None	100%	$0	$0	$1,000,000	

Schedule

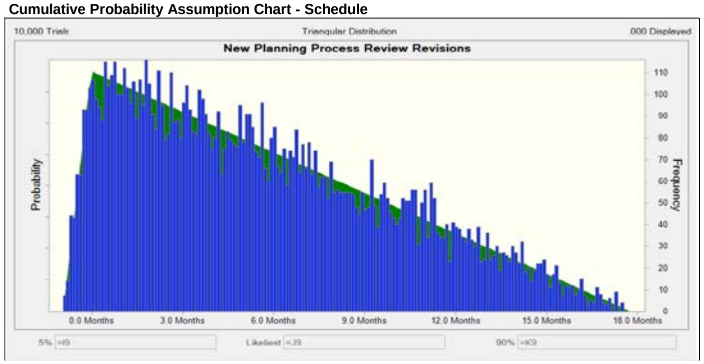
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
P-PPM-1	New Planning Process Review Revisions	Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	12.0 Months	

Description	As the project reaches mile stones and HQ revises or asks for changes to the process. The concern is during the 3x3x3 planning phase HQ revises the anticipated out come of the planning study and delays in the authorization schedule will be encountered.
Development of Low Values	The best case scenario is that the project moves forward with out any delays due to the new planning process. This will result in a 0 month delay and will have no impact on the schedule.
Development of High Values	The worst case scenario is that the planning process is changed mid stream and additional requirements are added that causes the entire schedule to slip 12 months. The additional 12 moths added to the schedule could add up to $1 million for study costs.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	P-PPM-2	Multiple overlapping projects	Very Likely	Significant	HIGH	Triangular	None	100%	$0	$0	$0	

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	P-PPM-2	Multiple overlapping projects	Very Likely	Significant	HIGH	Triangular	None	100%	0.0 Months	0.0 Months	0.0 Months	

Description	There are multiple overlapping projects and accounting for costs and benefits may be overlapping. Overall system needs to work together to provide benefits. There are numerous projects within the area that may have different purposes and overlapping features. This may cause accounting and authorization issues due to cost share and project purposes.
Development of Low Values	This risk must be addressed by HQ and the multiple project sponsors and is not studied. Savings Clause issues are assumed to be resolved and the project scope is assumed to be correct. NOT MODELED BUT CARRIED FOR WATCH LIST
Development of High Values	

Cumulative Probability Assumption Chart - Cost

Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

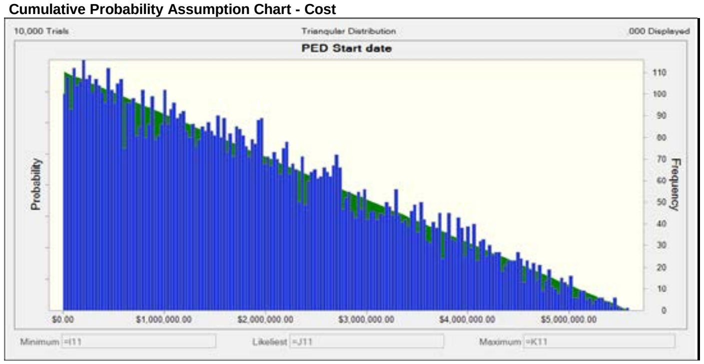
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
P-PPM-3	PED Start date	Very Likely	Negligible	LOW	Triangular	None	100%	$0	$0	$6,381,855	

Schedule

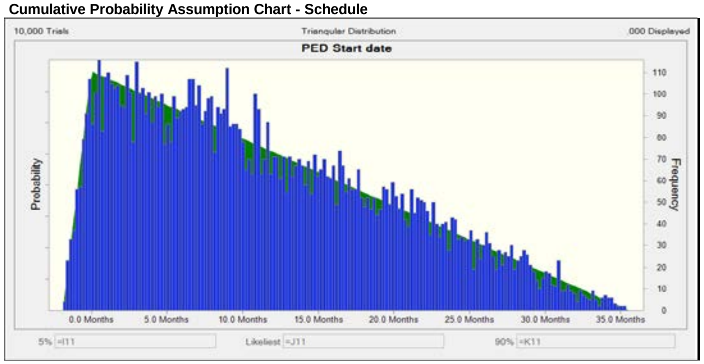
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
P-PPM-3	PED Start date	Very Likely	Critical	HIGH	Triangular	None	100%	0.0 Months	0.0 Months	24.0 Months	

Description	PED phase will most likely not start until next WRDA is passed. FY 2016 is probably the earliest authorization would occur. However this could change depending on the next WRDAs actual issuance.
Development of Low Values	The best case scenario is that construction starts as planned.
Development of High Values	The worst case scenario is that the next WRDA is delayed and the project is delayed 2 years. The additional 24 months could be added to the schedule. This delay is after the report is routed and could expose the project to additional escalation as well as additional 30/31 account cost to update and maintain the project data files. Assume 1/2 of one percent for two years cost

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

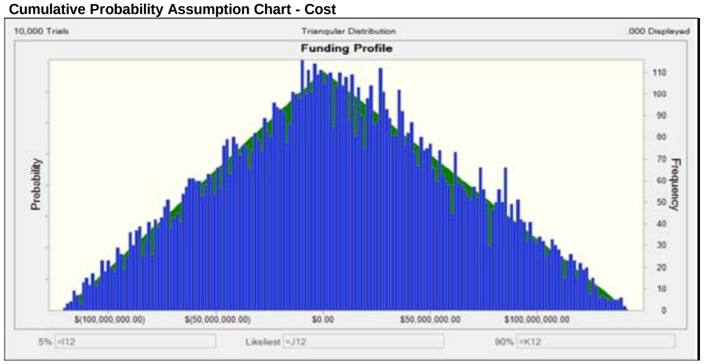
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
P-PPM-4	Funding Profile	Likely	Marginal	MODERATE	Triangular	None	100%	($95,021,870)	$0	$95,021,870	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
P-PPM-4	Funding Profile	Likely	Significant	HIGH	BETA P	None	100%	-38.3 Months	0.0 Months	76.5 Months	

Description	Project implementation is dependent on both the federal and sponsor being able to meet financial obligation to meet the project. Equal contributions or cost share from the sponsor and from USACE will be needed for future work. Progress could very based on actual finical contributions in funding the project.
Development of Low Values	The best case scenario is that the sponsor and the Corps are able to fund an additional 25% of the planned yearly cash contributions and that the schedule will act linear and reduce by 25%. It is assumed that this will have no effect on the overall project cost. Due to larger funding windows, construction could be more efficient and be reduced up to 10%.
Development of High Values	The worst case scenario is that the sponsor and corps are only able to fund 50% of the planned yearly cash contributions and the schedule will act linear and increase by 50%. It is assumed that this will have no effect on the overall project cost. The cost could increase by as much as 10% based on the extension of the schedule.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

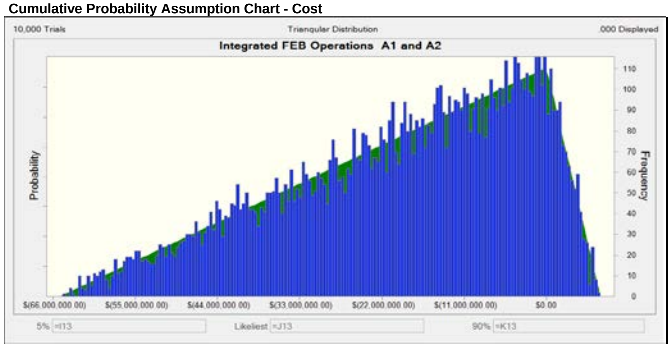
SAJ - CEPP Cost and Schedule Risk Analysis

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	NR-PPM-5	Integrated FEB Operations A1 and A2	Likely	Marginal	MODERATE	Triangular	None	100%	($49,750,000)	$0	$0	

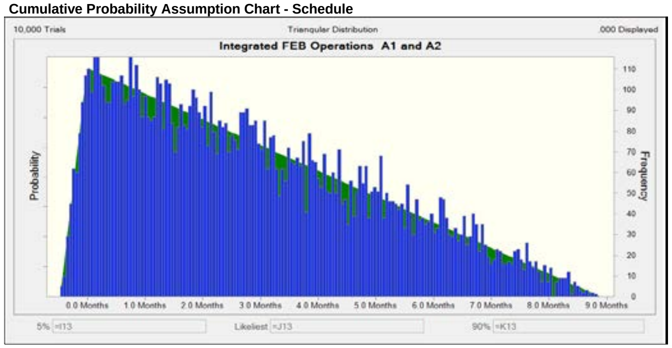
	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	NR-PPM-5	Integrated FEB Operations A1 and A2	Likely	Negligible	LOW	Triangular	None	100%	0.0 Months	0.0 Months	6.0 Months	

Description	It is assumed that A1 will be completed prior to construction of A2 (Start FEB 2015 Competed 2018). Some minor changes in design or assumed operating conditions may result depending on final configuration of A2. This is an opportunity for savings.
Development of Low Values	The best case scenario is that it is determined that one of the gated culverts in the project is no longer needed and the cost for the structure will be a savings of approx $16.5M. Assumed that one of the gated structures is no longer needed as this is concurrent work it will not have a savings for schedule. Another case scenario is that savings that could be realized range from sharing a perimeter levee ~7 miles of the ~20 miles in length of the A-1 FEB.The total costs for the 7 miles of shared levee will be $33.25 Million with a savings in schedule.
Development of High Values	The worst case scenario is that it takes up to 6 months to determine through planning that the structure is not needed and that could cause a slip in the schedule due to having to remodel the entire project multiple times to fully understand the benefits of each feature with no added cost.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



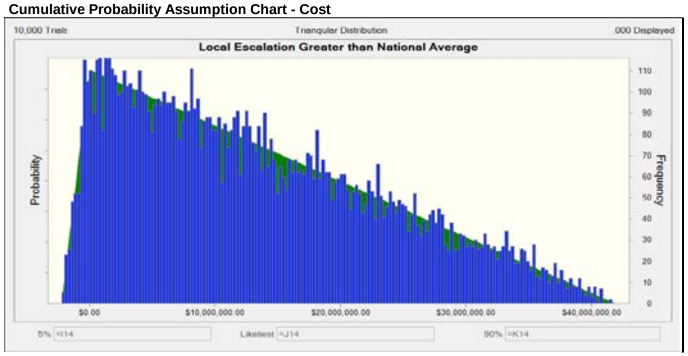
SAJ - CEPP Cost and Schedule Risk Analysis

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	PPM-6	Local Escalation Greater than National Average	Unlikely	Crisis	HIGH	Triangular	None	100%	$0	$0	$32,270,658	

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	PPM-6	Local Escalation Greater than National Average	Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	When dealing with large multiple year projects there are concerns for localized inflation above CWCCIS. The concern is that due to funding restrictions and multiple contracts that inflation in CWCCIS will be outpaced in future years. This is the possibility that inflation exceeds the CWCCIS tables in future years.
Development of Low Values	The best case is that CWCCIS captures the actual local inflation accurately.
Development of High Values	The worst case scenario is that CWCCIS will not account for the actual inflation. Based on the current average inflation of ~3%, for out years, this could be 1/4% low for the total construction costs in the long term. It is assumed that this will have no impact on the schedule.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

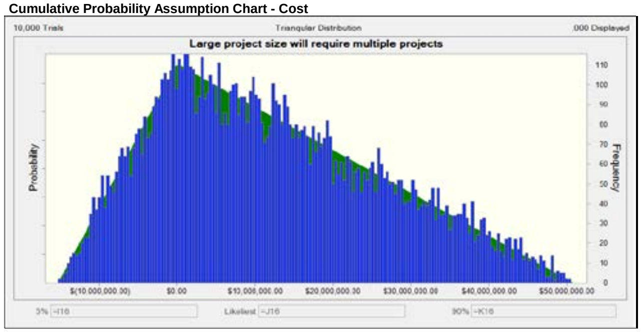
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
P-CA-1	Large project size will require multiple projects	Likely	Marginal	MODERATE	Triangular	None	100%	($9,502,187)	$0	$38,008,748	

Schedule

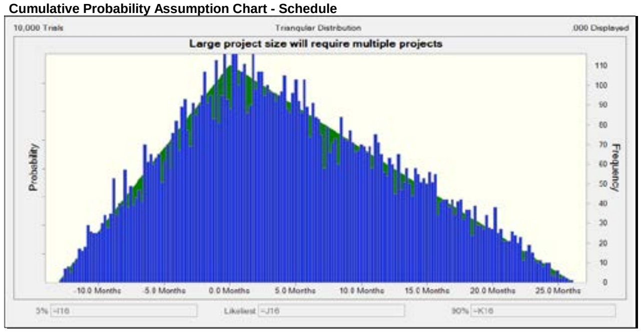
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
P-CA-1	Large project size will require multiple projects	Likely	Marginal	MODERATE	Triangular	None	100%	-8.0 Months	0.0 Months	16.0 Months	

Description	Most likely due to the large size of the project the project will be broken up into small individual contracts. Coordination and sequencing may change significantly due to acquisition approach. Some thought has been put into contract acquisition into base case estimate. However schedule and cost could change based on actual implementation.
Development of Low Values	The best case scenario is that the projects can be combined into larger than anticipated project resulting in lower implementation costs and lower overhead on the project. This potential savings will be realized based on saving 5% on 20% of the work. Based on scheduling fewer projects and having multiple phases of work on multiple structures there could be a 1 month savings per contract awarded. Schedule value is based on 37 features of work results in 8 contracts saving one month each.
Development of High Values	The worst case scenario is that the features are awarded individually or even broken into smaller projects to achieve a small business/8a contracting goal. This could result in an additional 20% construction cost for up to 20% of the work. Based on scheduling multiple contracts, overlapping award dates dependent on work under another contract it is assumed that for 2 additional months per contract could be needed on the additional 20% resulting in 8 contracts taking 16 additional months.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



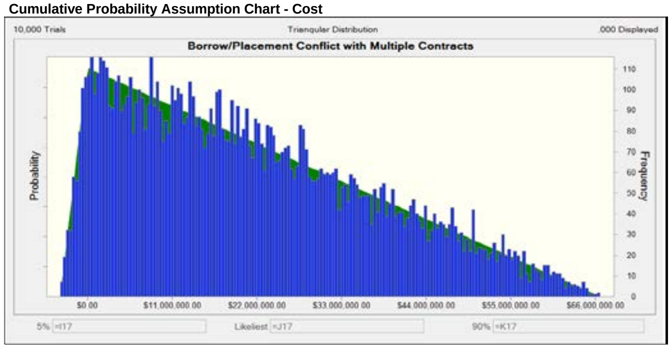
SAJ - CEPP Cost and Schedule Risk Analysis

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	SR-CA-2	Borrow/Placement Conflict with Multiple Contracts	Very Likely	Significant	HIGH	Triangular	None	100%	$0	$0	$45,000,000	

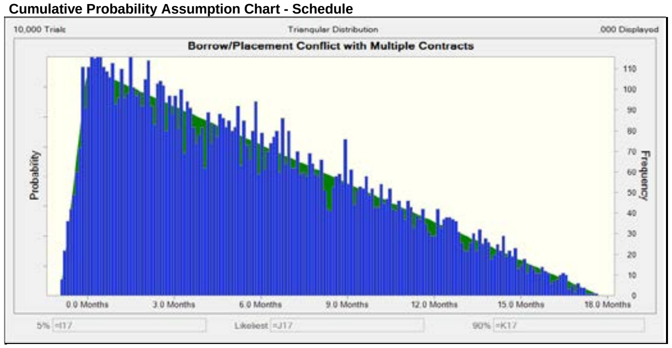
	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	SR-CA-2	Borrow/Placement Conflict with Multiple Contracts	Very Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	12.0 Months	

Description	Concern for scoping of projects to ensure that the backfill and excavation and structure modifications are in the same contract. L6 - L5 must be completed together along with modifications to S-8 and Miami back fill are all required to be completed in series. This could effect construction cost and schedule.
Development of Low Values	The best case scenario is that all construction features are accounted for correctly and will have no added costs. This is a case where there is no chance to save costs.
Development of High Values	The worst case scenario is that all work must be completed in one contract and that the material required from onsite excavations will not be available. This will result in additional costs for importing fill and also add additional costs for disposing of material. This is only referring to work at the south of the red line area. If an additional 1.8 million cubic yards of material is needed to backfill the Miami canal it could add an additional $45 Million. This will also lengthen the schedule. The schedule will need up to 12 months based on future scheduling and supply and demand for material.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

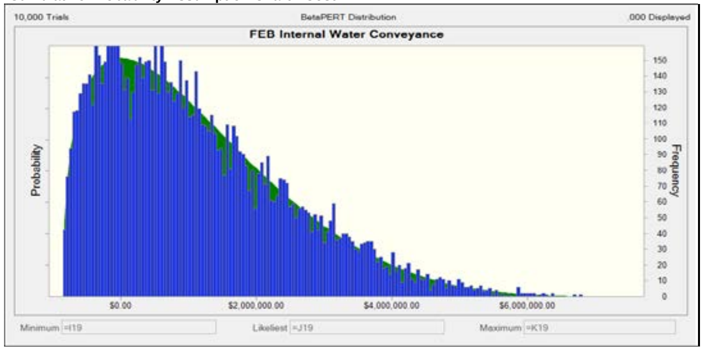
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
NR-TL-3	FEB Internal Water Conveyance	Very Likely	Marginal	MODERATE	Beta Pert	None	100%	($850,000)	$0	$7,500,000	

Schedule

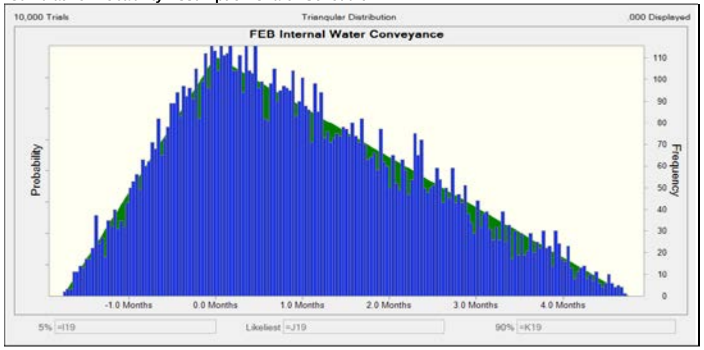
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
NR-TL-3	FEB Internal Water Conveyance	Very Likely	Marginal	MODERATE	Triangular	None	100%	-1.0 Months	0.0 Months	3.0 Months	

Description	There are existing AG canals in the proposed location of the FEB along with roads bordering each side of the canal that may cause issues. There is the possibility of piping through the proposed location of the perimeter levee. There is also the concern for not allowing sheet flow across the FEB with out backfilling or plugging the AG canals.
Development of Low Values	The best case scenario is that the AG canals will act as a conveyance method for draining the FEB and less work will be needed for the outflow canal. Assume that this reduces to cost and duration of the outflow canal by 10%.
Development of High Values	The worst case scenario is that additional work will be needed to ensure that sheet flow will be maintained across the FEB. This could include backfilling the AG canals or plugging the canals. Assume this could add an additional $7.5 Million to the project and 3 months.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

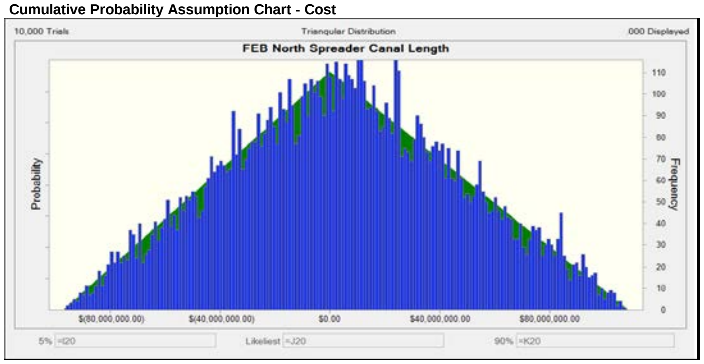
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
NR-TL-4	FEB North Spreader Canal Length	Likely	Marginal	MODERATE	Triangular	None	100%	($65,500,000)	$0	$61,300,000	

Schedule

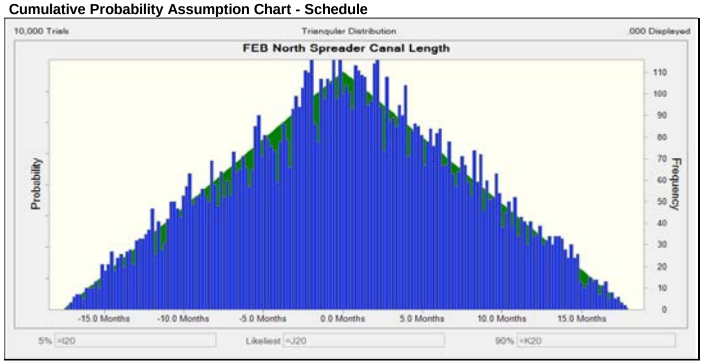
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
NR-TL-4	FEB North Spreader Canal Length	Likely	Marginal	MODERATE	Triangular	None	100%	-12.0 Months	0.0 Months	10.0 Months	

Description	Currently the spreader canal is only on part of the northern end of the FEB. There is concern that the canal my need to extend along the entire northern end including routing the spreader canal south and east to hydrate the east end of the FEB. This will lengthen the canal add additional costs and based on limited funding stream will add additional time to the schedule.
Development of Low Values	The best case scenario is that during design it is determined that the length depth and width can be varied to reduce the overall excavation to achive a net zero cut fill ballance. This could reduce the costs if excavation by 80.2% or by $65.5 million and shorten the duration by 12 months.
Development of High Values	The worst case scenario is that the excavation length is required full width and depth to extend to the eastern most extent of the FEB adding an additional 3 miles to the length of the canal. This could add an additional $61.3 million to the project and lengthen the schedule by 10 months.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



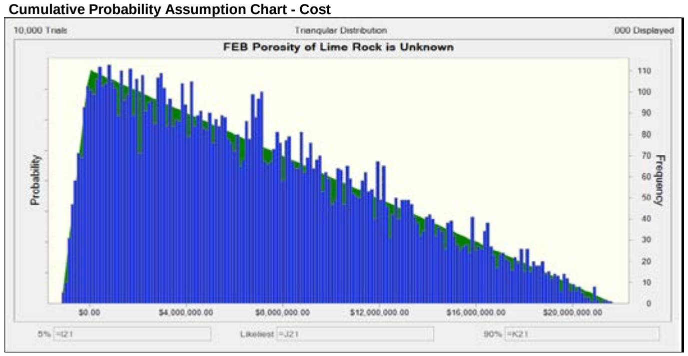
SAJ - CEPP Cost and Schedule Risk Analysis

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	NR-TL-5	FEB Porosity of Lime Rock is Unknown	Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$14,670,000	

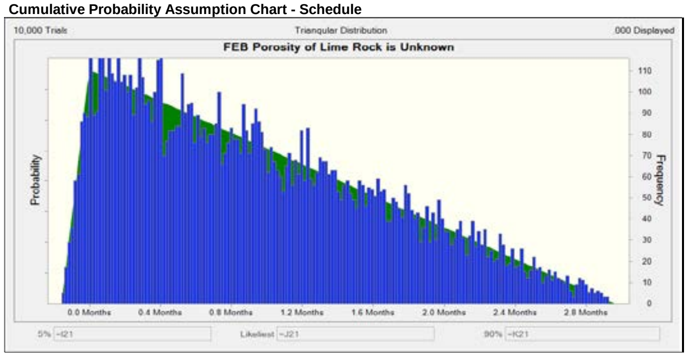
	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	NR-TL-5	FEB Porosity of Lime Rock is Unknown	Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	2.0 Months	

Description	There is the concern that the Lime rock is not capable of containing the water. Unknown geotechnical data. There is concern that there could be a need to be additional work under the FEB perimeter levee. A1 will be constructed prior to A2 and may provide some forewarning of issues.
Development of Low Values	The best case scenario is that the lime rock in the area of the FEB is at the anticipated depth of 1.5 ft. It would also be best case that the lime rock will not require any additional work to ensure that seepage is minimal. This results in the estimate as the best case for development of low values.
Development of High Values	The worst case scenario is that additional excavation is required to reach limestone for the base of the levee. It is assumed that one ft of additional excavation could be required to reach the limestone layer. This could also increase the schedule. It would also be worst case scenario that the lime stone needs additional work to minimize seepage out of the FEB. Assume that this could increase the cost of the perimeter levee base excavation and backfill would go up to 80% and an additional 20% for work required to ensure minimal seepage for a 100% increase in cost of excavating and backfilling the excavation.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

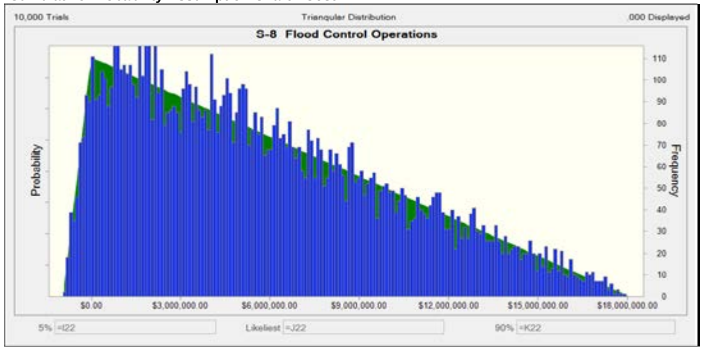
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
SR-TL-6	S-8 Flood Control Operations	Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$14,253,281	

Schedule

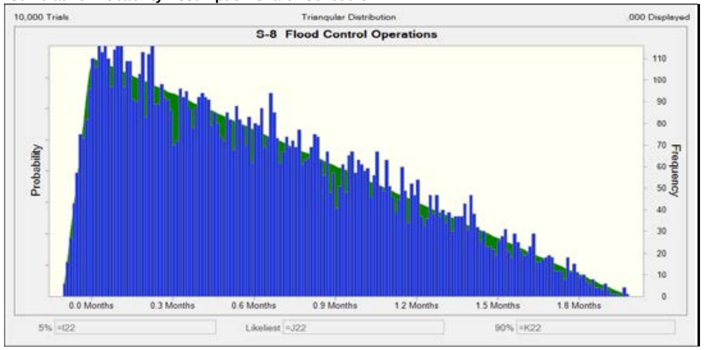
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
SR-TL-6	S-8 Flood Control Operations	Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	1.5 Months	

Description	S-8 needs to provide flood control the entire time until downstream work is complete. A plan and appropriate costs have been incorporated in the features effected by the operation of the S-8 pump station. This includes the gated culverts down stream of the pump station including diversion canals. If any additional work is needed to ensure flood protection it will cause additional cost and could lengthen the schedule.
Development of Low Values	The best case scenario is that no additional work will be required to maintain flood control during construction.
Development of High Values	The worst case scenario is that additional work will be required. It is unknown at this time the additional work that may be required it is assumed that it could total 1.5% of the total project cost it is assumed that the schedule will have the same delay.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

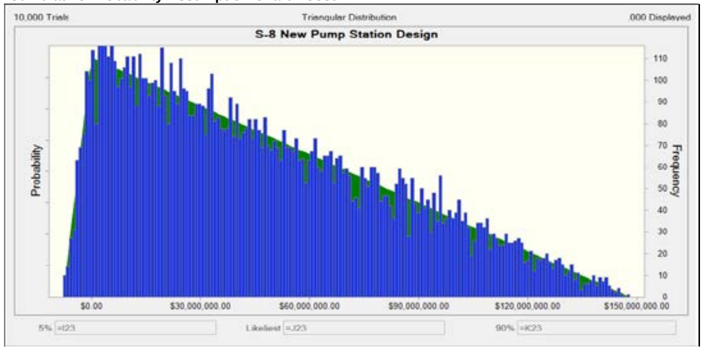
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
SR-TL-7	S-8 New Pump Station Design	Likely	Crisis	HIGH	Triangular	None	100%	$0	$0	$100,000,000	

Schedule

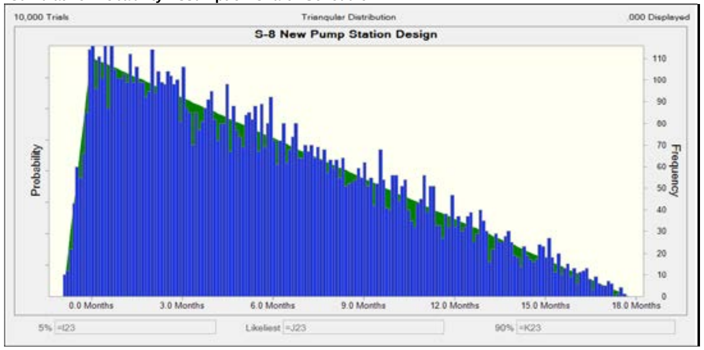
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
SR-TL-7	S-8 New Pump Station Design	Likely	Negligible	LOW	Triangular	None	100%	0.0 Months	0.0 Months	12.0 Months	

Description	The current plan is unclear on the status of S-8 Pump Station. This could require actions ranging form full replacement to minor modifications. The Engineering appendix does not provided sufficient information to determine what the new design of the S-8 pump station. It is likely that the pump station will need additional work to ensure that the pumps are capable of handling the flood waters. this could range from a new pump station to a rehab of the existing
Development of Low Values	The best case scenario is that no additional work will be required to complete the effort.
Development of High Values	The worst case scenario is that a new pump station will be required to be constructed. Based on the location of the pump station and the features that are being built in the area the work required to complete the new pump station could cost as much as $100 Mil based on the anticipated award of Miller PS at $100 Mil. The high schedule impact is based on the work taking 1 year to award based on funding restraints.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

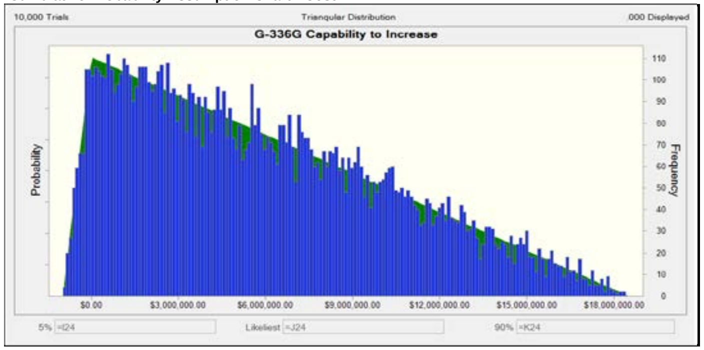
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
SR-TL-9	G-336G Capability to Increase	Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$12,500,000	

Schedule

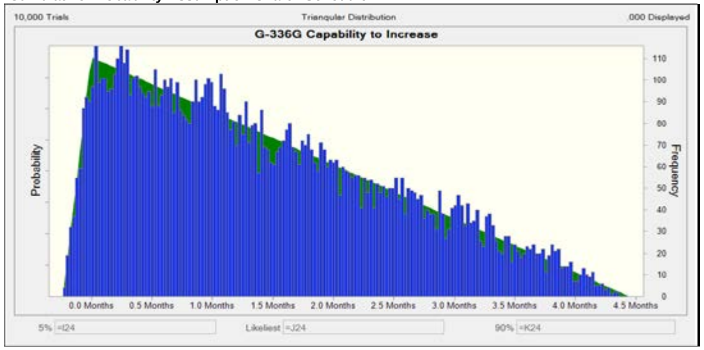
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
SR-TL-9	G-336G Capability to Increase	Likely	Negligible	LOW	Triangular	None	100%	0.0 Months	0.0 Months	3.0 Months	

Description	Usability of existing structure is in question. There is the possibility that the structure has more capability and will need little to no work. However if additional work is required there would be a need for additional costs.
Development of Low Values	The best case scenario is that there is no need for additional work.
Development of High Values	The worst case scenario is that the structure needs work resulting in a new feature being built. It is assumed that this feature could be similar to S-333N with a similar duration and construction cost.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-TL-15	Tamiami Trail Bridges and Roads Raise	Very Unlikely	Negligible	LOW	N/A	N/A		$0	$0	$0	*For this analysis low risks are not considered.*

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-TL-15	Tamiami Trail Bridges and Roads Raise	Unlikely	Crisis	HIGH	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	

Description	This work needs to be completed prior to CEPP and needs to be completed for project to operate as designed. Current scheduled completion dates for these features need to be considered in the implementation schedule for this project. If they are not completed they most likely would delay the CEPP project completion.
Development of Low Values	This risk would not necessarily delay the completion of the project but would delay the benefits from being fully utilized. This risk is not modeled as it is assumed that the bridge raise will be completed.
Development of High Values	

Cumulative Probability Assumption Chart - Cost

Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

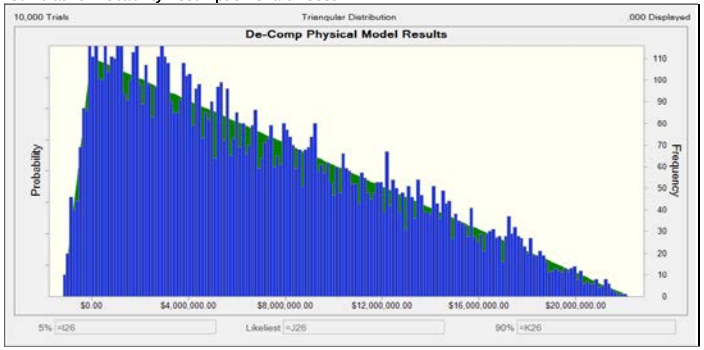
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-TL-20	De-Comp Physical Model Results	Unlikely	Significant	MODERATE	Triangular	None	100%	$0	$0	$15,000,000	

Schedule

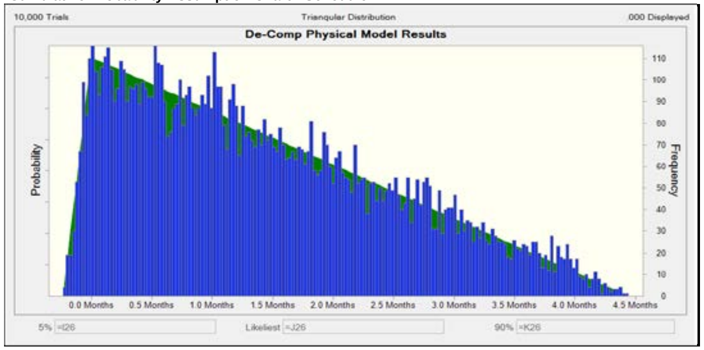
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-TL-20	De-Comp Physical Model Results	Unlikely	Significant	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	3.0 Months	

Description	There is the possibility that the de-comp model will change the design of some or all features L-67C could need to be backfilled or plugged as a result of the de-comp model results. There is also the possibility of features changing based on the results of De-Comp study. This may be difficult or impossible to model. Current report is based on best known information. This should be included on the watch list of risks.
Development of Low Values	The best case scenario is that once the model is finalized there is no additional work required to ensure the desired flow is achieved.
Development of High Values	The worst case scenario is that additional cost and schedule will be required to backfill the canal and accommodate the changes in the design of the features in the area. It is assumed that the additional backfill could add $5 mil to the project and the feature modifications could add $10 mil additional work in the Blue-Green-Yellow line area. This is not included under the adaptive management estimate.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-TL-21	Collector Canal at S-355B	Likely	Marginal	MODERATE	N/A	N/A		$0	$0	$0	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-TL-21	Collector Canal at S-355B	Unlikely	Marginal	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	

Description	There is concern that there could be the need for a collector canal at the location of the current S-355B. This is not included in the current construction estimate or scope. It will allow for the water to be drained out of the WCA 3B. The cost for a collector canal at S-355B is included in the adaptive management cost estimate. This is not modeled in the risk as the cost is in the adaptave management base costs.
Development of Low Values	The best case scenario is that no collector canal is needed. No credit is assumed.
Development of High Values	

Cumulative Probability Assumption Chart - Cost

Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

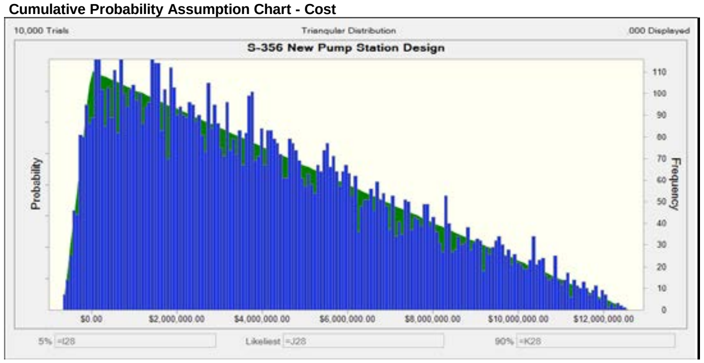
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Y-TL-26	S-356 New Pump Station Design	Very Likely	Marginal	MODERATE	Triangular	Y-LD-10	100%	$0	$0	$8,500,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Y-TL-26	S-356 New Pump Station Design	Very Unlikely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	It is unknown about the buy in from the tribes in the design. Noise, design of structure, and vibrations generated from pumps around tribal lands have been an issue in the past. There is concern for the proximity to the casino owned by the Miccosukee tribes. This may drive the pumps to be electric pumps or require additional aesthetics or soundproofing features.
Development of Low Values	The best case scenario is that pumping plant needs no changes.
Development of High Values	The worst case scenario is that addational changes could add 1/3 to the cost of the pump station.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

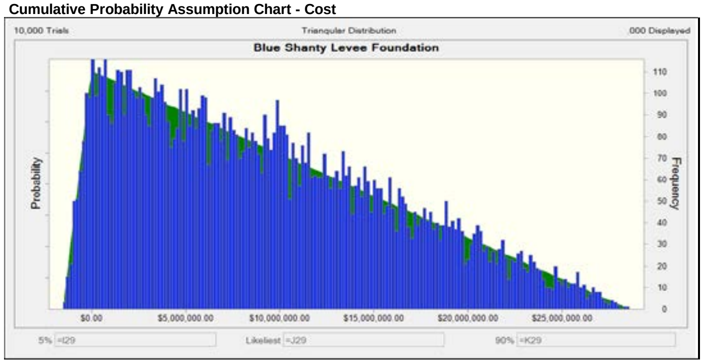
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-TL-27	Blue Shanty Levee Foundation	Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$19,300,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-TL-27	Blue Shanty Levee Foundation	Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	There is little to no data in the area of the levee. The need for upgrades to the foundation design may be needed, this would ensure that there was minimal piping under the levee. The future design could include the use of filter blankets to ensure the stability of the levee foundation.
Development of Low Values	The best case scenario is that through investigations it is determined that no additional work is needed to stabilize the levee base.
Development of High Values	The worst case scenario is that filter blankets and or other work is needed to ensure that there is minimal piping under the levee this could add an additional 25% to the levee cost.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

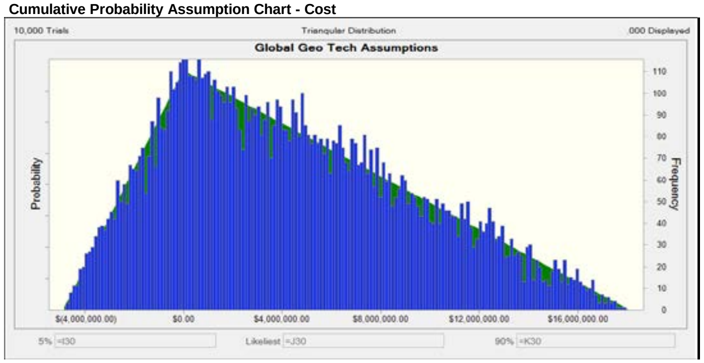
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
TL-28	Global Geo Tech Assumptions	Likely	Significant	HIGH	Triangular	None	100%	($2,520,000)	$0	$11,625,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
TL-28	Global Geo Tech Assumptions	Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	The team used global assumptions for the material strata for entire project although past experience shows that these can vary significantly throughout the region. Any localized variance in the material type could have an impact in the cost of excavation.
Development of Low Values	Currently the material strata for the entire project is set the same. There is the possibility that the material encountered during construction could be easier than expected. Assume that 5% of the material that currently needs blasting is actually inter-bedded formation. This will reduce the unit cost on 270,000 BCY by approximately $9 per BCY.
Development of High Values	If the material encountered during excavation is different than expected this could add additional cost. Assume that up to 25% of the blasted material is harder requiring slower production, and assume that the blasted material is 15% more than expected. Resulting in an additional 15% price increase per BCY for harder excavation and an additional 775,000 BCY of blasted excavation at approximately $9 per BCY more.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

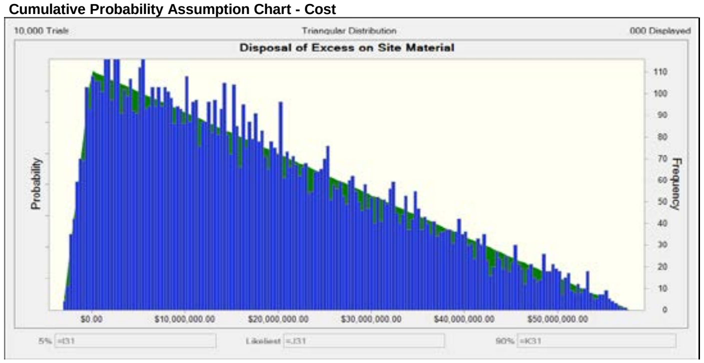
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
TL-29	Disposal of Excess on Site Material	Very Likely	Significant	HIGH	Triangular	None	100%	$0	$0	$39,000,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
TL-29	Disposal of Excess on Site Material	Very Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	Currently there is no design for location or technique of onsite disposal of excess material. There is likely the chance that additional work will be required to usefully dispose of the material on site. This could range from spreading across areas to increasing the size of earthen features.
Development of Low Values	The best case scenario is that no additional work will be needed to dispose of the material on site. The material can just be stockpiled.
Development of High Values	The worst case scenario is that additional work will be need to move and shape 40% the 5.5 million LCY around the FEB and create swales, berms, or build bigger levees. The estimate for moving the material is $39 million.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

Cost

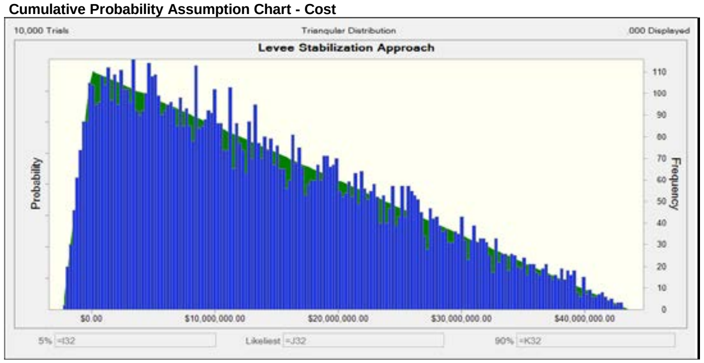
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
TL-30	Levee Stabilization Approach	Unlikely	Crisis	HIGH	Triangular	None	100%	$0	$0	$29,450,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
TL-30	Levee Stabilization Approach	Unlikely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	Currently the estimate has seeding as the means of stabilization for the side slope of the levees. Possibility exists that seeding may not be adequate to ensure the stabilization of the levee. In that case the levee might need to be covered in sod.
Development of Low Values	The best case scenario is that the levees and stabilization can be seeded or hydro seeded. This will result in no change to the estimate in cost or schedule.
Development of High Values	The worst case scenario is that the levees and stabilization will need sod used in the stabilization process. In this case the estimate has been modified and it adds an additional $29.45 Million to the cost. It will not add any additional time to the project.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

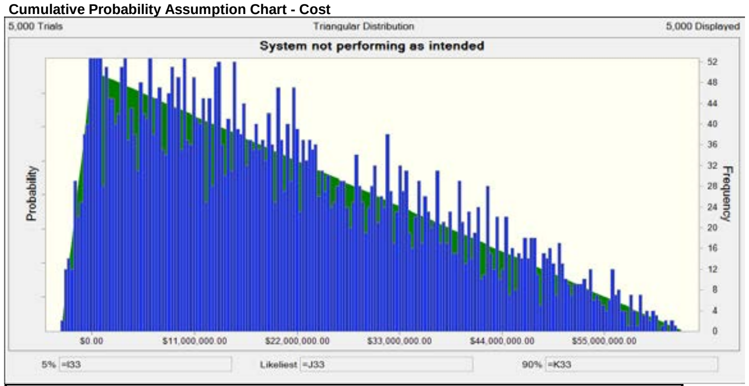
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
TL-31	System not performing as intended	Likely	Critical	HIGH	Triangle	None	100%	$0	$0	$42,832,535	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
TL-31	System not performing as intended	Unlikely	Negligible	LOW	#N/A	#N/A	#N/A	0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	There is a technical risk that the system may not perform as expected and that some additional work may be required
Development of Low Values	Assume the base case estiamte is same as the low value
Development of High Values	Assume that up to 5% of the estimated construction cost could be expended performing changes to the project to make it perform successfully.

Cumulative Probability Assumption Chart - Cost



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

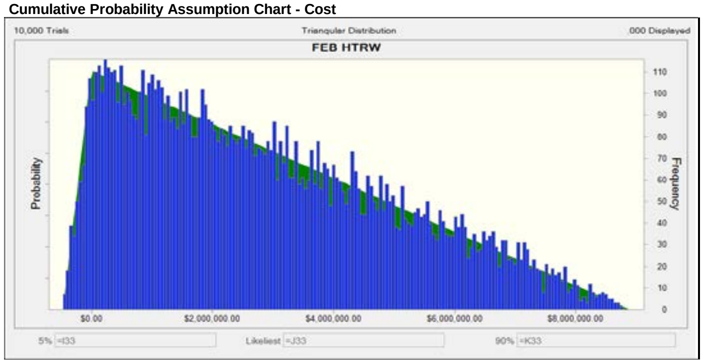
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
NR-LD-1	FEB HTRW	Very Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$6,000,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
NR-LD-1	FEB HTRW	Very Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	There is the possibility that the Farm Land may have HTRW in the area. There is likely an area or areas that will need additional work to ensure that the area is free of hazardous material prior to starting the construction of the FEB.
Development of Low Values	The best case scenario is that no HTRW will be found in the area.
Development of High Values	The worst case scenario is that HTRW is found. It is assumed that this would not delay the critical path. Costs for the HTRW are the sponsors responsibility but are included in the TPC and cost share. It is assumed that this could add an additional 6M to the project.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	BG-LD-8	Mitigation of Lands	Unlikely	Marginal	LOW	N/A	N/A		$0	$0	$0	

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	BG-LD-8	Mitigation of Lands	Unlikely	Significant	MODERATE	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	

Description	The concern is that not all lands necessary to complete the project will be acquired by other projects along Tamiami trail There is a risk that some lands targeted to be acquired by other projects may not be timely or be acquired due to funding. This could delay the project.
Development of Low Values	The best case scenario is that the other agency that is required to acquire the land will do so in a timely manner and it will not be an impact. The project can move forward without a delay.
Development of High Values	The worst case scenario is that the other agency will not acquire the lands in a timely manner potentially delaying implementation in the area. This could delay the project in the interim but not effect the overall critical path and final completion date. This will not be modeled.

Cumulative Probability Assumption Chart - Cost

Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

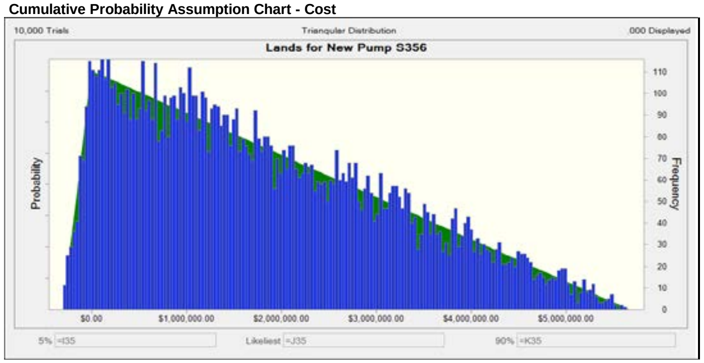
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Y-LD-10	Lands for New Pump S356	Likely	Marginal	MODERATE	Triangular	Y-TL-26	100%	$0	$0	$3,825,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Y-LD-10	Lands for New Pump S356	Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	The current location of the new pump is in the general proximity of the Miccosukee tribal area. Depending on the future state of S-356 a new location may be beneficial to acquire new lands for construction of the replacement. It is unknown if the temp pump will be used during construction, it also is unknown if the proposed location of the new pump will allow for the pump station to be able to be constructed while still operating the existing S-356 pumps.
Development of Low Values	The best case scenario is that the existing 356 pump station will remain operational as needed during construction, the new 356 pump station can be built on lands that do not need to be acquired in the same vicinity as the existing 356 pump station. No additional costs will be encountered.
Development of High Values	The worst case scenario is that temporary pumping will be needed and a new location for the pump station will be required. This could impact the cost of construction up to 15% of the cost of the new 356 pump station. This includes the land costs and new requirements for the different location. This is inversely correlated to Y-TL-26 I.e. if I redesign for noise, I don't need to move it but if I move it I don't need to consider the design/noise issues.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
RE-2	Water Quality Legal Issues Project Wide	Very Unlikely	Negligible	LOW	N/A	N/A		$0	$0	$0	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
RE-2	Water Quality Legal Issues Project Wide	Unlikely	Crisis	HIGH	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	

Description	Water quality in system has been challenged before. It is assumed that this will be resolved and water quality will be acceptable prior to the construction of CEPP. Legal action or delays could significantly delay the project if this is not resolved the project will not move forward, this issue must be resolved prior to authorization of the project.
Development of Low Values	This risk will not be modeled. It is assumed that the water quality issues will be resolved prior to authorization as this would stop the project.
Development of High Values	

Cumulative Probability Assumption Chart - Cost

Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

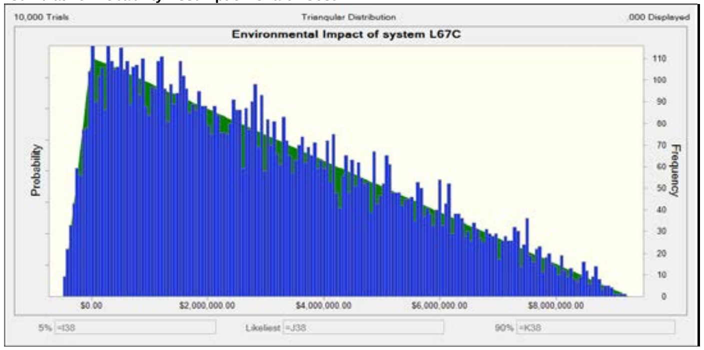
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-RE-9	Environmental Impact of system L67C	Likely	Significant	HIGH	Triangular	None	100%	$0	$0	$6,250,000	

Schedule

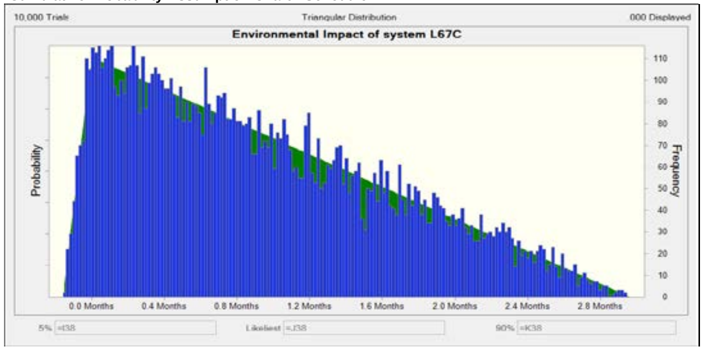
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-RE-9	Environmental Impact of system L67C	Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	2.0 Months	

Description	NEPA Impacts of changing the affected area needs to be considered. It is unclear if the areas and volumes will ensure a net positive effect. It is unclear if the foot print of impact to the system will be equal after construction. The initial documentation included for removing the L67C and backfilling the canal is compete however actual results could change the plan.
Development of Low Values	The best case scenario is that no additional work is needed to satisfy the NEPA requirements.
Development of High Values	The worst case scenario is that we would have to remove material from L67C and or build a spreader canal. Use approx 1.5 times the cost to fill in L67 EXT and 2 months.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

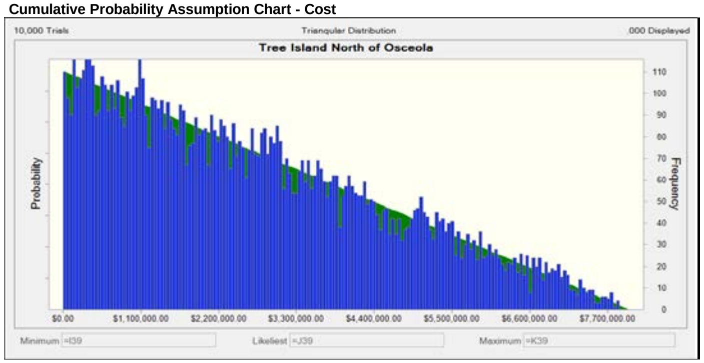
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-RE-13	Tree Island North of Osceola	Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$8,000,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-RE-13	Tree Island North of Osceola	Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	There are historically significant tree islands north of Osceola Camp. These islands cannot be effected in the construction or operation of the project. There is a potentially sensitive cultural site just north of the Osceola camp.
Development of Low Values	The best case scenario is that studies will show that there will be no need for additional protection around the Tree islands that have historically significant items.
Development of High Values	The worst case scenario is that additional work will be needed to ensure that the tree islands are maintained in their current state. This additional work could consist of anything from building a ring levee to armoring the extents of the island or rerouting the outflow canal from the new S-333 N structure around the island. Costs are based on routing the outflow canal around the island effectively adding three times the length of the canal to the current project.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

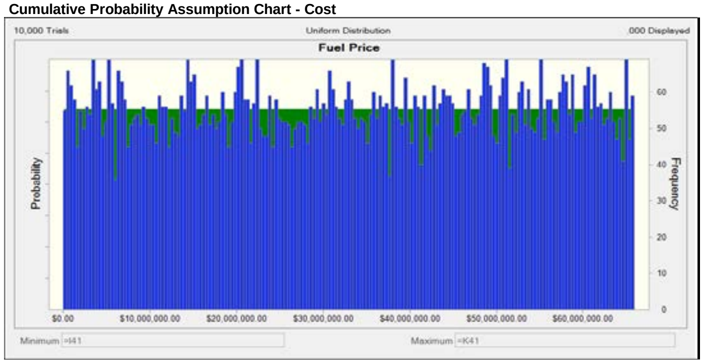
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
P-CON-1	Fuel Price	Likely	Significant	HIGH	Uniform	None	100%	$0	$0	$65,900,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
P-CON-1	Fuel Price	Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	Due to the large quantity of hauling that will take place on the job there is a chance that fuel prices increasing could impact the job. It is unknown at this time what the future of fuel prices will do this will be studied and determined what different increases in how fuel prices will effect the job.
Development of Low Values	The best case scenario is that fuel prices will maintain current inflation with CWCCIS. This will result in no change for the low value.
Development of High Values	The worst case scenario is that fuel prices will increase at the same rate as the last 10 years (8% per year) which will exceed CWCCIS by 4.5% per year. Based on a 20 year construction period fuel could increase from $119.1 million to $184.9 million to the midpoint of construction.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

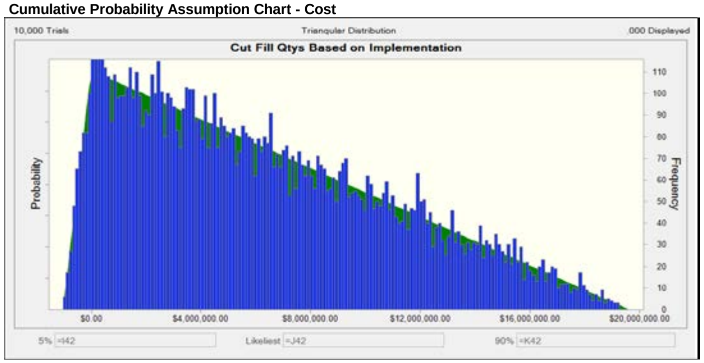
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
NR-CON-4	Cut Fill Qtys Based on Implementation	Very Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$13,250,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
NR-CON-4	Cut Fill Qtys Based on Implementation	Very Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	Cut/Fill quantities could vary from estimate. The concern is that you will need off site borrow or to create an excavation pit to ensure that all features have sufficient material. Additional processing of onsite materials as needed. This could also change based on implementation.
Development of Low Values	The best case scenario is that all projects are completed in a logical manor that delivers material for construction and benefit with eliminating any need for offsite fill.
Development of High Values	The worst case scenario is that the sequencing of benefits outweighs the construction scheduling for a net cut-fill balance and will require off site fill to complete features of work. FEB perimeter levee is required prior to construction of the C-625E. Assumed that off site material could be needed for 25% of the levee adding an additional $13.25 million.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

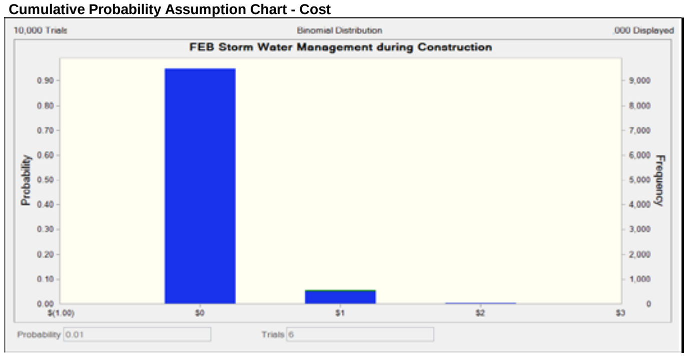
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
NR-CON-6	FEB Storm Water Management during Construction	Likely	Marginal	MODERATE	Binomial	None	100%	$0	$0	$25,000,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
NR-CON-6	FEB Storm Water Management during Construction	Likely	Marginal	MODERATE	Binomial	None	100%	0.0 Months	0.0 Months	12.0 Months	

Description	The concern is that there will be water influx to the area during a storm. There is the possibility that the water will need to be pumped or allowed to dry. There is concern that during the process of scheduling the work there will be delays that adversely impact the operations of the features.
Development of Low Values	The best case scenario is that there are no storms that impound water in the FEB prior to the system being operational. This will cause no delays or no additional costs. This can be achieved in scheduling of contracts and possible staged construction.
Development of High Values	The worst case scenario is that there is a major storm that impounds the FEB and systems are not operational to empty the system. This will likely add an additional year to the construction and $25 million for reconstruction of damaged features, overhead and the costs for dewatering the FEB. Use 6 years construction, 1/100 storm probability and 25M for damages.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

Cost

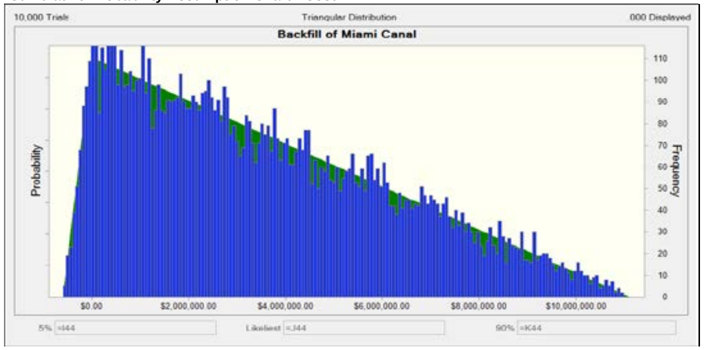
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
SR-CON-9	Backfill of Miami Canal	Very Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$7,500,000	

Schedule

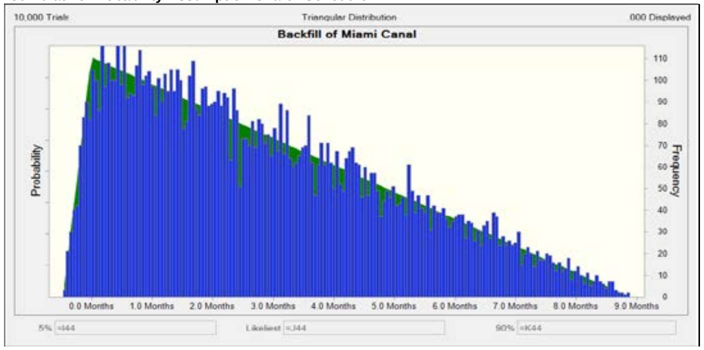
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
SR-CON-9	Backfill of Miami Canal	Very Likely	Marginal	MODERATE	Triangular	None	100%	0.0 Months	0.0 Months	6.0 Months	

Description	There is concern for sequence of construction when backfilling the Miami Canal. The concern is that the project will extend over multiple years and there will be a need for culverts, plugs, extra work that is not currently in the estimate. Funding and project schedule could impact this considerably.
Development of Low Values	The best case scenario is that the L-4 degrade and the work for new gated culverts at S-8 will be complete prior to backfilling the Miami canal and no additional work will be needed to ensure compliance with flood safety. This would add no additional time to the schedule.
Development of High Values	The worst case scenario is that additional work will be required at the gaps between the spoils mounds and every other gap will need a culvert costing $50 k to install and remove. With the canal having 150 mounds per side totaling 150 culverts needed to drain the Miami canal in the case that the modifications are not complete. The additional work could add up to 6 months to the schedule.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

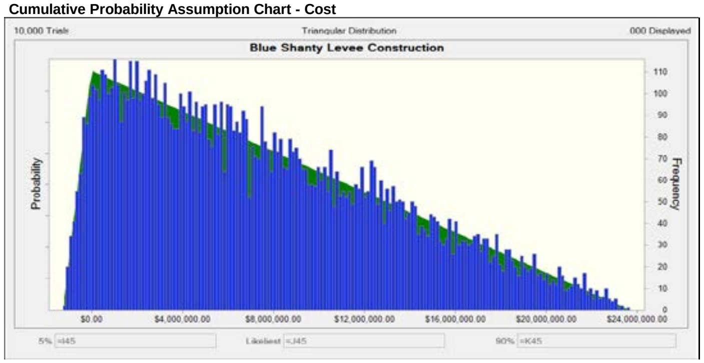
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-CON-11	Blue Shanty Levee Construction	Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$16,000,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-CON-11	Blue Shanty Levee Construction	Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	Sequencing could cause borrow/fill issues. Flood protection will be required during construction. It is not likely that L-29 can be removed prior to construction of the blue shanty flow way levee.
Development of Low Values	The best case scenario is that some of the material from the L-29 can be used. This could save on the offsite material cost. The qty that is believed to be built above flood stage is considered so minimal that it will not be used in development of the low value.
Development of High Values	The worst case scenario is that all material for the blue shanty flow way levee must be obtained from an off site source. This could add an additional $16 million based on the qty needed.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

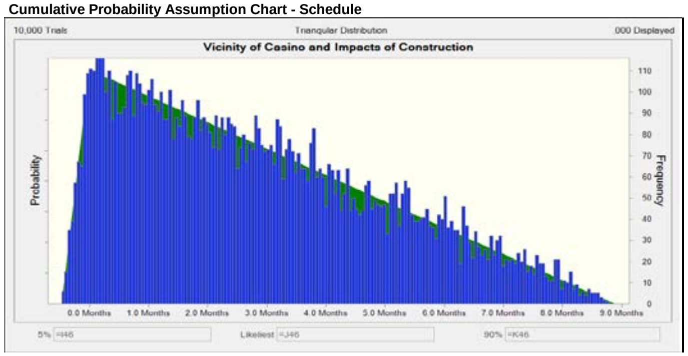
	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	Y-CON-12	Vicinity of Casino and Impacts of Construction	Likely	Negligible	LOW	N/A	N/A		$0	$0	$0	*Cost risk already addressed in other risks.*

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	Y-CON-12	Vicinity of Casino and Impacts of Construction	Likely	Significant	HIGH	Triangular	None	100%	0.0 Months	0.0 Months	6.0 Months	

Description	Nearby Casino may be sensitive to noise and or vibrations from construction. This construction contractor may be impacted due to concern of vibrations from the Casino nearby. This could cause restrictive construction windows placed on the contractor.
Development of Low Values	The best case is that there is no impact on the construction schedule based on the location of the structure. Deliveries and work can commence as planned and will not be impacted.
Development of High Values	The worst case scenario is that the proximity to the casino will restrict work windows, delivers, and or materials leaving the job site. These factors combined could affect project production slowing down the duration of construction for the pump station. Assumed an additional 6 months based on restrictive work windows.

Cumulative Probability Assumption Chart - Cost

Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

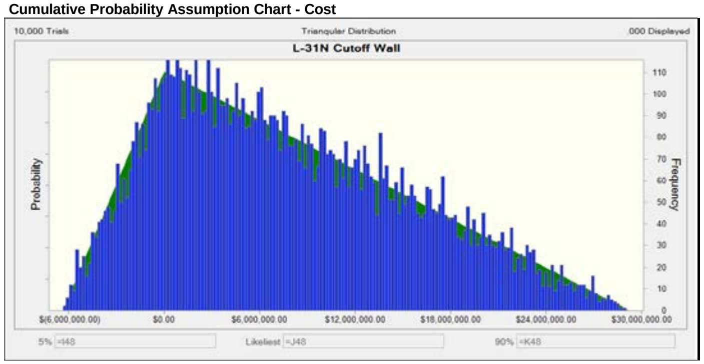
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Y-EST-10	L-31N Cutoff Wall	Very Likely	Significant	HIGH	Triangular	None	100%	($3,000,000)	$0	$19,000,000	

Schedule

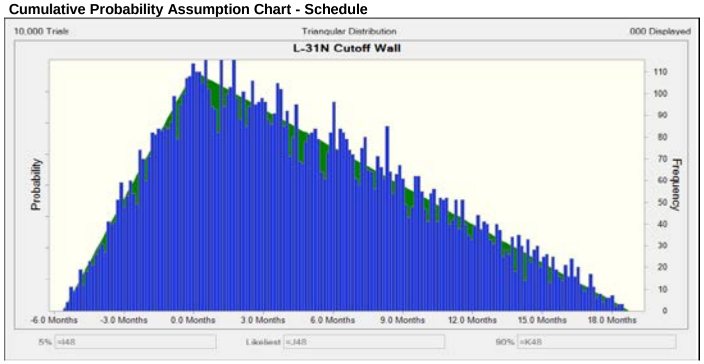
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Y-EST-10	L-31N Cutoff Wall	Very Likely	Significant	HIGH	Triangular	None	100%	-3.0 Months	0.0 Months	12.0 Months	

Description	There is reason to believe that information gathered from the miners cutoff wall will change the implementation of the cutoff wall. Currently the wall is designed to a 35 ft depth placed on the bench between the levee and the canal. This location may change adding additional depth, based on the results from the miners wall additional depth or length may be required to achieve the proper effects. Quantity could be as little as 2 extra miles of cutoff wall, but could
Development of Low Values	The best case scenario is that based on demonstrations from the miner's cutoff wall it is shown that the CEPP cutoff wall can be shortened to 2 miles..
Development of High Values	The worst case scenario is that based on the demonstrations from the miner's cutoff wall the length and or depth will need to be increased. The team is aware that the cutoff wall may need to be relocated to the top of the levee adding an additional 50% to the depth, in addition there could be the need for additional length requiring the cutoff wall to be a total of 100% bigger by square footage.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

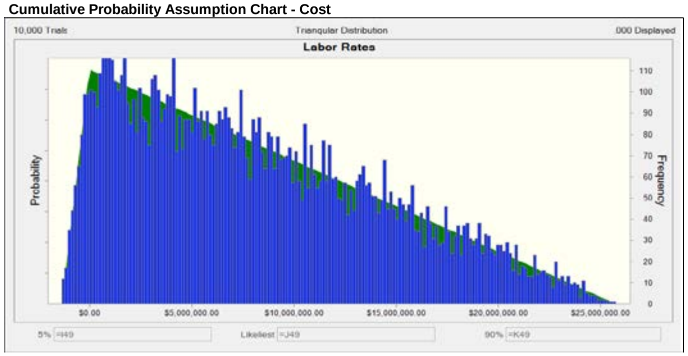
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
EST-11	Labor Rates	Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$17,400,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
EST-11	Labor Rates	Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	Local wage rate assumptions could vary from assumed and impact the estimate Generally wage rates are low in the area however skilled workers generally can command higher wages similar to those in other areas. Wage rates in estiamte are based on local market research and are current.
Development of Low Values	Wage rates in the area are generally lower than the rest of the US and the Davis Bacon act wages are generlly low in comparison. The estimate uses average BLS wages or the Davis Bacon wages and are generally the MINIMUMS.
Development of High Values	Skilled and specialty workers could command a premium in the local market place for skill sets such as millwrights, electricians, etc. Assume that the skilled labor required for significant portions of the project could reqire additional funds. Although the average labor rates from the estimate fall in line with past labor rates there is a concern that the skilled workers building features in CEPP may be making much more then local rates. If the wage rates are $2 per hour low that could add an additional $17.4 million.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

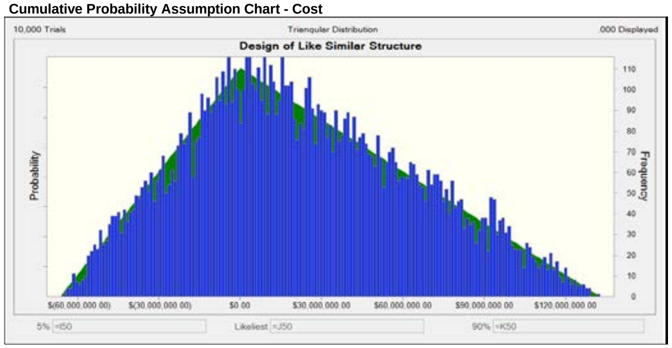
SAJ - CEPP Cost and Schedule Risk Analysis

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	EST-12	Design of Like Similar Structure	Likely	Marginal	MODERATE	Triangular	None	100%	($47,510,935)	$0	$95,021,870	

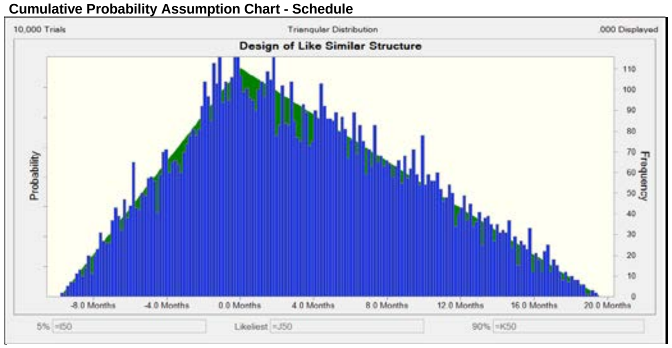
	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	EST-12	Design of Like Similar Structure	Likely	Marginal	MODERATE	Triangular	None	100%	-6.0 Months	0.0 Months	12.0 Months	

Description	That features were estimated using plans from similar structures with minimal design for the CEPP feature. The assumption that local like similar features would be adequate to capture the necessary scope to construct the feature. The project has conducted very little design and scoping. Additional scope may be required to successfully complete each feature over what was identified in the similar feature. Additionally the estimators had to make significant assumptions in the development of the quantities to complete the cost estimate.
Development of Low Values	The best case scenario is that the similar structures are over designed compared to the features for CEPP in both qty and scope. This could lead to a reduction in costs and schedule of 5% across the board.
Development of High Values	The worst case scenario is that the similar structures are under designed compared to the features for CEPP in both qty and scope. This could result in an increase of costs and schedule of 10% across the board.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule



SAJ - CEPP Cost and Schedule Risk Analysis

Cost

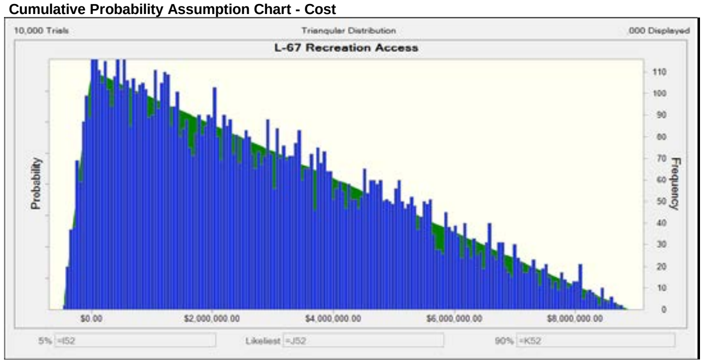
Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-FL-2	L-67 Recreation Access	Likely	Marginal	MODERATE	Triangular	None	100%	$0	$0	$6,000,000	

Schedule

Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
BG-FL-2	L-67 Recreation Access	Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	Access for existing recreation features may need to be changed due to project construction. Some costs for relocating the recreation access to the L-67C and L-67A are included in the cost estimate. There is the risk that additional recreation sites may be needed and that improvements to existing levees to allow for vehicle access may be needed.
Development of Low Values	The best case scenario is that the current recreation plan is sufficient to cover the anticipated needs for recreation.
Development of High Values	The worst case scenario is that the recreation plan needs additional funding to allow for vehicle access across the levees. That work could consist of widening levees, adding guard rail, turnouts, paving or any combination of the above. The cost is assumed it could add an additional 6M to the construction cost. The schedule will not be impacted as the recreation is not considered critical path construction.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

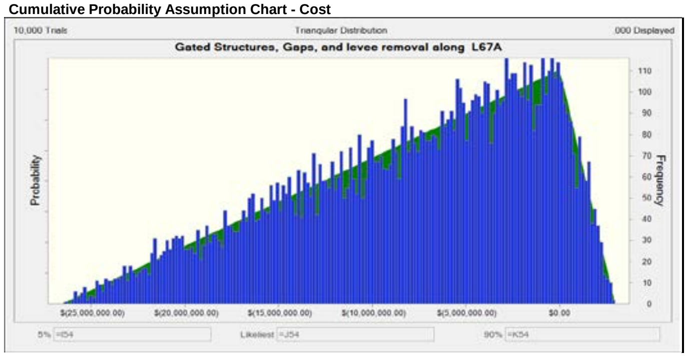
SAJ - CEPP Cost and Schedule Risk Analysis

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	BG-PR-5	Gated Structures, Gaps, and levee removal along L67A	Likely	Marginal	MODERATE	Triangular	None	100%	($20,300,000)	$0	$0	

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	BG-PR-5	Gated Structures, Gaps, and levee removal along L67A	Likely	Negligible	LOW	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	*For this analysis low risks are not considered.*

Description	There is the possibility that the three gated structures in L67A, levee removal and gaps in L67C and L67 extension removal are included in another authorized project Costs for 3 gated structures, the gaps along L67C and the Levee removal of the L67 extension are included in the costs of this project. If it is determined that they should not be included, their cost will be considered an opportunity.
Development of Low Values	The best case scenario is that another authority has committed to covering the costs of the L-67A structure and the L-67C gaps and removal. This could result in a savings of $20.3 million.
Development of High Values	The worst case scenario is that no other authority has already committed to covering the cost of the work and it will all be incorporated in the cost of CEPP.

Cumulative Probability Assumption Chart - Cost



Cumulative Probability Assumption Chart - Schedule

SAJ - CEPP Cost and Schedule Risk Analysis

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Cost	PR-6	Close Out of Other Projects	Likely	Marginal	MODERATE	N/A	N/A		$0	$0	$0	

	Risk Reference No.	Risk Event	Likelihood	Impact	Risk Level	Distribution	Correlation	Correlation Factor	Low	Most Likely	High	Notes
Schedule	PR-6	Close Out of Other Projects	Likely	Significant	HIGH	N/A	N/A		0.0 Months	0.0 Months	0.0 Months	

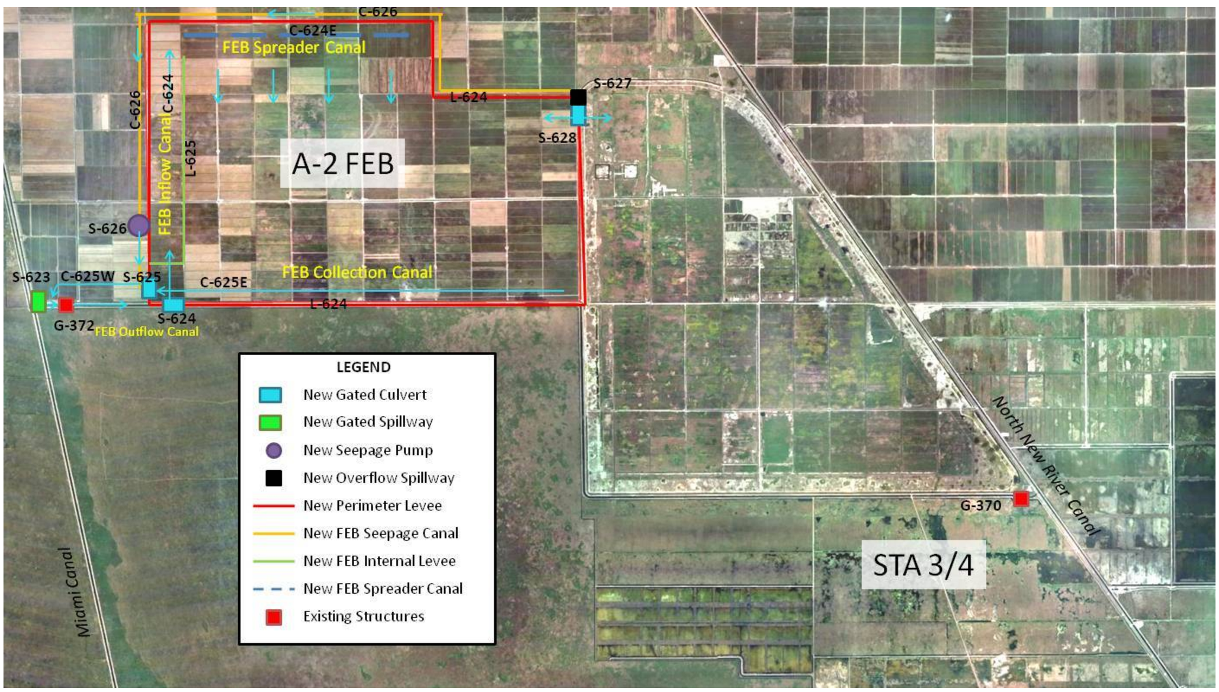
Description	HQ has not provided final confirmation that Mod-Waters will be closed out. Prioritization and closeout of other projects could effect the start and funding for this project. These effects could substantially change the project formulation and execution schedule. This risk will be noted but not modeled.
Development of Low Values	This is a case where features will change and or structures could be incorporated based on final close out of another authorization. This will be noted and maintained on the risk watch list/register but will not be modeled.
Development of High Values	

Cumulative Probability Assumption Chart - Cost

Cumulative Probability Assumption Chart - Schedule

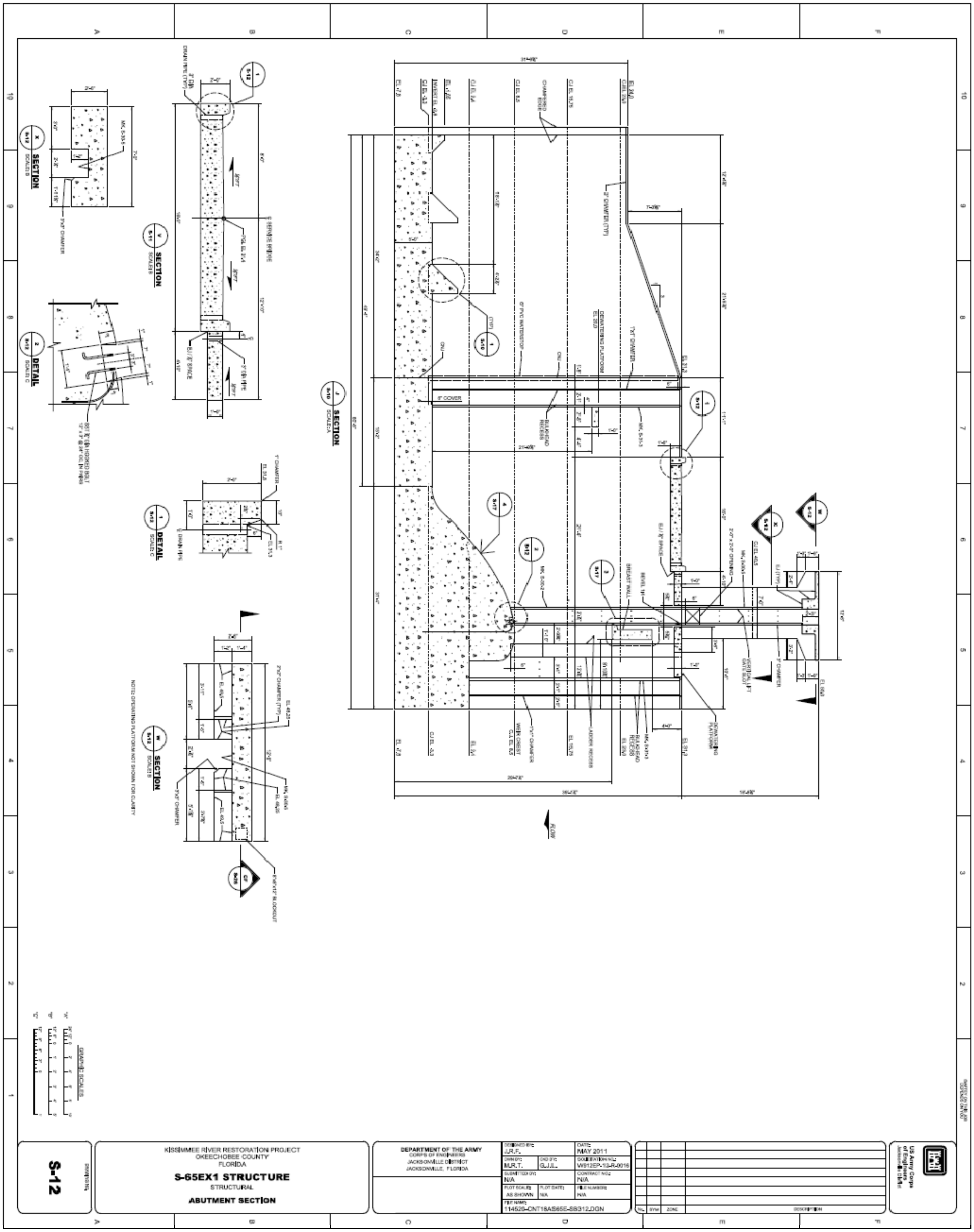
CEPP Cost Estimate Scope Assumptions, Representative Drawings and Quantity Takeoffs

North of the Redline – Storage and Treatment Flow Equalization Basin A-2 (FEB)



Feature of Work:	FEB - S-623 (DS-8) Gated Spillway 3700 CFS in 3/4 Canal
Scope Given:	The S-623 spillway will serve as a divide structure to separate pre-treated FEB waters from untreated waters of the Miami Canal to maximize incidental water quality value of the flow-through impoundment. When open, S-623 will allow for the normal operations of the G-372 pump station to route Miami Canal water, or when closed can be use to route pre-treated FEB water through the STA 3/4 Supply Canal to STA 3/4. S-623 is a four-bay gated spillway. Th design flow is 3,700 cfs with a design hydraulic head of 0.25 feet. The design flow was established to match the existing capacity of the G-372 pump station downstream at 3,700 cfs. The spillway consists of four gates with dimensions of 35 ft wide by 14 ft high. The crest invert elevation is set to 3.50 ft NGVD. The upstream and downstream aprons are set at an elevation of -2.00 ft NGVD, with an apron length of 36 feet. S-623 is located in lin with the STA 3/4 upstream of the G-372 pump station. During PED, a Value Engineering investigation will be performed to optimize structure type and size for this design function.
Reference for Scope Basis:	Engineering Appendix dated March 2013 A.5.3.2.1.4 Water Control Structures A.5.3.2.1.4.2 Gated Spillway A.5.3.3.2.1.2 Table A-14.S-623 Gated Spillway A.5.4.3 Overflow spillways
Scope Assumptions:	- Assume similar to structure S-65EX. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - The spillway will be built in a two phased construction only blocking half of the canal at a time. - Assume aprons are in addition to the concrete structure shown in the provided drawings. - Assume power for the structure will be provided from local power lines located .5 miles from the structure. - Assume that a diesel generator is needed for backup power. - Assume 50 ft deep sheet pile 880 ft long only 440 ft will be used, as it will be driven extracted and re-driven basec on the two phase construction. - Assume dewatering will be ongoing through feature of work. - Assume 50 KW Diesel Generator with 1000 gallon above ground tank.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	Sheet pile half of the canal to allow for two staged construction of the gated spillway. Excavation of materials to allow for construction of the foundation of the cross canal gate structure and the canal apron/wingwall. Concrete work for structure followed by apron and wingwalls. Backfill suitable material around the structure and import riprap. Construct control station, diesel generator, and fuel storage. Place gates and other associated closure devices for the gate structure. Remove sheet pile and reinstall on opposite side and build second half of the spillw then restore flow to canal.
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: S-623



Feature of Work:	FEB - S-623 (DS-8) Gated Spillway 3700 CFS in 3/4 Canal

Quantity Take Off:

Structure Dimensions and volumes

Underwater Concrete Seal Volume (Unreinforced concrete)	=	9,481.5	CY	Assume underwater concrete is not reinforced, 10 ft thick 160 ft wide and 160 ft long			
Number of Gates	=	3.0	EA				
Superstructure/Gate Structure							
tower cross section	=	144.9	SF				
number of towers	=	4.0	EA				
pier cross section	=	154.1	SF				
number of Piers	=	2.0	EA				
tower width	=	3.5	FT				
Pier Height	=	35.0	FT				
beam cross section	=	15.0	SF				
Beam Length	=	69.0	FT				
volume	=	12,815.6	CF		=	474.7	CY
volume of elevated beam	=	1,035.0	CF		=	38.3	CY
Width	=	69.0	FT				
Cross section of platform,bridge,brestwall	=	46.5	SF				
Volume	=	3,211.3	CF		=	118.9	CY
OGEE volume							
Cross section	=	143.9	SF				
width	=	69.0	FT				
OGEE Spillway volume	=	9,929.0	CF		=	367.7	CY
Spillway wall volume (Abutment)	=	1,153.3	CY	Structure is 90' long and cross section of wall is 173 SF			
Approach apron	=	460.0	CY	Assumed 36ft long 89 ft wide and 5 ft thick per S-65EX design			
Stilling Basin	=	460.0	CY	Assumed 36ft long 89 ft wide and 5 ft thick per S-65EX design			

Wing Walls: Assumed approach wing walls similar to downstream wing wall plan from S-65EX-1 with anchor walls. Construction will consist of driven sheet pile with a 2'x2' concrete pile cap. The anchor walls will be 1 ft thick reinforced concrete. Concrete anchor wall dimensions will match wing wall dimensions. The wing wall and concrete anchor wall will be connected by #10 all thread grade 70. A C8x18.75 channel will be attached to the back of the wing wall where the anchors will be attached to.

wing walls			
Number	=	4.0	Each
Length average US and DS	=	95.5	FT
US Depth	=	44.5	FT
DS Depth	=	26.5	FT

area of sheet pile	=	13,561.0	SF	=	183.1	TONS
Pile Cap						
height	=	2.0	FT			
width	=	2.0	FT			
volume	=	56.6	CY			
Anchor Rod length	=	60.0	FT			
spacing	=	4.0	FT			
number of rods	=	96.0	EA			
Anchor Walls						
height	=	8.0	FT			
thickness	=	1.0	FT			
length	=	382.0	FT			
volume	=	113.2	CY			
Rip Rap				Lengths and depths assumed to extend beyond aprons.		
Length	=	440.0	FT			
width	=	69.0	FT			
Depth	=	3.0	FT	average of all depths		
volume	=	3,373.3	ECY			
Excavation for Footing Volume	=	96,000.0	CF	Assume 89' wide (per width of channel) by 60 ft long (per S-65EX) and 10' deep to allow for construction of the underwater seal and structural footings.		
	=	3,555.6	BCY			
	=	5,333.3	LCY			
Excavation east and west canal banks for installation of wing	=	177,600.0	CF	Assume top of bank is 15.5 ft NGVD (Per table A-14) and bottom of excavation and bottom of excavation is at -23.5 ft NGVD (Total depth 37'). Assume excavation is 160 ft long and extends the bottom of the canal an additional 15' per bank. Assume material is common or rippable as it is the bank of a levee.		
	=	6,577.8	BCY			
	=	9,866.7	LCY			
Sheet pile/cofferdam	=	880.0	LF	Assume 1200 LF of sheet pile/cofferdam to go around entire work site. Sheet pile will be driven 60ft deep. All sheet pile used as a coffer dam will be removed.		
	=	44,000.0	SF			

Gate weight calculations

3/8" Plate steel	=	15.3	lb/sq ft				
1/2" Plate steel	=	20.4	lb/sq ft				
1" Plate Steel	=	40.8	lb/sq ft				
Gate Skin 3/8" Plate Steel	=	392.0	sq ft	Assume Gate dimensions of 14'x28'			
3/8" Plate stiffeners and seal angles	=	87.0	sq ft	Assume 5 sq ft for seal angles and 82 for stiffeners			
Horizontal C-Channels (1/2")	=	607.0	sq ft	Assume each channel is equivalent to 26"x28' (10 Channels).			
Vertical C-Channels (1/2")	=	303.0	sq ft	Assume each vertical channel is 26"x14' (10 Channels).			
Pull Pad eyes (1")	=	4.0	sq ft	Assume 4 pad eyes per gate @ 1 sq ft each			
Total 3/8" Plus 10% for misc. items	=	526.9	sq ft	=	8,061.6	lbs	
Total 1/2" plus 15% for misc items	=	1,046.5	sq ft	=	21,348.6	lbs	
Total 1" steel	=	4.0	sq ft	=	163.2	lbs	
lbs/sq ft for 28'x14' gate	=	75.4	lb/sq ft				
Area of single S-623 Gate	=	490.0	sq ft			assumed 3 ft bigger then opening in each direction	
Approximate weight of S-623 Gate	=	36,966.7	lb				
Overweight factor for larger gates (10%)	=	40,663.4	LB EA	=	20.3	Ton Each	3 needed.

Precast Concrete Control Building / Generator Shelter

Shelter square footage	=	315.0	sq ft	
Excavation/backfill for shelter	=	163.3	ECY	Building will be set on grade with 12" capillary water barrier and geotextile fabric and a 12" thick concrete curb around the building perimeter.
Generator Fuel Tank	=	1000 Gallon		
Fuel Pad dimensions	=	96.0	SF	Assume 8'x12'x12" thick reinforced concrete slab on grade pad.

Gate embeds/seal lengths

Gate Dimensions						
Width	=	35.0	FT			
Height	=	14.0	FT			
Gate well Height	=	42.0	FT			
Gate Well Embed	=	119.0	FT			
Total Embed length	=	357.0	FT	3 gates		
Seal Length	=	63.0	FT	seal length is the perimeter of bottom and both sides.		
Total Seal length	=	189.0	FT	total of 3 gates		
Up and Downstream Bulkhead Slot	=	588.0	FT	6 times vertical plus width of new gate per slot		
Bulkheads	=	40,663.4	LB EA	assume same size as gates		
number	=	6.0	EA	two per gate needed		
Total Length of imbeds	=	945.0	FT			
Total Weight of gates and stoplogs	=	365,970.5	LB	=	183.0	TON
TOTAL J BULB for GATES AND STOP LOGS	=	567.0	FT			

Backfill

Structure Backfill	=	3,555.6	ECY	=	4,017.8	LCY

Railings and ladders

Railing				
Length	=	958.0	FT	assumed 4 time the length of a wing wall and 6 times the width of the structure and twice the length
Height	=	3.5	FT	
Ladders				
Count	=	6.0	EA	assumed ladders on each side of the structure.
Height	=	17.5	FT	average of all three types
total height	=	105.0	FT	

Boat Barrier

Number	=	2.0	EA	
Length each	=	140.0	FT	assumed
Total Length	=	280.0	FT	

Site Fencing

Length	=	1,000.0	FT	assumed a total of 1000 LF of chain link fencing.
Gates	=	4.0	EA	assumed

Access road

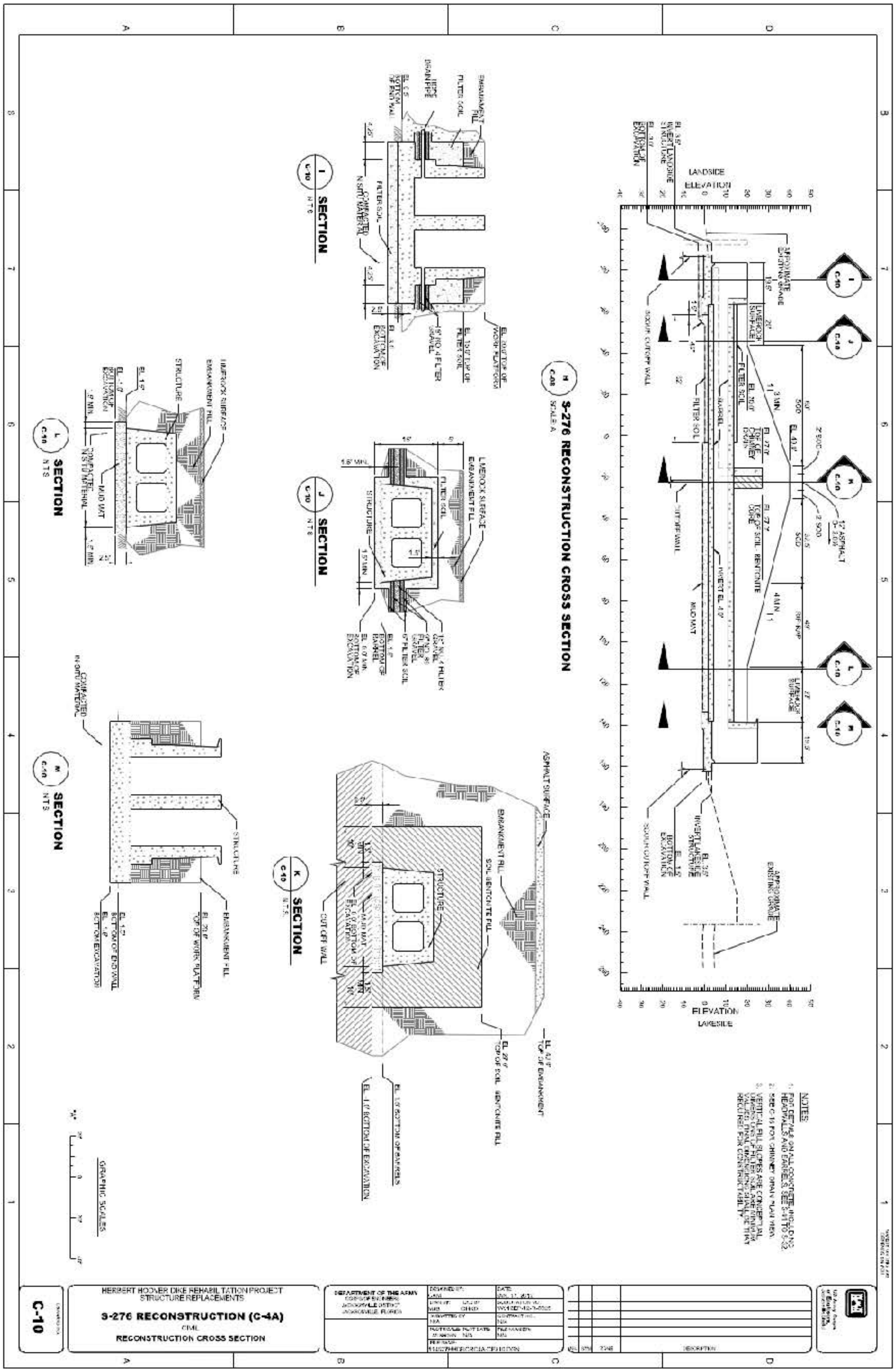
Length	=	300.0	FT	assumed		
Width	=	14.0	FT	assumed		
Area	=	4,200.0	SF	=	466.7	SY

SWPPP

Length	=	1,500.0	LF	
Floating Silt Boom	=	250.0	LF	assumed

Feature of Work:	FEB - S-624 (DS-5) Gated Sag Culvert (FEB inflow Structure) 1550 CFS from STA 3/4 Supply canal.
Scope Given:	The S-624 structure is a gated sag culvert that serves as the controlled inflow into the A-2 FEB. This structure will operate in conjunction with the existing G-372 pump station to route flows from the Miami Canal into the impoundment when storage capacity is available. The structure will open for inflow operations into the FEB from G 372, and will close during A-2 FEB by-pass operations (flow directly to STA 3/4 or the A-1 FEB) or to prevent back fl into STA 3/4 Supply Canal. S-624 is a two-barreled, gated sag culvert with four 45 degree bends. The culverts will ru from the STA 3/4 Supply canal, beneath the FEB discharge/collection canal, and into the FEB inflow canal/flow way The design flow is 1,550 cfs with a design hydraulic head of 2.5 feet resulting in a design velocity of 6.75 fps. This velocity was targeted in design to provide a scour velocity to clean out culverts, thereby reducing periodic maintenance requirements. The structure is a two barreled cast-in-place concrete box culvert with dimensions of 1 ft by 11 ft each with vertical slide gates, and a total length of approximately 350 ft. The upstream invert is set at elevation -4.50 ft NGVD, 0.5 feet above the existing bottom elevation of the STA 3/4 Supply Canal. The downstrean invert is set at elevation 0.50 ft NGVD, 0.5 feet above the proposed bottom elevation of the FEB Inflow Canal. The S 624 structure is designed to cross beneath the existing collection canal (invert elev. 0.00 ft NGVD) with a spacing of feet, resulting in a minimum barrel sag invert of -14.00 ft NGVD. S-624 is located near the southwest corner of the 2 FEB, east of the G-372 pump station.
Reference for Scope Basis:	Engineering Appendix dated March 2013 A.5.3.2.1.4 Water Control Structure A.5.3.3.2.1.1 Gated Culverts Table A-15. S-624 Gated Culvert A.5.4.4
Scope Assumptions:	- Assume similar to structures S-276 and S-277 but will be a SAG culvert. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - Assume sheet pile will need to be driven around inlet structure on the canal side. Sheet pile depth 50 ft, set back from excavation of 25 ft, with pumping ongoing during construction in conjunction with a rim ditch excavation around the remainder of the sag culvert excavation. -Assume Excavation will be to the same depth below finished grade as shown in contract drawings for similar projects with a slope of 1:2 for construction. - Assume material as 1.5 ft of organic, 10 ft of blastable cap rock, and inter-bedded formation of sand/shell and fragmented limestone for the remainder of the excavation. - Assume power will be provided from power lines in the area approximately 500'. - Assume that a diesel generator is needed for backup power.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	-Assume sheet piling will be utilized around the perimeter of the excavation/project site and dewatering will be required. Sheet pile will be installed around the inlet structure. A rim ditch water system will be utilized to dewater the excavation around which the culver will be constructed. Upon completion of the concrete work backfill and compact excavation as required for other features of work (L-624 Levee, L-625 Levee and C-625 canal). Gated structures power will be sourced from local power and installed to the control station. A backup generator will be required along with a fuel pad.
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: S-624



Feature of Work:	FEB - S-624 (DS-5) Gated Sag Culvert (FEB inflow Structure) 1550 CFS from STA 3/4 Sup

Quantity Take Off:

Sheet Pile											
	Width	=	266.0	FT		assumed 25 ft from nearest excavation					
	Length	=	200.0	FT		Assumed 100 ft back from canal					
	Depth	=	50.0	FT							
	Area	=	46,600.0	SF							
Levee Removal											
	Length	=	266.0	FT		Assumed same as width of sheetpile					
	Height	=	14.0	FT		Assumed levee dimensions					
	Top Width	=	14.0	FT		Assumed levee dimensions					
	Side Slope	=	3.0	:1							
	Bottom Width	=	98.0								
	Volume	=	208,544.0	CF	=	7,723.9	BCY	=	9,654.8	LCY	
Rim Ditch Excavation											
	Length	=	390.0	ft		Length of excavation					
	Width	=	112.0	ft		Bottom width of excavation					
	Canal Dimension	=	3ft deep x 3 ft wide								
	Ditch volume	=	4,518.0	CF	=	167.3	BCY	=	209.2	LCY	
Sag culvert excavation											
	Length	=	390.0	FT		0.1	Miles =	390.0			
	Total Depth	=	26.0	FT							
	Thickness of Organic	=	1.5	FT							
	Thickness of Blasting Cap Rock	=	10.0	FT							
	Thickness inter-bedded material	=	14.5	FT							
	Slope1	=	2.0	:1							
	Slope2	=	2.0	:1							
	Bottom Width	=	112.0	FT							
	Top Width	=	216.0	FT							
	Cross Section	=	4,264.0	SF							
	Cross Section Organic	=	319.5	SF							
	Cross Section of Blasting Cap Rock	=	1,900.0	SF							
	Cross section Inter-Bedded Material	=	2,044.5	SF							
	Surface Area of Canal	=	84,240.0	SF	=	1.9	ACRE				
	Organic Volume	=	124,605.0	CF	=	4,615.0	BCY	=	5,768.8	LCY	
	Blasted Cap Rock Volume	=	741,000.0	CF	=	27,444.4	BCY	=	34,305.6	LCY	
	Inter-bedded Material Volume	=	797,355.0	CF	=	29,531.7	BCY	=	44,297.5	LCY	
			TOTAL		=	61,591.1	BCY				
Concrete Culvert Concrete											
	Length	=	350.0	FT							
	Foundation Concrete										
	Bottom Width	=	32.0	FT							
	Bottom Thickness	=	2.5	FT							
	Volume	=	28,000.0	CF	=	1,037.0	CY				
	Vertical concrete										
	Height	=	11.0	FT							
	width of walls	=	8.8	FT							
	Volume	=	33,687.5	CF	=	1,247.7	CY				
	Elevated Concrete										
	Top Width	=	29.6	FT							
	Thickness	=	2.5	FT							
	Volume	=	25,900.0	CF	=	959.3	CY				
	PVC water stops	=	2.0	EA							
	Length	=	93.5	LF							
	Spacing	=	15.0	FT							
	Total Length	=	4,488.0	LF							

Inlet and Outlet Works

Number	=	8.0	EA		assumed intake and outlet are the same assumed 2 per each end gate and bulkhead					
Foundation										
Length	=	8.0	FT							
Depth	=	5.0	FT							
Width	=	47.0	FT							
Volume	=	7,520.0	CF	=	278.5	CY				
Head Walls										
Height	=	25.5	FT							
Thickness	=	3.0	FT							
width	=	35.0	FT							
openings	=	242.0	SF							
volume	=	7,806.0	CF	=	289.1	CY				
End walls										
height	=	24.0	FT							
length	=	100.0	FT		total each side					
thickness	=	2.0	FT							
volume	=	9,600.0	CF	=	355.6	CY				

MISC METALS

Railing	=	358.0	LF				
Ladders	=	4.0	EACH				
height	=	25.5	FT EA	=	102.0	FT TOTAL	
Grating	=	400.0	SF per Gate				assumed 20 by 20 section of grating per gate per end.
TOTAL Grating	=	1,600.0	SF				

Gates IN HHD

Height	=	14.0	FT	*** STAINLESS STEEL
Width	=	10.0	FT	
Weight	=	6,500.0	LB	
Weight Per SF	=	46.4	LB/SF	

NEW GATES

number of gates	=	8.0	EA		assumed 2 on each end 1 gate and one bulkhead.				
Height	=	18.0	FT		assumed 4 ft larger then similar gate				
Width	=	14.0	FT		assumed 4 ft larger then similar gate				
Weight % larger	=	10.0	%		assumed				
Total Weight of gates	=	12,870.0	LB EA	=	102,960.0	LB total	=	51.5	TON
Motors	=	8.0	EA						
Gear Reduction	=	8.0	EA						
Actuators	=	8.0	EA						
cable reels	=	8.0	EA						
Imbeds for gate	=	520.0	LF						
Gate Seal Length	=	512.0	LF						

Operations building

size	=	315.0	SF	21 x 15
Electrical	=	NEEDED		
Communications	=	NEEDED		

Backfill

Existing Levees	=	208,544.0	CF	=	7,723.9	ECY	=	8,728.0	LCY
Area of Levee	=	26,068.0	SF	=	2,896.4	SY			
Area above Culvert	=	1,662,960.0	CF	=	61,591.1	ECY	=	69,598.0	LCY

Cut off walls

Number	=	2.0	EA	assumed one in the STA3/4 Levee and one in the FEB perimeter Levee.		
Soil Bentonite Fill						
Height	=	25.0	FT			
Width	=	52.0	FT			
Thickness	=	8.0	FT			
Volume	=	10,400.0	CF/EA	=	385.2	CY/EA
TOTAL VOLUME	=	770.4	CY			
Cutoff Wall						
Depth	=	35.0	FT			
Width	=	112.0	FT			
Thickness	=	3.0	FT			
Volume	=	11,760.0	CF/EA	=	435.6	CY/EA
Area	=	3,920.0	SF/EA			
TOTAL AREA	=	7,840.0	SF			

RIP RAP

common both sides						
number of placements	=	2.0	EA	1 each side		
Length	=	20.0	FT			
Width	=	47.0	FT			
thickness	=	4.0	FT			
Volume	=	3,760.0	CF EA	=	139.3	ECY EA
Total Volume	=	278.5	ECY	=	445.6	TON

Boat Barrier

Number	=	3.0	EA
Length	=	98.0	FT
Total Length	=	294.0	FT

SWPPP

Floating Silt Boom	=	980.0	FT	assumed 10 times the width of the canal.
Silt Fence	=	6,492.0	FT	

Site Fence

Length	=	1,000.0	FT	Assumed
gates	=	4.0	FT	assumed

Feature of Work:	FEB - S-625 (DS-7) Gated Culverts (FEB Discharge Structure) From Collection Canal to Outflow Canal 1550 CFS

Scope Given:	S-625 conveys flows from the A-2 FEB to the G-372 pump station via a new discharge canal (C-625W) from the FEB 625 will only pump into G-372 if flow from the Miami Canal is blocked via use of S-623 gated spillway. Consisting of each 9 ft by 9 ft box culvert with an overall culvert length of 140 ft.

Reference for Scope Basis:	Engineering Appendix dated March 2013 A.5.3.2.1.4 Water Control Structure A.5.3.3.2.1.1 Gated Culverts Table A-16. S-625 Gate Culvert

Scope Assumptions:	- Assume similar to structures S-276 and S-277. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - Pumping ongoing during construction in conjunction with a rim ditch excavation around the Structure. -Assume Excavation will be to the same depth below finished grade as shown in contract drawings for similar projects. - Assume material as 1.5 ft of organic, 10 ft of blastable cap rock, and inter-bedded formation of sand/shell and fragmented limestone for the remainder of the excavation. - Assume power will be provided from power lines in the area approximately 1000'. - Assume that a diesel generator is needed for backup power.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

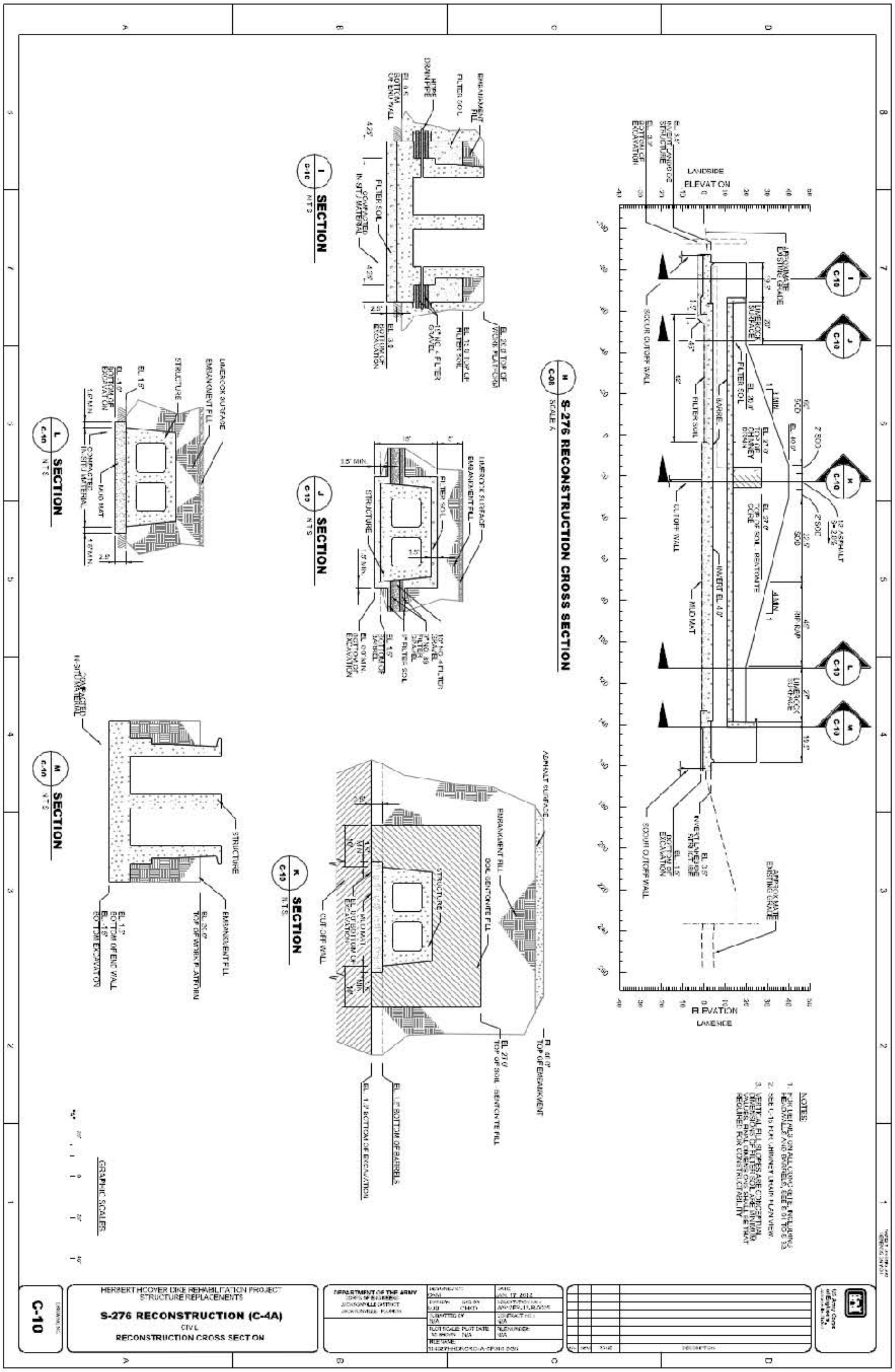
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	-Upstream canal depth 0' NGVD and 45' wide, Downstream canal depth -5' NGVD 45' wide. Construction will be performed prior to excavation for the C-625E and C-625W canals. Dewatering will be needed, utilizing rim ditch an dewatering pumps used as needed. Excavation/blasting of limestone rock will be required to allow space for the foundation for the drainage structure. Culverts, foundations and structures will then be placed. Control structures for the culverts will be installed and assume that the control station for the SAG Culvert will also have control of th discharge structure. An additional backup generator will be required along with local utility power. The shelter for the generator will be placed on the west side of the FEB perimeter levee. Apron, wing wall, and riprap placement will occur after culverts have been placed. Backfill and compaction around the structure will occur, and then the FI perimeter levee (L-624) will be built on top of the culverts.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: S-625



Feature of Work:	FEB - S-625 (DS-7) Gated Culverts (FEB Discharge Structure) From Collection Canal to Outflow Canal 1550 CFS

Quantity Take Off:

Rim Ditch Excavation

Length	=	200.0	ft	Length of excavation						
Width	=	119.0	ft	Bottom width of excavation						
Canal Dimension	=	3ft deep x 3 ft wide								
Ditch volume	=	2,871.0	CF	=	106.3	BCY	=	132.9	LCY	

Culvert excavation

Length	=	200.0	FT						
Total Depth	=	11.0	FT						
Thickness of Organic	=	1.5	FT						
Thickness of Blasting Cap Rock	=	9.5	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1						
Bottom Width	=	119.0	FT						
Top Width	=	163.0	FT						
Cross Section	=	1,551.0	SF						
Cross Section Organic	=	240.0	SF						
Cross Section of Blasting Cap Rock	=	1,311.0	SF						
Surface Area of Canal	=	32,600.0	SF	=	0.7	ACRE			
Organic Volume	=	48,000.0	CF	=	1,777.8	BCY	=	2,222.2	LCY
Blasted Cap Rock Volume	=	262,200.0	CF	=	9,711.1	BCY	=	14,566.7	LCY
		TOTAL		=	11,488.9	BCY			

Concrete Culvert Concrete

Length	=	160.0	FT			
Foundation Concrete						
Bottom Width	=	39.0	FT			
Bottom Thickness	=	2.5	FT			
Volume	=	15,600.0	CF	=	577.8	CY
Vertical concrete						
Height	=	9.0	FT			
width of walls	=	12.5	FT			
Volume	=	18,000.0	CF	=	666.7	CY
Elevated Concrete						
Top Width	=	34.5	FT			
Thickness	=	2.5	FT			
Volume	=	13,800.0	CF	=	511.1	CY
PVC water stops	=	2.0	EA			
Length	=	87.5	LF			
Spacing	=	15.0	FT			
Total Length	=	1,925.0	LF			

Inlet and Outlet Works

Number	=	12.0	EA	assumed intake/outlet are the same assumed 2 per each end gate and bulkhead			
Foundation							
Length	=	8.0	FT				
Depth	=	5.0	FT				
Width	=	57.0	FT				
Volume	=	9,120.0	CF		=	337.8	CY
Head Walls							
Height	=	25.5	FT				
Thickness	=	3.0	FT				
width	=	45.5	FT				
openings	=	243.0	SF				
volume	=	11,007.0	CF		=	407.7	CY
End walls							
height	=	24.0	FT				
length	=	100.0	FT	total either inlet or outlet			
thickness	=	2.0	FT				
volume	=	9,600.0	CF		=	355.6	CY

MISC METALS

Railing = 358.0 LF
Ladders = 6.0 EACH
height = 25.5 FT EA = 153.0 FT Total

Grating = 400.0 SF per Gate assumed 20 by 20 section of grating per gate per end.
TOTAL Grating = 2,400.0 SF

Gates IN HHD

Height = 14.0 FT *** STAINLESS STEEL for opening 7 by 7
Width = 10.0 FT
Weight = 6,500.0 LB
Weight Per SF = 46.4 LB/SF

NEW GATES

number of gates = 12.0 EA assumed 2 on each end 1 gate and one bulkhead.
Height = 16.0 FT assumed 2 ft larger then similar gate
Width = 12.0 FT assumed 2 ft larger then similar gate
Weight % larger = 10.0 % assumed
Total Weight of gates = 9,805.7 LB EA = 117,668.6 LB = 58.8 TON

Motors = 12.0 EA
Gear Reduction = 12.0 EA
Actuators = 12.0 EA
cable reels = 12.0 EA

Imbeds for gate = 756.0 LF

Gate Seal Length = 672.0 LF

Operations building

size = 315.0 SF 21 x 15

Electrical = NEEDED
Communications = NEEDED

Backfill

Area above Culvert = 310,200.0 CF = 11,488.9 ECY = 12,982.4 LCY

Cut off walls

Number = 1.0 EA Assumed in FEB perimeter Levee

Soil Bentonite Fill
Height = 25.0 FT
Width = 59.0 FT
Thickness = 8.0 FT
Volume = 11,800.0 CF/EA = 437.0 CY

Cutoff Wall
Height = 35.0 FT
Width = 119.0 FT
Thickness = 3.0 FT
Volume = 12,495.0 CF = 462.8 CY
Area = 4,165.0 SF

RIP RAP

common both sides
number of placements = 2.0 EA 1 each side
Length = 20.0 FT
Width = 57.0 FT
thickness = 4.0 FT
Volume = 4,560.0 CF/EA = 168.9 CY/EA
Total Volume = 337.8 ECY = 540.4 TON

Boat Barrier

Number = 2.0 EA
Length = 163.0 FT
Total Length = 326.0 FT

SWPPP

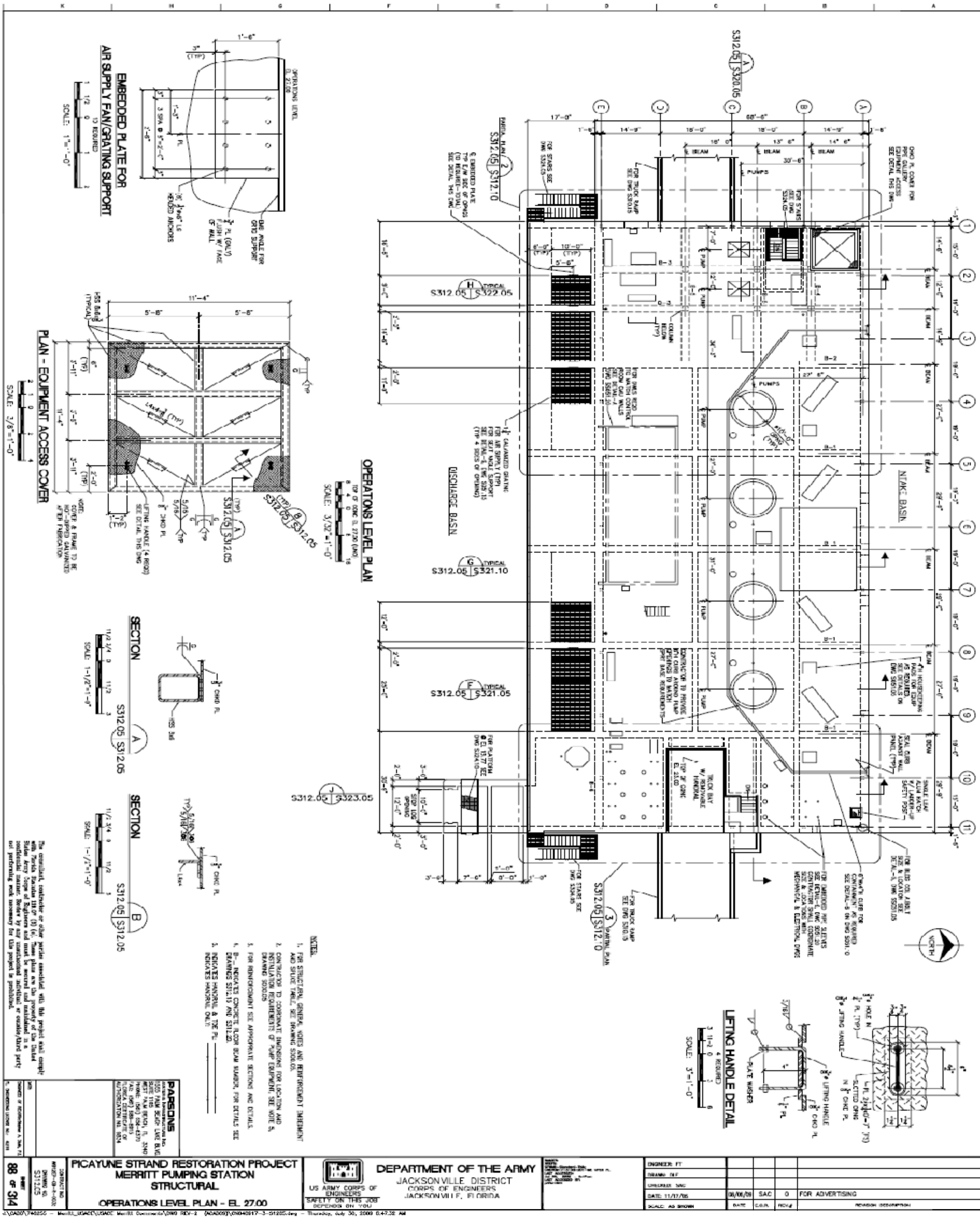
Silt Fence = 966 ft FT

Site Fence

Length = 1,000.0 FT Assumed
gates = 4.0 FT assumed

Feature of Work:	FEB - S-626 (PS-1) Seepage Pump Station, 500 CFS
Scope Given:	The CEPP Recommended Plan proposes to construct a new seepage collection pump station, S-626, for seepage management. The pumping rate of 500 cfs was established to accommodate the peak estimated seepage inflow ra of 400 cfs, as well as provide additional capacity for possible high flow events. The s-626 pump station will return seepage intercepted in the FEB seepage canal back to the existing G-372 pump station through the C625W Outflow canal. Pumps will be (3) 100 CFS Electric pumps with (1) 200 CFS Diesel engine pump that will also serve as a backu generator.
Reference for Scope Basis:	Engineering Appendix dated March 2013 A.5.3.2.1.4 Water Control Structures A.5.3.2.1.4.4 Pump Stations A.5.3.3.2.1.4 Pump Stations Table A-18. S-626 Pump Station A.5.5.3 Pumping Station S-626
Scope Assumptions:	Scope Assumptions: - Assume similar to structure Pump Station 357. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - Assun there will be a total of 4 pumps, three 100 cfs electric pumps and one 200 cfs diesel engine driven pumps. - Assume discharge of pumps will be piped by three 3' diameter steel pipe and will terminate in a discharge structu built into C-625W for the 100 CFS pumps and one 4' diameter pipe for the diesel driven pump. - Assume the discharge structure will consist of a concrete headwall full height of the canal 30 ft wide 18 inch thick reinforced concrete, 20'x30' apron 18 inch thick reinforced concrete, wing walls extending 30ft up and downstrean of the discharge point sloping from full height of the canal to 0 18 inch thick reinforced concrete and riprap lining 1 ft beyond the concrete apron. - Assume the excavation will extend 3 feet below the seepage canal bottom elevation. - Assume material as 1.5 ft of organic, 10 ft of blastable cap rock, and inter-bedded formation of sand/shell and fragmented limestone for the remainder of the excavation. - Assume excavation for the pump station is separate in scope from the excavation of the seepage canal or the C-625W canal. - Assume pump station will be constructed of reinforced concrete below grade and a Combination of cast-in-place columns and reinforced CMU walls. . - Assume a fuel pad will be required for storage tanks for the diesel pump and the diesel generator, assumed size o 20’ by 20’ 2 feet thick reinforced concrete. - Assume discharge will be directed into the C-625W by the discharge piping directed downstream.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	Pump Station will be installed at the end of C-626 seepage canal. Excavation will be required to provide suitable foundation for the pump station. Excavation of the pump station will be completed prior to excavation of the seepage canal or out flow canal thus minimal dewatering will be required. The pump station will be constructed on site. The pump station will also have a 480 volt, 3 phase, diesel generator. The station will have housing accommodations including bed, shower, water closet, HVAC, potable water, sanitary sewer and communications equipment (radio transmitter).
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: S-626



Feature of Work:	FEB - S-626 (PS-1) Seepage Pump Station, 500 CFS

Quantity Take Off:

Rim Ditch Excavation

Length	=	60.0	ft	Length of excavation					
Width	=	80.0	ft	Bottom width of excavation					
Canal Dimension	=	3ft deep x 3 ft wide							
Ditch volume	=	1,260.0	CF	=	46.7	BCY	=	58.3	LCY

FEB Seepage Pump Station Excavation.

Length	=	60.0	FT	Assume 60 ft to allow for footprint of pump station					
Total Depth	=	21.5	FT	Assume Channel depth is 14.5' with an additional 7' of over excavation for structure.					
Thickness of Organic	=	4.5	FT						
Thickness of Blasting Cap Rock	=	10.0	FT						
Thickness inter-bedded material	=	7.0	FT						
Slope1	=	-	:1						
Slope2	=	-	:1						
Bottom Width	=	80.0	FT	Assume 90 ft to allow for footprint of Pump Station					
Top Width	=	80.0	FT						
Cross Section	=	1,720.0	SF						
Cross Section Organic	=	360.0	SF						
Cross Section of Blasting Cap Rock	=	800.0	SF						
Cross section Inter-Bedded Material	=	560.0	SF						
Surface Area of Canal	=	4,800.0	SF	=	0.1	ACRE			
Organic Volume	=	21,600.0	CF	=	800.0	BCY	=	1,000.0	LCY
Blasted Cap Rock Volume	=	48,000.0	CF	=	1,777.8	BCY	=	2,666.7	LCY
Inter-bedded material Volume	=	33,600.0	CF	=	1,244.4	BCY	=	1,866.7	LCY
Backfill	=	10,320.0	CF	=	382.2	ECY	=	553.3	LCY
Assume Backfill is 10% of excavated quantity.									

Care and Diversion of Water

Construction Sequence:

1 Construct perimeter concrete ring beam and rock anchors.

2 Place Sheet piling and connect piling to concrete ring beam. Excavate. Assume sheet pile length of 36 ft

3 Install rock anchors for concrete seal slab. Anchor length 17'-6" slab rock anchor.

4 Place Concrete Seal slab. 6'-0" thick and dimensions of sheet pile

5 Dewater cofferdam and prepare top of concrete base mat slab

6 Place concrete walls to elevation 9'-0" at pump structure monolith prior to abandoning or removing in place cofferdam sheet piles. Remove ring beams in inlet and outlet.

7 install lateral bracing for walls.

8 Construct service bridge slab. Remainder of walls and operating floor slab.

9 Install sheet pile wing walls.

# of pump station Bays	=	4.0		
Cofferdam width per pump station bay	=	15.0	ft	Assume Per S-101
Total width length	=	60.0	ft	
Length (Up and downstream) of Cofferdam	=	90.0	ft	Assume per S-101
Area of Cofferdam sheet pile to remain in place	=	9,000.0	SF	
Total perimeter length (length of sheet pile/ring beam)	=	300.0	ft	
Length of Sheet pile to Be utilized as wing wall	=	186.0	ft	
Volume of ring beam (Reinforced Concrete	=	70.4	CY	Per detail S-103
# of 54' ring beam anchors @ 10' OC	=	30	ea	Per detail S-101
# of 17'-6" uplift slab rock anchors	=	54	ea	
Volume of Concrete seal/uplift slab	=	1,200.0	CY	Assume 6' thick
Width of each Bay	=	15.00	ft	Assumed per similar PS-357
Length of Operating Floor	=	45.0	ft	
Width of Operating Floor	=	60.0	ft	

Horizontal concrete volume	=	800.0	CY	
Vertical Concrete	=	1,500.0	CY	
Service Bridge Elevated Flatwork	=	190.1	CY	Total Elevated Flatwork = 446.4 CY
Operating Floor (Elevated Flatwork	=	225.0	CY	
Elevated Vertical Work (Operating floor to	=	31.3	CY	
Roof slab / Metal Deck	=	220.0	CY	
Loading Truck Ramp (horizontal Concrete)	=	4,903.0	SF	= 272.4 CY Assumed From Merritt Pump Station
SF of Generator, Electric and Office/Contro	=	900.0	SF	Assume Generator room. Electric Room and Office control room is 20ftx39ft
Volume of Concrete for Gen, Elec and Offic	=	1,500.0	CF	= 55.6 CY Assume 1.67 ft thick
Assume 10 18"x18"x26' tall Columns	=	21.7	CY	
Tilt Up 7-1/2" Thick Precast Panels	=	21,072.0	SF	Assume Similar to Merritt Pump Station
CMU Wall Dimensions (Exterior Surface Area of CMU)	=	7,044.0	SF	
Roof 32" Double tee units 56 ft long required	=	8	each	
Intake Basin Concrete	=	89	CY	
Discharge Basin Concrete Apron	=	133.3	CY	Assume 36" thick concrete
Stone Protection Riprap discharge	=	1,688.9	CY	Assume 5 ft thick layer of riprap lining the C-625W canal upstream 60 ft and downstream 60 ft.
Stone Protection inlet	=	750.0	CY	Assume 36" thick layer of riprap lining the sides and bottom for 150' upstream
Trash Rack Surface Area (total)	=	1,680.0	SF	Assume Trash rake is 28 ft tall and covers the width of the operating floor each individual covers the width of the bays (14ft).
Roll Up Garage Door	=	168.0	SF	Assume Roll up garage door 12'x14'
# of Doors	=	4.0	ea	Assume 1 set of double doors and two other doors
# louver openings	=	8.0	ea	Assume 8 louver openings 7'-4" square
Overhead Crane	=	2.0	ea	Assume 2 overhead cranes @ 25 tons each
Power Line Connection	=	2,500.0	LF	Assume power available 2500 lf from site
Septic tank system	=	1.0	ea	Assume 1 septic tank system
Potable water	=	1.0	ea	Assume 1 potable water well will be required
Generator Fuel Tank	=	2000 Gallon	ea	Assume two 2000 gallon fuel tanks required
Fuel Pad dimensions	=	400.0	SF	Assume two 20'x20'x2' thick reinforced concrete slab on grade pad.
		44.4	CY	
Discharge Piping				
48" discharge pipe	=	50.0	LF/ea	Assume Pumps will have a 48" Discharge Piping
Concrete Encasement	=	349.1	CY	Assume 2 ft of concrete to encase piping
Floor Grating	=	240.0	SF	Assume 14' x4 ft wide for each pump bay.
Ladders	=	120.0	VLF	Assume 30 ft per pump bay
Railings	=	180.0	LF	Assume a handrail on the up and downstream side and one a width of the operating floor
Haul road length	=	21,120.0	FT	
Haul road width	=	14.0		
Haul road thickness	=	1.0	FT	
Area	=	295,680.0	SF	= 32,853.3 see
Chain link Fence	=	2,280.0	LF	Assume Similar to Merritt Pump Station
Silt Fence	=	3,700.0	LF	Assume similar to Merritt Pump Station

Feature of Work:	FEB - S-627 (CS-4) Emergency Overflow Weir 445/1850 CFS Between A 2 and A-1 FEB, just north of S-628

Scope Given:	The spillway will include a 265 foot long weir with crest elevation set at 13.50 ft NGVD. The spillway will discharge into the adjacent seepage canal along the northern portions of the A-1 and A-2 FEBs. The spillway will be located in line with the northern extent of the eastern perimeter levee, adjacent to structure S-628. S-627 is an overflow weir that will have the same crest width as the levee of 14 feet. The design will be similar to the overflow weir design in the C-111 South Dade S-327.

Reference for Scope Basis:	Engineering Appendix dated March 2013 A.5.4.5 Weirs A.5.3.3.2.1.5 Other Features

Scope Assumptions:	- Assume similar to structure S-327. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - FEB is not operational prior to overflow weir being constructed. - Assumed that levee is constructed to design grade of overflow weir. Minimal excavation is needed prior to placement of concrete. - Assumed that the weir will start at the toe of the levee then rise at a constant slope up to elevation 13.5 ft be 14 f wide then back down to the opposite toe of the levee.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

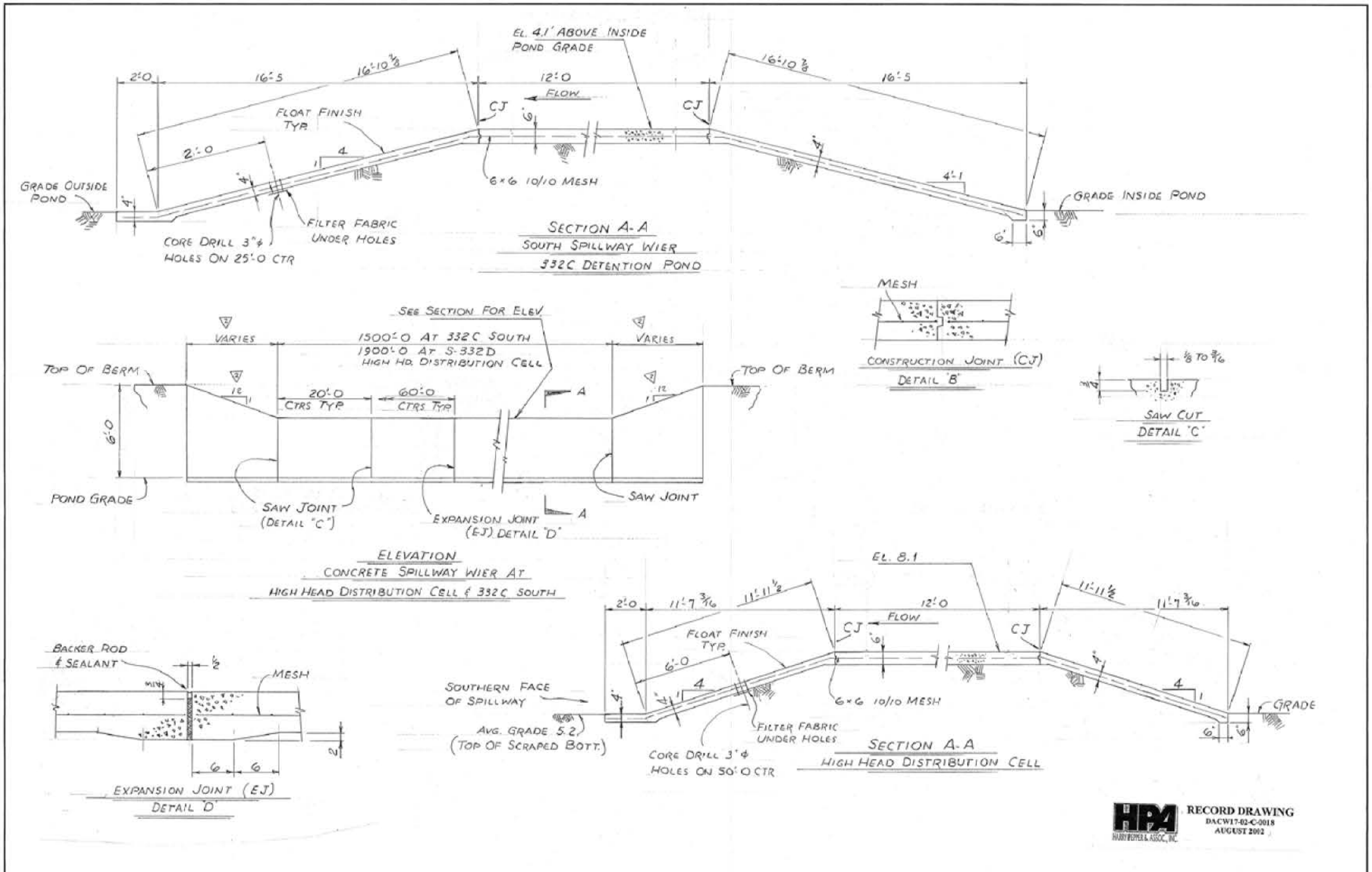
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope and assumptions were documented and sent to the design team for review. After reaching consensus on the scope and major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	- Site survey and stake entire area of Emergency Overflow Weir. - Silt Fence the entire site. Silt fence maintenance will be ongoing during construction of the overflow weir. - Excavate site for keyed ends near the toe of the levee and the intersection of the levee crown and the weir. - Place filter fabric below future holes, set and tie reinforcing. Form, place, finish, and cure concrete. Saw cut joints Strip forms backfill and compact at edges of concrete.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: S-627



NO.	DATE	BY	REVISION
1	4-27	JNC	ISSUED FOR CONST
2	5-2	JNC	RUN OUT SLOPE
3	8-12	JNC	AS BUILT

PROJECT HPA'119
DESIGN J. GATES
DRAWN J. GATES
CHECKED

HARRY PEPPER AND ASSOCIATES INC.
ENGINEERING AND CONSTRUCTION JACKSONVILLE, FLORIDA

CONCRETE SPILLWAY WIER DETAILS

SCALE NTS
DATE 9-13-02
SHEET C 3
OF

ORIGINAL

Feature of Work:	FEB - S-627 (CS-4) Emergency Overflow Weir 445/1850 CFS Between A-2 and A-1 FEB, just north of S-628

Quantity Take Off:

Excavation

Length of spillway	=	265.0	FT							
Width of spillway	=	14.0	FT							
elevation of levee	=	20.3	FT							
elevation of spillway	=	13.5	FT							
base width of levee	=	82.0	FT							
Base elevation of levee	=	9.0	FT							
Slope length of spillway	=	34.3	FT							
Slope towards levee from Spillway Crest	=	12.0	:1							
each side length of slope	=	81.9	FT							
Apron length	=	2.0	FT							
Depth	=	1.0	FT	assumed depth						
backfilled material	=	15.0	%	assumed						
TOTAL Volume	=	36,080.2	CF		=	1,336.3	BCY	=	1,670.4	LCY

Concrete

Top of levee depth	=	0.5	FT			
Slopes of levee depth	=	0.3	FT			
volume	=	10,282.4	CF	=	380.8	CY
area	=	27,845.7	SF			
total length of spillway concrete	=	428.8	FT			
total length over spillway	=	82.6	FT			
saw cut spacing	=	20.0	FT			
number of saw cuts	=	21.0	EA			
length of saw cut	=	1,734.5	LF			
Spacing of expansion joints	=	60.0	FT			
number of Expansion joints	=	7.0	EA			
Length of Expansion joints	=	578.2	FT			

Backfill

Volume	=	200.4	ECY	=	226.5	LCY

Site Prep

Area of work	=	34,807.1	SF	=	0.8	Acre
Length of Silt Fence	=	1,278.4	LF			

Silt Fence

Floating Silt Boom	=	428.8	LF	
Silt Fence	=	1,276.9	LF	assumed 125% longer then the perimeter of the work area

Feature of Work: FEB - S-628 (DS-9) Gate Culvert FEB Intake / Discharge structure between A-1 and A-2 FEB 930 CFS

Scope Given:

S-628 is a bi-directional inlet and outlet structure that hydraulically connects the A-2 FEB to the A-1 FEB. This featu will allow water to be passed between the A-2 and A-1 FEBs, depending on impoundment stages and capacity. Wat from the Miami Canal could potentially be routed through the A-1 FEB by use of this structure. The opposite operation can occur, using water routed through A-1 from the North New River Canal via G-370 pump station and (15 to supplement water in A-2. S-628 is a two-barreled gated box culvert with dimensions of 9 ft by 9 ft with vertic slide gates. The design flow is 930 cfs (60% of total A-2 inflow, assuming only partial flow would be conveyed between impoundments) with a design hydraulic head of 1.0 foot. The upstream and downstream barrel inverts ar set at elevation 1.50 ft NGVD. The design velocity through the structure is 5.75 fps. S-628 is located in the northeas corner of the A-2 FEB, in line with the eastern levee shared by A-1 and A-2.

Reference for Scope Basis:

Engineering Appendix dated March 2013
A.5.3.2.1.4 Water Control Structures
A.5.3.3.2.1.1 Gated Culverts
Table A-17.S-628 Gated Culvert

Scope Assumptions:

- Assume similar to structures S-276 and S-277.
- Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure.
- Assume S-628 is built prior to construction of the L-624 but after the A-1 FEB is operational.
- Assume sheet pile will need to be driven around the A-1 side intake/discharge structure. Sheet pile depth 50 ft, se back from excavation of 25 ft, with a rim ditch in conjunction with pumping ongoing during construction.
- Assume the Seepage canal between the A-1 FEB and the A-2 FEB is operational and will need plugs up and downstream of the culvert.
-Assume Excavation will be to the same depth below finished grade as shown in contract drawings for similar projects with a slope of 1:2 for construction.
- Assume material as 1.5 ft of organic, 10 ft of blastable cap rock, and inter-bedded formation of sand/shell and fragmented limestone for the remainder of the excavation.
- Assume power will be provided from power lines approximately 2.5 miles away.
- Assume that a diesel generator is needed for backup power.

Supporting Documentation: (by Cost Team) Quantity Takeoff, Material Quotes

Class of Estimate Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:

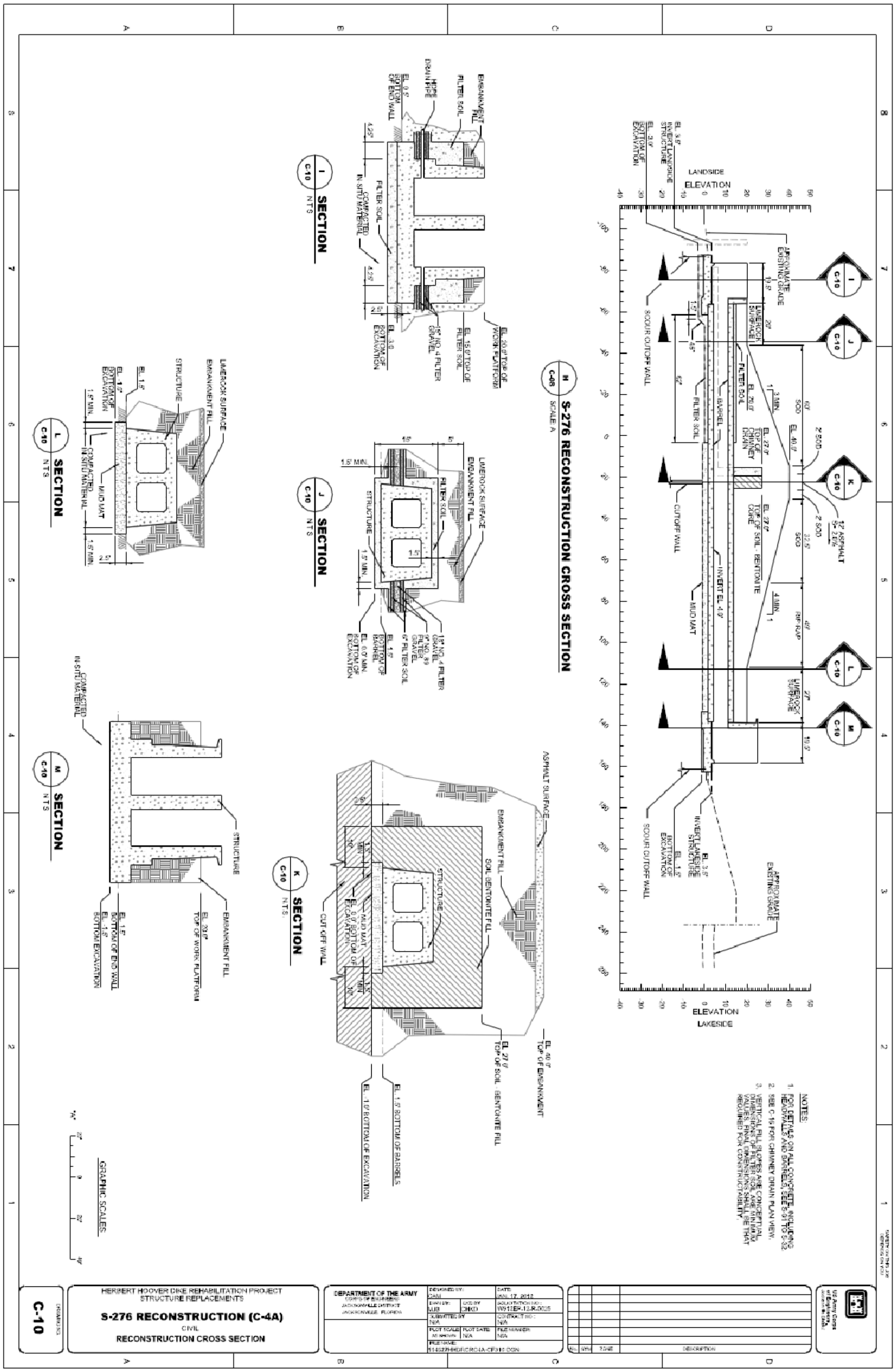
When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:

Survey of the site and installation of canal plugs. The culvert will have to breach the existing A-1 FEB levee and an inlet apron in both FEBS will be installed along with construction of the Culverts. Cast-in-place culverts will be formed and set along with the foundation for the gated inlet/outlet structures. Backfill and compaction around th canal portion of the culverts will be completed to restore flow to the existing seepage canal. The perimeter levee will be reconstructed and the gated structure construction will be completed. The plugs will be removed from the seepage canal between the two FEBS, and Support facilities (control station and generator shelters) will be constructed.

Key Outstanding Questions/Issues:

Representative Drawings/Photos: S-628



Feature of Work:	FEB - S-628 (DS-9) Gate Culvert FEB Intake / Discharge structure between A-1 and A-2 FEB 930 CFS

Quantity Take Off:

Rim Ditch Excavation											
	Length	=	240.0	ft		Length of excavation					
	Width	=	89.0	ft		Bottom width of excavation					
	Canal Dimension	=	3ft deep x 3 ft wide								
	Ditch volume	=	2,961.0	CF	=	109.7	BCY	=	137.1	LCY	
Canal Plug											
	Number	=	2.0	EA							
	Top Width	=	100.0	FT							
	Canal Width	=	73.0	FT							
	Depth	=	14.5	FT							
	Side Slope	=	3.0	:1							
	bottom width	=	187.0	FT							
	Volume	=	303,789.5	CF	=	11,251.5	ECY	=	12,714.2	LCY	
Levee Removal											
	Length	=	300.0	FT		assumed 300 ft of A-1 Perimeter levee will need to be removed.					
	Height	=	11.3	FT		assumed					
	Top Width	=	14.0	FT		assumed					
	Side Slope	=	3.0	:1							
	Bottom Width	=	81.8	FT							
	Volume	=	162,381.0	CF	=	6,014.1	BCY	=	7,517.6	LCY	
Culvert excavation											
	Length	=	240.0	FT		0.0	Miles =	240.0			
	Total Depth	=	26.0	FT		assumed same as S-624					
	Thickness of Organic	=	1.5	FT							
	Thickness of Blasted Cap Rock	=	10.0	FT							
	Thickness of Inter-bedded material	=	14.5	FT							
	Slope1	=	2.0	:1							
	Slope2	=	2.0	:1							
	Bottom Width	=	89.0	FT							
	Top Width	=	193.0	FT							
	Cross Section	=	3,666.0	SF							
	Cross Section Organic	=	285.0	SF							
	Cross section Blasted Cap Rock	=	1,670.0	SF							
	Cross Section Inter-bedded Material	=	1,711.0	SF							
	Surface Area of Canal	=	46,320.0	SF	=	1.1	ACRE				
	Organic Volume	=	68,400.0	CF	=	2,533.3	BCY	=	3,166.7	LCY	
	Blasted Cap Rock Volume	=	400,800.0	CF	=	14,844.4	BCY	=	18,555.6	LCY	
	Inter-bedded Material Volume	=	410,640.0	CF	=	15,208.9	BCY	=	22,813.3	LCY	
			TOTAL		=	32,586.7	BCY				
Concrete Culvert Concrete											
	Length	=	140.0	FT							
	Foundation Concrete										
	Bottom Width	=	29.0	FT							
	Bottom Thickness	=	2.5	FT							
	Volume	=	10,150.0	CF	=	375.9	CY				
	Vertical concrete										
	Height	=	9.0	FT							
	width of walls	=	8.8	FT							
	Volume	=	11,025.0	CF	=	408.3	CY				
	Elevated Concrete										
	Top Width	=	25.5	FT							
	Thickness	=	2.5	FT							
	Volume	=	8,925.0	CF	=	330.6	CY				
	PVC water stops	=	2.0	EA							
	length	=	93.5	LF							
	Spacing	=	15.0	FT							
	total length	=	1,870.0	LF							

Inlet and Outlet Works

Number	=	8.0	EA		assumed intake and outlet are the same assumed 2 per each end gate and bulkhead					
Foundation										
Length	=	8.0	FT							
Depth	=	5.0	FT							
Width	=	47.0	FT							
Volume	=	7,520.0	CF	=	278.5	CY				
Head Walls										
Height	=	25.5	FT							
Thickness	=	3.0	FT							
width	=	35.0	FT							
openings	=	162.0	SF							
volume	=	8,766.0	CF	=	324.7	CY				
End walls										
height	=	24.0	FT							
length	=	100.0	FT		total each side					
thickness	=	2.0	FT							
volume	=	9,600.0	CF	=	355.6	CY				

MISC METALS

Railing	=	358.0	LF					
Ladders	=	4.0	EACH					
height	=	25.5	FT EA	=	102.0	FT	TOTAL	
Grating	=	400.0	SF per Gate					assumed 20 by 20 section of grating per gate per end.
TOTAL Grating	=	1,600.0	SF					

Gates IN HHD

Height	=	14.0	FT	*** STAINLESS STEEL
Width	=	10.0	FT	
Weight	=	6,500.0	LB	
Weight Per SF	=	46.4	LB/SF	

NEW GATES

number of gates	=	8.0	EA		assumed 2 on each end 1 gate and one bulkhead.				
Height	=	16.0	FT		assumed 2 ft larger then similar gate				
Width	=	12.0	FT		assumed 2 ft larger then similar gate				
Weight % larger	=	10.0	%		assumed				
Total Weight of gates	=	9,805.7	LB EA	=	78,445.7	LB	=	39.2	TON
Motors	=	8.0	EA						
Gear Reduction	=	8.0	EA						
Actuators	=	8.0	EA						
cable reels	=	8.0	EA						
Imbeds for gate	=	504.0	LF						
Gate Seal Length	=	448.0	LF						

Operations building

size	=	315.0	SF	21 x 15
Electrical	=	NEEDED		
Communications	=	NEEDED		

Backfill

Existing Levees	=	162,381.0	CF	=	6,014.1	ECY	=	6,795.9	LCY
Area of Levee	=	24,540.0	SF	=	2,726.7	SY			
Area above Culvert	=	879,840.0	CF	=	32,586.7	ECY	=	36,822.9	LCY

Plug Removal

Plugs	=	303,789.5	CF	=	11,251.5	BCY	=	14,064.3	LCY

Cut off walls

Number	=	2.0	EA	assumed one in the A-1 and one in the A-2 Perimeter Levee			
Soil Bentonite Fill							
Height	=	25.0	FT				
Width	=	49.0	FT				
Thickness	=	8.0	FT				
Volume	=	9,800.0	CF/EA		=	363.0	CY/EA
Total Volume	=	725.9	CY				
Cutoff Wall							
Height	=	35.0	FT				
Width	=	89.0	FT				
Thickness	=	3.0	FT				
Volume	=	9,345.0	CF/EA		=	346.1	CY/EA
Area	=	3,115.0	SF/EA				
Total Area	=	6,230.0	SF				

RIP RAP

common both sides							
number of placements	=	2.0	EA	1 each side			
Length	=	20.0	FT				
Width	=	47.0	FT				
thickness	=	4.0	FT				
Volume	=	3,760.0	CF		=	139.3	CY
TOTAL	=	278.5	ECY		=	445.6	TON

Boat Barrier

number	=	2.0	EA
length	=	73.0	FT
total length	=	146.0	FT

SWPPP

Floating Silt Boom	=	730.0	FT	assumed 10 times the length of the canal
Silt Fence	=	6,226.0	FT	

Site Fence

Length	=	1,000.0	FT	Assumed
gates	=	4.0	FT	assumed

Site Restoration

area	=	4.2	Acre	=	20,328.0	SY

Feature of Work:	FEB - L-624 Levee FEB Perimeter Levee

Scope Given:	Perimeter Levee: 20 Miles, 11.3 ft high, 3:1 Slopes, top width 14 ft

Reference for Scope Basis:	Engineering Appendix dated March 2013 A.5.1 Levee Height and crown A5.3.3.1 Assumed Levee Height

Scope Assumptions:	- Assumed material must be removed to the level of the cap rock to allow for a stable levee foundation. Assumed side slopes of excavation at a 1:2 slope. Assumed the excavated area will be backfilled with levee material. - Assumed material type Organic Material: 1.5 ft thick material will be disposed of on site. - Assumed Plantings: All plantings on levees will be native grasses. - Access road: 6 inches of crushed limestone, 14 ft wide entire length of levee. - Assumed processing: 50% of the material will need processing prior to placement as levee and 50% of material ca be placed without the need for processing.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

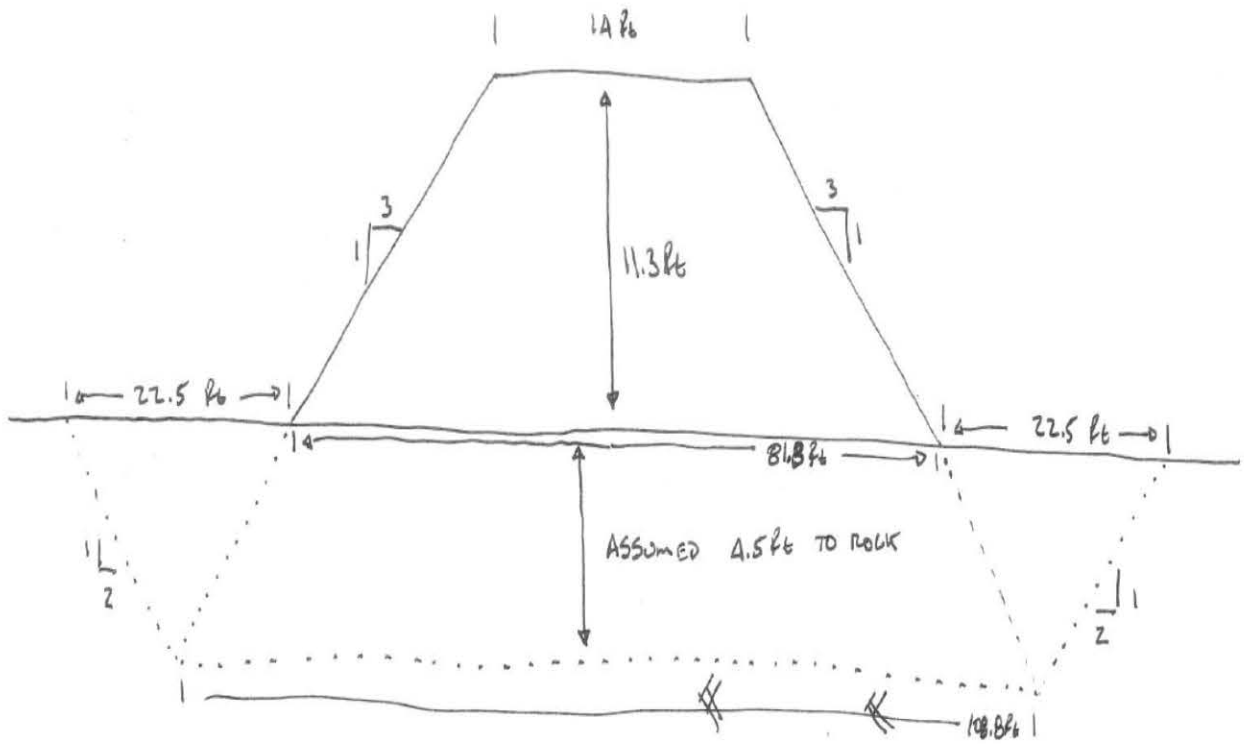
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	- Site survey and stake entire length and width of Levee. - Install silt fence and maintain as needed. - Excavate Organic Material to cap rock depth. Material will be disposed of onsite assumed side slopes of excavatio at 1V:2H. - Construct rim ditch for dewatering of levee base. - Build Levee compacting in 12 inch lifts. - Install slope protection on side of levee slopes. - Build access road on top of levee.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: L-624

L-624



* ALL AREA EXCAVATED WILL BE BACKFILLED W/ LEVEE CONSTRUCTION MATERIAL.

NTS

Feature of Work:	L-624 Levee FEB Perimeter Levee

Quantity Take Off:

Levee Construction

Length	=	105,600.0	FT		20.0	Miles =	105,600.0	FT	
Height	=	11.3	FT						
Slope1	=	3.0	:1						
Slope2	=	3.0	:1						
Top width	=	14.0	FT						
Bottom Width	=	81.8	FT						
Cross Section	=	541.3	SF						
Surface Area of Levee	=	10,828,622.6	SF	=	248.6	ACRE			
Volume	=	57,158,112.0	CF	=	2,116,967.1	ECY	=	2,392,172.8	LCY
base area of levee	=	8,638,080.0	SF	=	959,786.7	SY	=	198.3	Acre
side slopes of levee	=	9,350,222.6	SF	=	1,038,913.6	SY	=	214.7	Acre
roadway area	=	1,478,400.0	SF	=	164,266.7	SY	=	33.9	Acre

Levee Sub Surface Excavation

Thickness of Organic	=	1.5	FT						
bottom width	=	90.8	FT						
Slope of Excavation	=	2.0	:1						
Top Width of Excavation	=	96.8	FT						
Excavation of Organic	=	140.7	SF						
Volume of Organic	=	14,857,920.0	CF	=	550,293.3	BCY	=	687,866.7	LCY
Total Excavation	=	14,857,920.0	CF						
Total Backfill of Excavation	=	14,857,920.0	CF	=	550,293.3	ECY	=	621,831.5	LCY
Road length	=	105,600.0	FT						
Road width	=	14.0	FT						
minimum thickness	=	0.5	FT						

Site Work

Silt Fence	=	211,200.0	LF			
Site Survey	=	10,222,080.0	SF	=	234.7	ACRE

TOTAL BACKFILL AND FILL

Fill for excavation and levee	=	2,667,260.4	ECY	=	3,014,004.3	LCY

Site Restoration

area next to levees	=	1,584,000.0	SF	=	176,000.0	SY

Construction Haul Road

Length	=	105,600.0	FT			
Width	=	14.0	FT			
Area	=	1,478,400.0	SF	=	164,266.7	SY
Thickness	=	1.0	FT			
Volume to Remove	=	54,755.6	BCY	=	68,444.4	LCY

Rim Ditch Dewatering

Length	=	211,200.0	FT						
Dimensions	=	3 ft wide x 1.5 ft deep							
		950,400.0	CF	=	35,200.0	BCY	=	44,000.0	LCY
Backfill	=	35,200.0	ECY	=	44,000.0				

Feature of Work:	FEB - L-625 Levee Interior Inflow Canal Levee

Scope Given:	Inflow Levee: 4 Miles, 11.3 ft high levee with 14 crown and 3:1 side slopes.

Reference for Scope Basis:	Engineering Appendix dated March 2013 A.5.1 Levee Height and crown width A5.3.3.1 Assumed Levee Height as assumed from levee design from perimeter levee

Scope Assumptions:	- Assumed material must be removed to the level of the cap rock to allow for a stable levee foundation. Assumed side slopes of excavation at a 1:2 slope. Assumed the excavated area will be backfilled with levee material. - Assumed material type Organic Material: 1.5 ft thick material will be disposed of on site. - Assumed Plantings: All plantings on levees will be native grasses. - Access road: 6 inches of crushed limestone, 14 ft wide entire length of levee. - Assumed processing: 50% of the material will need processing prior to placement as levee and 50% of material ca be placed without the need for processing.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

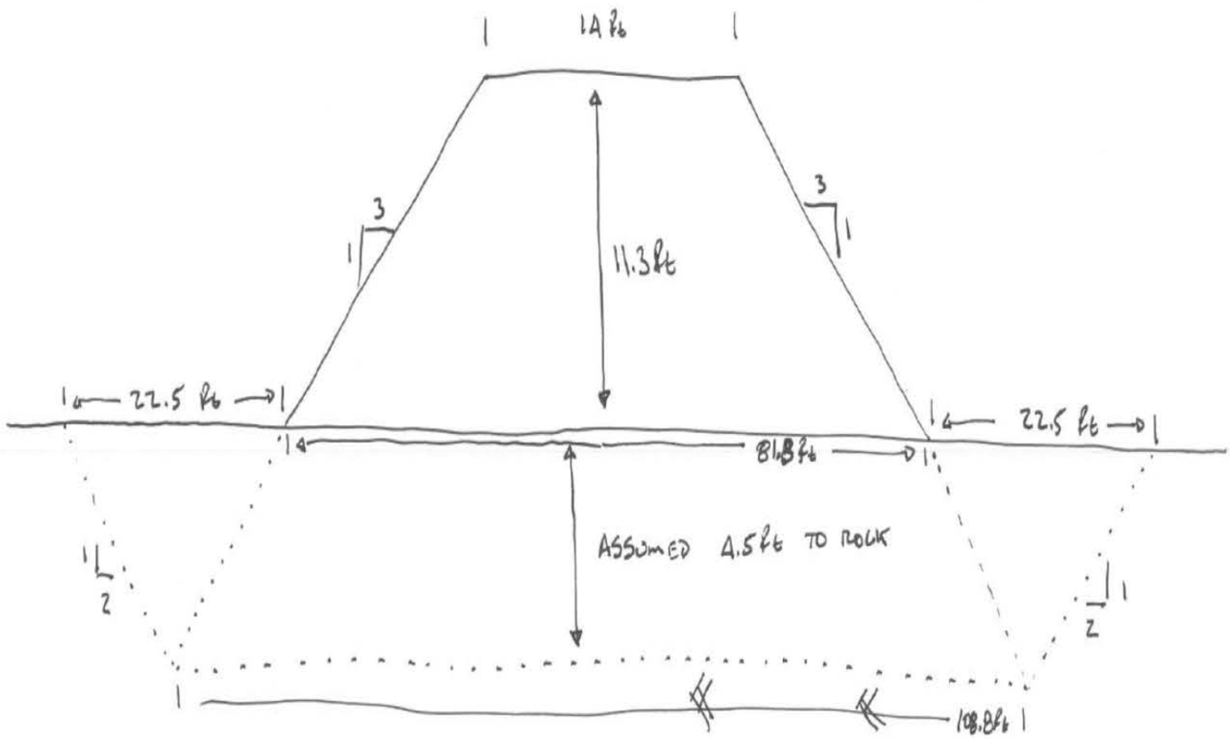
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	- Site survey and stake entire length and width of Levee. - Install silt fence and maintain as needed. - Excavate Organic Material to cap rock depth. Material will be disposed of onsite assumed side slopes of excavatio at 1V:2H. - Construct rim ditch for dewatering of levee base. - Build Levee compacting in 12 inch lifts. - Install slope protection on side of levee slopes. - Build access road on top of levee.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: L-625

L-625



* ALL AREA EXCAVATED WILL BE BACKFILLED W/ LEVEE CONSTRUCTION MATERIAL.

NTS

Feature of Work:	FEB - L-625 Levee Interior Inflow Canal Levee

Quantity Take Off:

Levee Construction

Length	=	21,120.0	FT		4.0	Miles =	21,120.0	FT	
Height	=	11.3	FT						
Slope1	=	3.0	:1						
Slope2	=	3.0	:1						
Top width	=	12.0	FT						
Bottom Width	=	79.8	FT						
Cross Section	=	518.7	SF						
Surface Area of Levee	=	1,856,335.3	SF	=	42.6	ACRE			
Volume	=	10,954,310.4	CF	=	405,715.2	ECY	=	458,458.2	LCY
base area of levee	=	1,685,376.0	SF	=	187,264.0	SY	=	38.7	Acre
side slopes of levee	=	1,602,895.3	SF	=	178,099.5	SY	=	36.8	Acre
roadway area	=	253,440.0	SF	=	28,160.0	SY	=	5.8	Acre

Levee Sub Surface Excavation

Thickness of Organic	=	1.5	FT						
Total depth	=	1.5	FT						
bottom width	=	88.8	FT						
Slope of Excavation	=	2.0	:1						
Top Width of Excavation	=	94.8	FT						
Excavation of Organic	=	137.7	SF						
Volume of Organic	=	2,908,224.0	CF	=	107,712.0	BCY	=	134,640.0	LCY
Total Backfill of Excavation	=	2,908,224.0	CF	=	107,712.0	ECY	=	121,714.6	LCY
Road length	=	21,120.0	FT						
Road width	=	14.0	FT						
minimum thickness	=	0.5	FT						

Site Work

Silt Fence	=	42,240.0	LF			
Site Survey	=	2,002,176.0	SF	=	46.0	ACRE

TOTAL BACKFILL AND FILL

Fill for excavation and levee	=	513,427.2	ECY	=	580,172.7	LCY

Site Restoration

area next to levees	=	316,800.0	SF	=	35,200.0	SY

Construction Haul Road

Length	=	21,120.0	FT			
Width	=	12.0	FT			
Area	=	253,440.0	SF	=	28,160.0	SY
Thickness	=	1.0	FT			
Volume to Remove	=	9,386.7	BCY	=	11,733.3	LCY

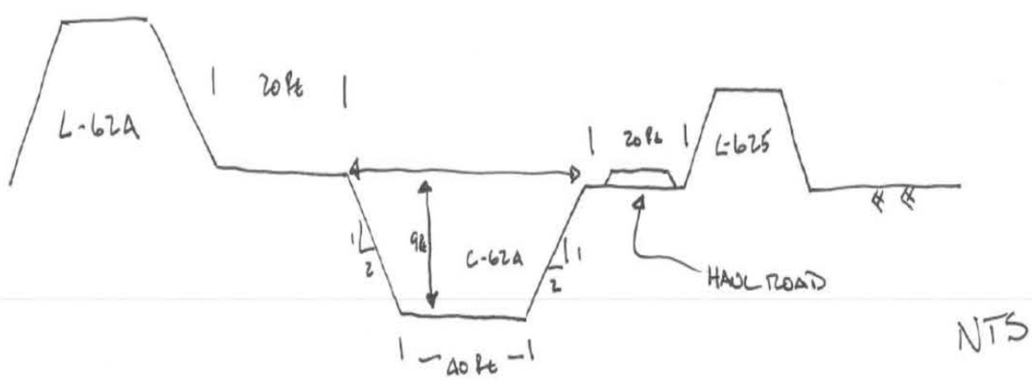
Rim Ditch Dewatering

Length	=	42,240.0	FT

Feature of Work:	FEB - C-624 Inflow Canal 1550 CFS West Side of FEB
Scope Given:	Inflow Canal 4 Miles(21,120 FT), 9 ft deep canal, bottom width 40 ft, includes left side slope 2:1 and right side slope 2:1
Reference for Scope Basis:	Engineering Appendix dated March 2013 Paragraph A.5.3.3.2.1.3 Canals TABLE A-4. C-624 Gravity inflow Canal
Scope Assumptions:	- Assume material type Organic Material: 1.5 ft thick material will be disposed of on site. - Cap Rock excavation: 10 ft thick cap rock will need blasting. All rock excavation will need processing to be used in a structural manor for a levee. - Remainder of excavation is an inter-bedded formation of sand/shell and fragmented limestone. - Agricultural canals frequency: 60 (counted from Google Earth) canals will need to be backfilled intersecting ag canals. Assumed dimensions of 12 ft wide 3 ft deep with a 4 ft bottom width assumed a 100 ft long plug will be needed.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope and assumptions were documented and sent to the design team for review. After reaching consensus on the scope and major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	'- Site survey and stake entire length and width of canal. - Install silt fence and maintain as needed. - Clear and grub entire site to remove vegetation and organic materials. - Construct a haul road parallel to the canal. This will be ongoing as needed during construction of the canal. Haul road maintenance will be ongoing during construction of the canal. Assumed same length as the canal will stay in place after construction. Assumed width of 14 ft 1 ft thick. - Excavate material from haul road allow to drain excess water. - Backfill of intersecting agricultural canals as needed.
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: C-624

C-624



Feature of Work:	FEB - C-624 Inflow Canal 1550 CFS West Side of FEB

Quantity Take Off:

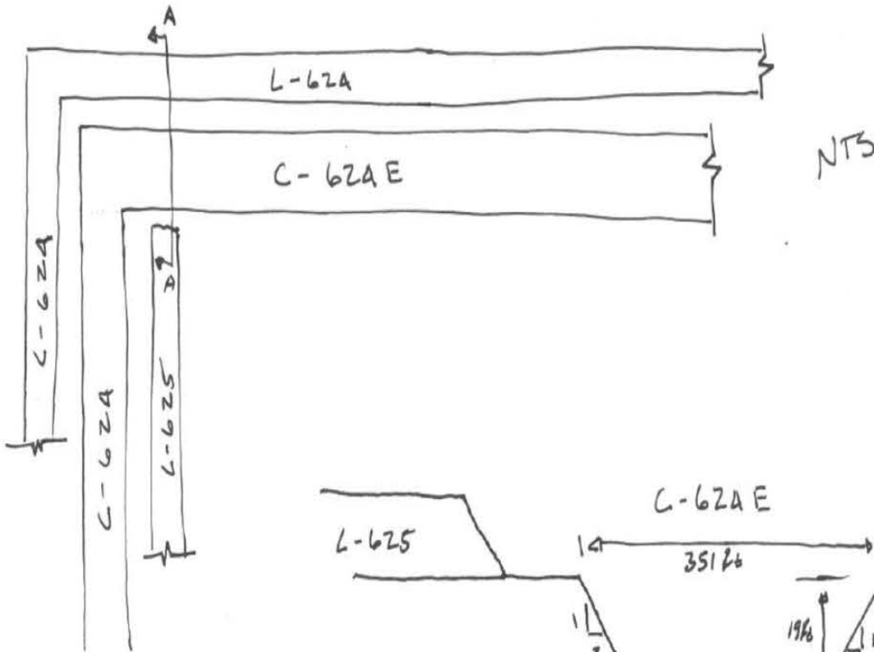
Canal Excavation Pete Layer Common Layer and Rock Layer

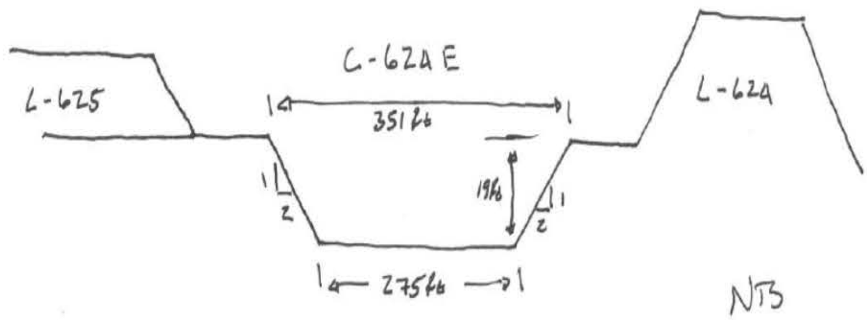
Length	=	21,120.0	FT		4.0	Miles =	21,120.0	ft		
Total Depth	=	9.0	FT							
Thickness of Organic	=	1.5	FT							
Thickness of Blasting Cap Rock	=	7.5	FT							
Slope1	=	2.0	:1			Silt Fence =	42,392.0	ft		
Slope2	=	2.0	:1							
Bottom Width	=	40.0	FT			Silt boom =	1,216.0	ft		
Top Width	=	76.0	FT							
Cross Section	=	522.0	SF							
Cross Section Organic	=	109.5	SF							
Cross Section of Blasting Cap Rock	=	412.5	SF							
Surface Area of Canal	=	1,605,120.0	SF	=	36.8	ACRE				
Organic Volume	=	2,312,640.0	CF	=	85,653.3	BCY	=		107,066.7	LCY
Blasted Cap Rock Volume	=	8,712,000.0	CF	=	322,666.7	BCY	=		484,000.0	LCY

Haul road length	=	21,120.0	FT					
Haul road width	=	14.0	FT					
Haul road thickness	=	1.0	FT					
Haul Road Area	=	295,680.0	SF	=	32,853.3	SY		
Back Fill Existing Ag Canal	=	60.0	ea					
Ag Canal								
Length of plug	=	100.0	FT					
Top width	=	12.0	FT					
bottom width	=	4.0	FT					
depth	=	3.0	FT					
Cross section	=	72.0	SF					
Volume	=	7,200.0	CF EA	=	266.7	ECY	=	301.3 LCY
TOTAL Volume	=	432,000.0	CF	=	16,000.0	ECY	=	18,080.0 LCY

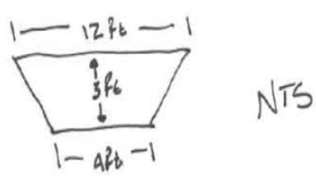
Feature of Work:	FEB - C-624E Spreader Canal Northern Boundary of FEB
Scope Given:	Distribution/Spreader Canal: 4 Miles long, bottom width 275 ft, 2:1 slopes both sides.
Reference for Scope Basis:	Engineering Appendix dated March 2013 Table A-6 C-624E Spreader Canal
Scope Assumptions:	- Organic Material: 1.5 ft thick - Cap rock excavation: 10 ft thick - Remaining Excavation: inter bedded formation. - Agricultural canals frequency: 13 (counted from Google Earth) canals will need to be backfilled intersecting ag canals. Assumed dimensions of 12 ft wide 3 ft deep with a 4 ft bottom width assumed a 100 ft long plug will be needed.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	- Site survey and stake entire length and width of Levee. - Install silt fence and maintain as needed. - Excavate Organic Material, material will be disposed of onsite. - Construct a haul road parallel to the canal. This will be ongoing as needed during construction of the canal. Haul road maintenance will be ongoing during construction of the canal. Assumed same length as the canal will be removed after construction. Assumed width of 14 ft 1 ft thick. - Excavate material into haul truck. - Backfill of intersecting agricultural canals.
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: C-624E





INTERSECTING AG CANAL



NTS

C-624E

Feature of Work:	FEB - C-624E Spreader Canal Northern Boundary of FEB

Quantity Take Off:

Canal Excavation Pete Layer Common Layer and Rock Layer

Length	=	21,120.0	FT		4.0	Miles =	21,120.0	ft	
Total Depth	=	19.0	FT						
Thickness of Organic	=	1.5	FT						
Thickness of Cap Rock	=	10.0	FT			Silt Fence =	42,942.0	ft	
Thickness of Inter bedded Formation		7.5	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1			Silt Boom =	5,616.0	ft	
Bottom Width	=	275.0	FT						
Top Width	=	351.0	FT						
Cross Section	=	5,947.0	SF						
Cross Section Organic	=	522.0	SF						
Cross Section Cap Rock	=	3,250.0	SF						
Cross section Inter Bedded Formation	=	2,175.0	SF						
Surface Area of Canal	=	7,413,120.0	SF	=	170.2	ACRE			
Organic Volume	=	11,024,640.0	CF	=	408,320.0	BCY	=	510,400.0	LCY
Cap Rock Volume	=	68,640,000.0	CF	=	2,542,222.2	BCY	=	3,813,333.3	LCY
Inter Bedded Formation Volume	=	45,936,000.0	CF	=	1,701,333.3	BCY	=	2,552,000.0	LCY

backfill existing ag canals	=	13.0	EA			
Haul road length	=	21,120.0	FT			
Haul road width	=	14.0				
Haul road thickness	=	1.0	FT			
Area	=	295,680.0	SF	=	32,853.3	SY

Ag Canal									
Length of plug	=	100.0	FT						
Top width	=	12.0	FT						
bottom width	=	4.0	FT						
depth	=	3.0	FT						
Cross section	=	72.0	SF						
Volume	=	7,200.0	CF EA	=	266.7	ECY	=	301.3	LCY
TOTAL Volume	=	93,600.0	CF	=	3,466.7	ECY	=	3,917.3	LCY

Feature of Work:	FEB - C-625E Collection Canal 400 CFS FEB interior collection Canal Along Southern Perimeter

Scope Given:	FEB collection canal along the southern boundary of the FEB. Length 6.0 miles aide slopes 1:2, bottom width 10 ft depth 9.0 ft from north elevation to canal bottom elevation.

Reference for Scope Basis:	Engineering Appendix dated March 2013 TABLE A-7. C-625E COLLECTION CANAL EXISTING CONDITIONS

Scope Assumptions:	- Assume material type Organic Material: 1.5 ft thick material will be disposed of on site. - Cap Rock excavation: 10 ft thick cap rock will need blasting. All rock excavation will need processing to be used in structural manor for a levee. - Remainder of excavation is an inter-bedded formation of sand/shell and fragmented limestone. - Agricultural canals frequency: 11 (counted from Google Earth) canals will need to be backfilled intersecting ag canals. Assumed dimensions of 12 ft wide 3 ft deep with a 4 ft bottom width assumed a 100 ft long plug will be needed.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

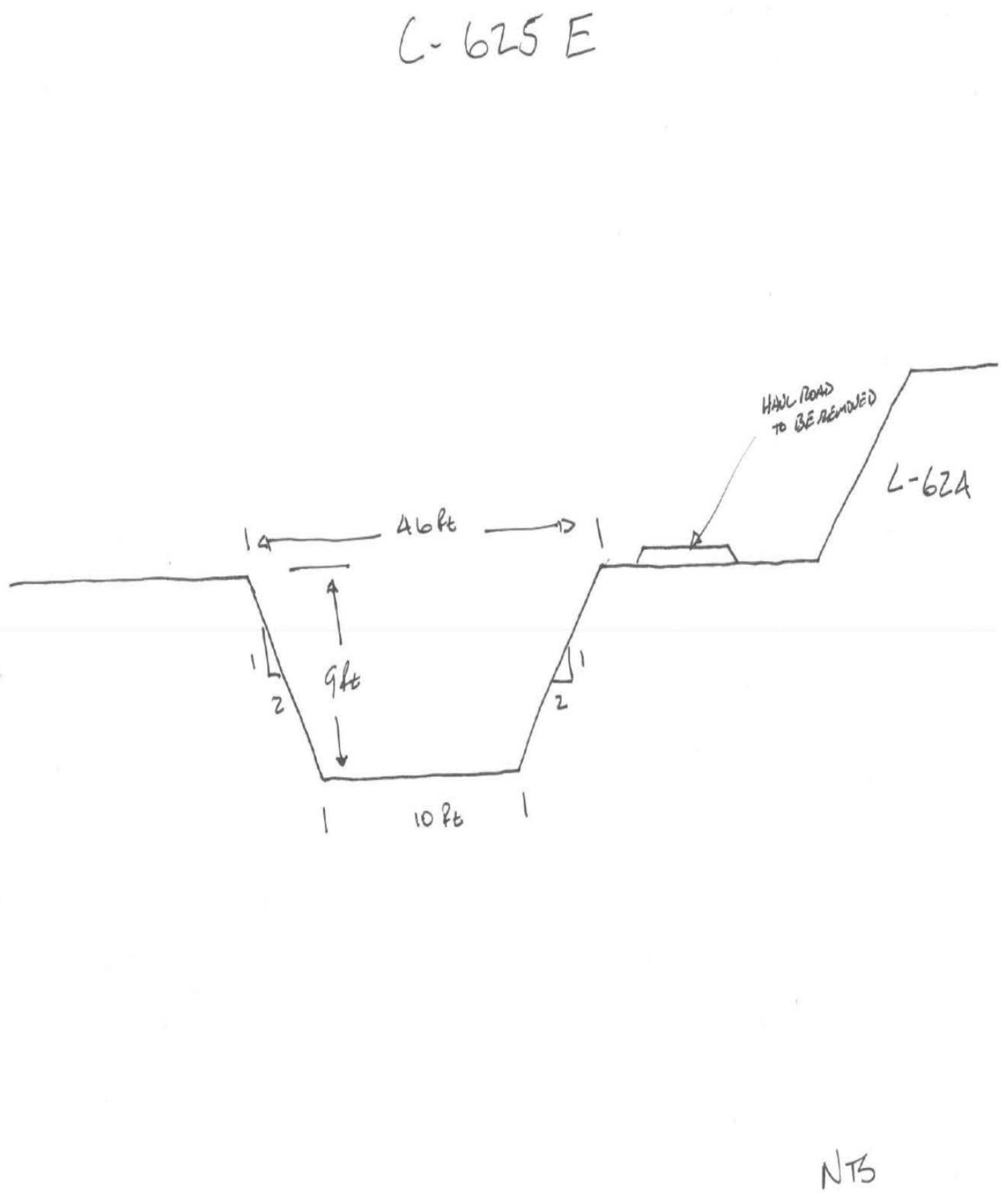
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope and assumptions were documented and sent to the design team for review. After reaching consensus on the scope and major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	'- Site survey and stake entire length and width of canal. - Install silt fence and maintain as needed. - Clear and grub entire site to remove vegetation and organic materials. - Construct a haul road parallel to the canal. This will be ongoing as needed during construction of the canal. Haul road maintenance will be ongoing during construction of the canal. Assumed same length as the canal will stay in place after construction. Assumed width of 14 ft 1 ft thick. - Excavate material from haul road allow to drain excess water. - Backfill of intersecting agricultural canals as needed.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: C-625E



Feature of Work:	FEB - C-625E Collection Canal 400 CFS FEB interior collection Canal Along Southern Perimeter

Quantity Take Off:

Canal Excavation Pete Layer Common Layer and Rock Layer

Length	=	31,680.0	FT		6.0	Miles =	31,680.0	ft		
Total Depth	=	9.0	FT							
Thickness of Organic	=	1.5	FT							
Thickness of Blasting Cap Rock	=	7.5	FT			Silt Fence =	63,360.0	FT		
Slope1	=	2.0	:1							
Slope2	=	2.0	:1							
Bottom Width	=	10.0	FT			Silt Boom =	1,104.0	Ft		
Top Width	=	46.0	FT							
Cross Section	=	252.0	SF							
Cross Section Organic	=	64.5	SF							
Cross Section of Blasting Cap Rock	=	187.5	SF							
Surface Area of Canal	=	1,457,280.0	SF	=	33.5	ACRE				
Organic Volume	=	2,043,360.0	CF	=	75,680.0	BCY	=		94,600.0	LCY
Blasted Cap Rock Volume	=	5,940,000.0	CF	=	220,000.0	BCY	=		330,000.0	LCY
backfill existing ag canals	=	11.0	EA							
Haul road length	=	31,680.0	FT							
Haul road width	=	14.0	FT							
Haul road thickness	=	1.0	FT							
Area of Haul Road	=	443,520.0	SF	=	49,280.0	SY				
Ag Canal										
Length of plug	=	100.0	FT							
Top width	=	12.0	FT							
bottom width	=	4.0	FT							
depth	=	3.0	FT							
Cross section	=	72.0	SF							
Volume	=	7,200.0	CF EA	=	266.7	ECY	=		301.3	LCY
TOTAL Volume	=	79,200.0	CF	=	2,933.3	ECY	=		3,314.7	LCY

Feature of Work:	FEB - C-625W OUTFLOW CANAL 1.5 MILE LENGTH 1550 CFS

Scope Given:	The C-625W canal serves as the FEB discharge canal, extending from the S-625 discharge structure to the headwat of G-372 pump station. The existing canal currently serves as the seepage canal for the STA 3/4 Supply Canal, but w be modified to accommodate the FEB discharges. The existing canal will be extended northward and westward of t G-372 pump station to create a tie-in at the headwater of the structure. The canal will have a 1V:5H transition fron elevation 0.0 ft NGVD where outlet structure S-625 ties into the canal, down to elevation -5.0 ft NGVD for conveyance capacity purposes. Design data for C-625W is summarized in Table A-8 and Table A-9.

Reference for Scope Basis:	Engineering Appendix dated March 2013 TABLE A-8. C-625W FEB DISCHARGE CANAL

Scope Assumptions:	- Assume material type Organic Material: 1.5 ft thick material will be disposed of on site. - Cap Rock excavation: 10 ft thick cap rock will need blasting. All rock excavation will need processing to be used in structural manor for a levee. - Remainder of excavation is an inter-bedded formation of sand/shell and fragmented limestone. - Agricultural canals frequency: 4 (counted from Google Earth) canals will need to be backfilled intersecting ag canals. Assumed dimensions of 12 ft wide 3 ft deep with a 4 ft bottom width assumed a 100 ft long plug will be needed.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

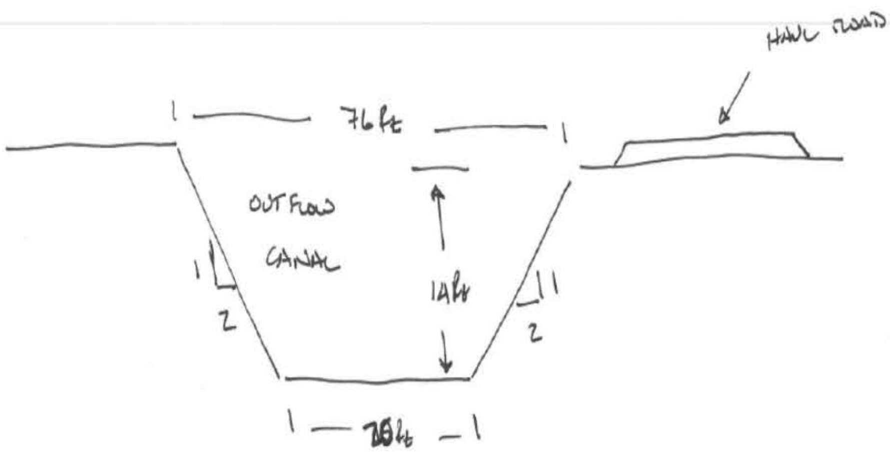
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	'- Site survey and stake entire length and width of canal. - Install silt fence and maintain as needed. - Clear and grub entire site to remove vegetation and organic materials. - Construct a haul road parallel to the canal. This will be ongoing as needed during construction of the canal. Haul road maintenance will be ongoing during construction of the canal. Assumed same length as the canal will stay in place after construction. Assumed width of 14 ft 1 ft thick. - Excavate material from haul road allow to drain excess water. - Backfill of intersecting agricultural canals as needed.

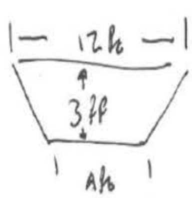
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: C-625W

C-625 W



INTERSECTING AG CANALS



NTS

NTS

Feature of Work:	FEB - C-625W OUTFLOW CANAL 1.5 MILE LENGTH 1550 CFS

Quantity Take Off:

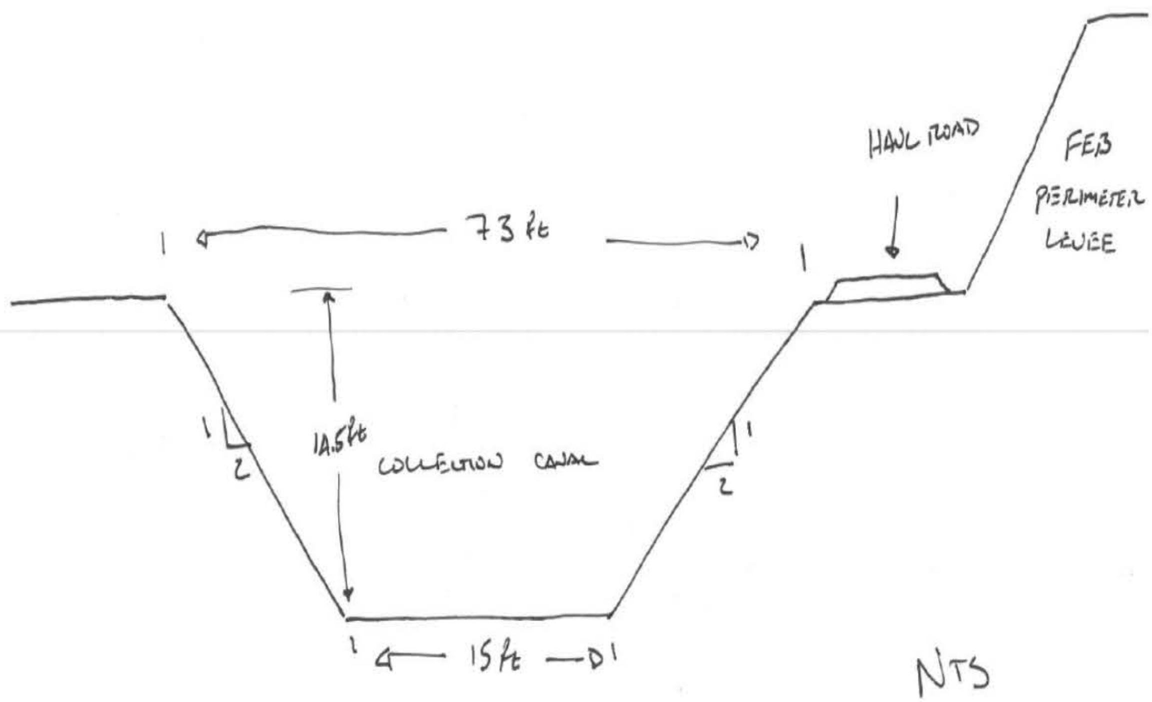
Canal Excavation Pete Layer Common Layer and Rock Layer

Length	=	7,900.0	FT		1.5	Miles =	7,920.0	ft		
Total Depth	=	14.0	FT			approximately 1.5 miles table listed at 7900 ft				
Thickness of Organic	=	1.5	FT							
Thickness of Blasting Cap Rock	=	10.0	FT							
Thickness inter-bedded material		2.5	FT			Silt Fence =	15,952.0	FT		
Slope1	=	2.0	:1			Silt Boom =	456.0	FT		
Slope2	=	2.0	:1							
Bottom Width	=	20.0	FT							
Top Width	=	76.0	FT							
Cross Section	=	672.0	SF							
Cross Section Organic	=	109.5	SF							
Cross Section of Blasting Cap Rock	=	500.0	SF							
Cross section Inter-Bedded Material	=	62.5	SF							
Surface Area of Canal	=	600,400.0	SF	=	13.8	ACRE				
Organic Volume	=	865,050.0	CF	=	32,038.9	BCY	=		40,048.6	LCY
Blasted Cap Rock Volume	=	3,950,000.0	CF	=	146,296.3	BCY	=		219,444.4	LCY
Inter-bedded Material Volume	=	493,750.0	CF	=	18,287.0	BCY	=		27,430.6	LCY

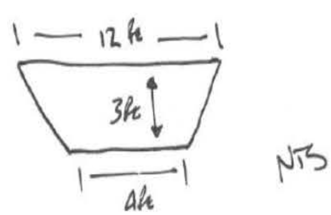
backfill existing ag canals	=	6.0	EA						
Haul road length	=	7,900.0	FT						
Haul road width	=	14.0	FT						
Haul road thickness	=	1.0	FT						
Area of Haul Road	=	110,600.0	SF	=	12,288.9	SY			
Ag Canal									
Length of plug	=	100.0	FT						
Top width	=	12.0	FT						
bottom width	=	4.0	FT						
depth	=	3.0	FT						
Cross section	=	72.0	SF						
Volume	=	7,200.0	CF EA	=	266.7	ECY	=	301.3	LCY
TOTAL Volume	=	43,200.0	CF	=	1,600.0	ECY	=	1,808.0	LCY

Feature of Work:	FEB - C-626 SEEPAGE CANAL
Scope Given:	Seepage Canal: 11 Miles 14.5 ft deep 15 ft bottom width 73 ft top width and 2:1 slopes.
Reference for Scope Basis:	Engineering Appendix dated March 2013 Table A-10. C-626 Seepage Canal Collection Canal
Scope Assumptions:	- Assume material type Organic Material: 1.5 ft thick material will be disposed of on site. - Cap Rock excavation: 10 ft thick cap rock will need blasting. All rock excavation will need processing to be used in structural manor for a levee. - Remainder of excavation is an inter-bedded formation of sand/shell and fragmented limestone. - Agricultural canals frequency: 40 (counted from Google Earth) canals will need to be backfilled intersecting ag canals. Assumed dimensions of 12 ft wide 3 ft deep with a 4 ft bottom width assumed a 100 ft long plug will be needed.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope and assumptions were documented and sent to the design team for review. After reaching consensus on the scope and major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	'- Site survey and stake entire length and width of canal. - Install silt fence and maintain as needed. - Clear and grub entire site to remove vegetation and organic materials. - Construct a haul road parallel to the canal. This will be ongoing as needed during construction of the canal. Haul road maintenance will be ongoing during construction of the canal. Assumed same length as the canal will stay in place after construction. Assumed width of 14 ft 1 ft thick. - Excavate material from haul road allow to drain excess water. - Backfill of intersecting agricultural canals as needed.
Key Outstanding Questions/Issues:	

SEEPAGE COLLECTION CANAL C-626



INTERSECTING AG CANAL



Feature of Work:	FEB - C-626 SEEPAGE CANAL

Quantity Take Off:

Canal Excavation Pete Layer Common Layer and Rock Layer

Length	=	58,080.0	FT		11.0	Miles =	58,080.0	ft		
Total Depth	=	14.5	FT							
Thickness of Organic	=	1.5	FT							
Thickness of Blasting Cap Rock	=	10.0	FT			Silt Fence =	116,306.0	FT		
Thickness inter-bedded material		3.0	FT							
Slope1	=	2.0	:1			Silt Boom =	3,212.0	Ft		
Slope2	=	2.0	:1							
Bottom Width	=	15.0	FT							
Top Width	=	73.0	FT							
Cross Section	=	638.0	SF							
Cross Section Organic	=	105.0	SF							
Cross Section of Blasting Cap Rock	=	470.0	SF							
Cross section Inter-Bedded Material	=	63.0	SF							
Surface Area of Canal	=	4,239,840.0	SF	=	97.3	ACRE	471,093.3			
Organic Volume	=	6,098,400.0	CF	=	225,866.7	BCY		=	282,333.3	LCY
Blasted Cap Rock Volume	=	27,297,600.0	CF	=	1,011,022.2	BCY		=	1,516,533.3	LCY
Inter-bedded Material Volume	=	3,659,040.0	CF	=	135,520.0	BCY		=	203,280.0	LCY

Intersecting ag Canals

backfill existing ag canals	=	40.0	EA						
Haul road length	=	58,080.0	FT						
Haul road width	=	14.0	FT						
Haul road thickness	=	1.0	FT						
Haul road area	=	813,120.0	SF	=	90,346.7	SY			
Ag Canal									
Length of plug	=	100.0	FT						
Top width	=	12.0	FT						
bottom width	=	4.0	FT						
depth	=	3.0	FT						
Cross section	=	72.0	SF						
Volume Each	=	7,200.0	CF EA	=	266.7	ECY	=	301.3	LCY
TOTAL Volume	=	288,000.0	CF	=	10,666.7	ECY	=	12,053.3	LCY

Cut Fill Study

	Excavation									
	organic		common		Blasted Cap Rock		Inter-Bedded Material		Levee Material	
Structure	BCY	LCY	BCY	LCY	BCY	LCY	BCY	LCY	BCY	LCY
S-623	-	-	10,133.3	12,666.7	-	-	-	-	-	-
S-624	4,615.0	5,768.8	-	-	27,444.4	41,166.7	29,699.0	44,548.5	7,723.9	9,654.8
S-625	1,777.8	2,222.2	-	-	9,817.4	14,726.2	-	-	-	-
S-626	800.0	1,000.0	-	-	1,777.8	2,666.7	1,291.1	1,936.7	-	-
S-627	-	-	-	-	-	-	-	-	1,336.3	1,670.4
S-628	2,533.3	3,166.7	-	-	14,844.4	22,266.7	15,318.6	22,977.8	6,014.1	7,517.6
L-624	550,293.3	687,866.7	-	-	-	-	-	-	-	-
L-625	107,712.0	134,640.0	-	-	-	-	-	-	-	-
C-624	85,653.3	107,066.7	-	-	322,666.7	484,000.0	-	-	-	-
C-624E	408,320.0	510,400.0	-	-	2,542,222.2	3,813,333.3	1,701,333.3	2,552,000.0	-	-
C-625E	75,680.0	94,600.0	-	-	220,000.0	330,000.0	-	-	-	-
C-625W	32,038.9	40,048.6	-	-	146,296.3	219,444.4	18,287.0	27,430.6	-	-
C-626	225,866.7	282,333.3	-	-	1,011,022.2	1,516,533.3	135,520.0	203,280.0	-	-
TOTAL	1,495,290.3	1,869,112.9	10,133.3	12,666.7	4,296,091.5	6,444,137.3	1,901,449.0	2,852,173.6	15,074.3	18,842.8

	Fill	
	Levee Quality Material	
Structure	ECY	LCY
S-623	3,555.6	4,017.8
S-624	69,315.0	78,325.9
S-625	11,488.9	12,982.4
S-626	382.2	431.9
S-627	200.4	226.5
S-628	38,600.8	43,618.9
L-624	2,667,260.4	3,014,004.3
L-625	513,427.2	580,172.7
C-624	16,000.0	18,080.0
C-624E	3,466.7	3,917.3
C-625E	2,933.3	3,314.7
C-625W	1,600.0	1,808.0
C-626	10,666.7	12,053.3
TOTAL	3,338,897.2	3,772,953.8

Processed LCY = 9,327,820.3 LCY

Needed LCY = 3,772,953.8 LCY

rejected/unused processed = 5,554,866.5 LCY

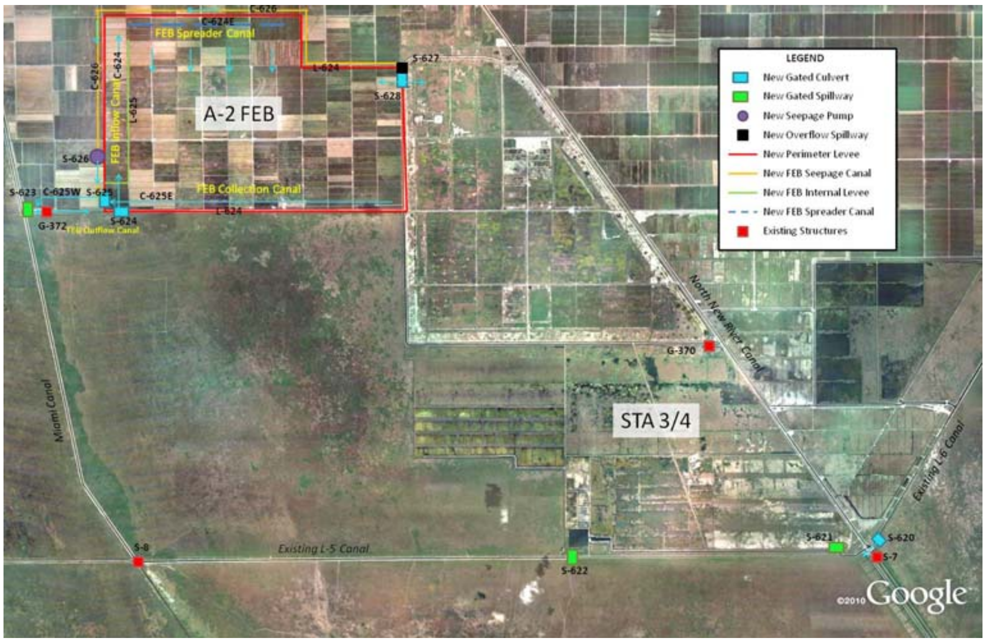
Needs Removed From Site = 59.55%

299,058.1

2,521,004.7

2,333.3

South of the Redline – Diversion and Conveyance



Feature of Work:	S-620 (CS-1) Gated Culvert 500 CFS In L-6 Canal

Scope Given:	S-620 is proposed to be a two-barreled 8 ft by 8 ft gated box culvert to control outflow from the L-6 Canal to the L- Canal. The structure will replace the existing plug. S-620 will be located at the southern end of the L-6 Canal, approximately 0.15 miles north of S-7. The structure is an outlet control structure to allow conveyance from the L-(Canal to the eastern (remnant) L-5 Canal, replacing the existing plug at the most southern end of the L-6 Canal. S-6 is a two-barreled gated box culvert structure. The design flow is 500 cfs with a design hydraulic head of 0.5 ft. The structure is a typical box culvert with dimensions of 8 ft by 8 ft with vertical slide gates and a total length of 75 ft. T upstream and downstream inverts are set at elevation -3.5 ft NGVD. The design velocity through the structure is 4. fps.

Reference for Scope Basis:	Engineering Appendix, March 2013 and Annexes Existing Plug Removal A.6.3.3.2.1.1 Gated Culverts S-620 Gated Culvert (CS-1) A.6.4.4 Culverts A.6.4.1 General Status of Completed and Non-Executed Efforts A.6.5.2 General Status of Completed and Non-Executed Efforts Location Lat 26 20 12.36 Lon 80 32 11.83 A.6.1.5 Utility Relocations Table A-23. S-620 Gated Culvert

Scope Assumptions:	- Assume similar to structures S-276 and S-277. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - Assume a canal plug will be utilized in concert with a rim ditch dewatering to install the culvert. -Assume Excavation will be to the same depth below finished grade as shown in contract drawings for similar projects. Assume existing plug is comprised of levee quality material and constructed to the same shape and the FE perimeter levee. Assume any excavation below grade will blasted. - ASSUME power will be provided from power lines in the area approximately 1000'. - Assume that a diesel generator is needed for backup power.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

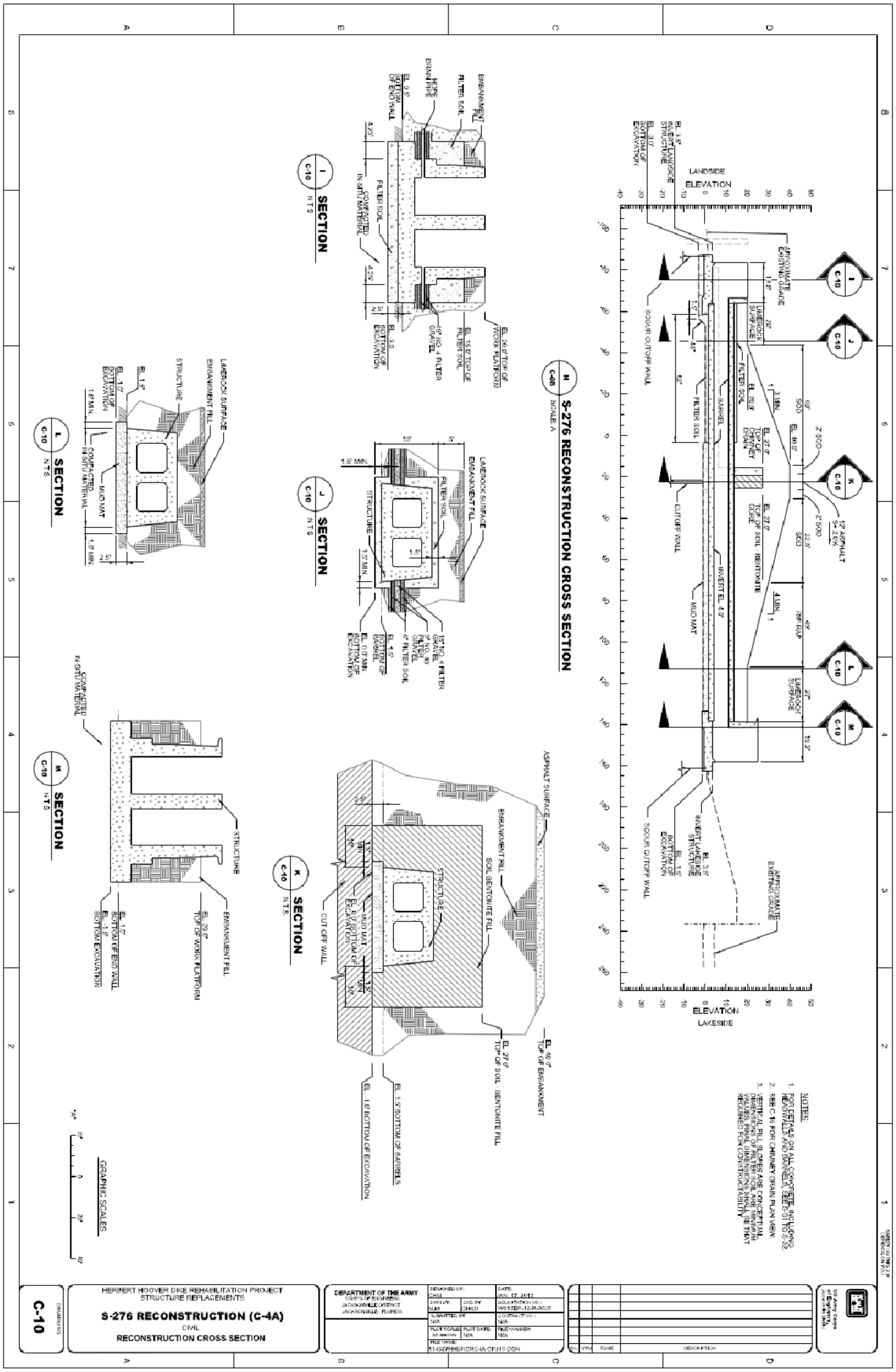
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	- Construction will be performed after the canal plugs are installed up and downstream of the proposed culvert location. Dewatering will be needed, Dewatering pumps used as needed throughout Construction utilizing rim ditc Dewatering approach. Excavation/blasting of limestone rock will be required to allow space for the foundation for the gated culvert structure. Culverts, foundations and structures will then be placed. Control structures for the Culverts will be installed and A standalone Control station will be built in the area. An additional backup generator will be required along with local utility power. Apron, wing wall, and riprap placement will occur after Culverts have been placed. Backfill and compaction around the structure will occur, the plugs will be removed.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: S-620



Feature of Work:	S-620 (CS-1) Gated Culvert 500 CFS In L-6 Canal

Quantity Take Off:

Existing Plug Removal

Length	=	140.0	FT							
Height	=	24.0	FT							
Slope1	=	3.0	:1							
Slope2	=	3.0	:1							
Top width	=	14.0	FT							
Bottom Width	=	158.0	FT							
Cross Section	=	2,064.0	SF							
Surface Area of Levee	=	15,756.1	SF	=	0.4	ACRE				
Volume	=	288,960.0	CF	=	10,702.2	BCY	=	13,377.8	LCY	
base area of levee	=	22,120.0	SF	=	2,457.8	SY	=	0.51	Acre	
side slopes of levee	=	12,396.1	SF	=	1,377.3	SY	=	0.28	Acre	
roadway area	=	1,960.0	SF	=	217.8	SY	=	0.04	Acre	

Care and Diversion of water plug (two required)

Assume each is 80 ft long 24ft deep with 3:1 side slopes

Length	=	160.0	FT						
Height	=	24.0	FT						
Slope1	=	3.0	:1						
Slope2	=	3.0	:1						
Top width	=	5.0	FT						
Bottom Width	=	149.0	FT						
Cross Section	=	1,848.0	SF						
Surface Area of Levee	=	8,899.6	SF	=	0.2	ACRE			
Volume	=	295,680.0	CF	=	10,951.1	ECY	=	12,374.8	LCY
Plug Removal	=	10,951.1	BCY	=	13,688.9	LCY			

Culvert excavation

Length	=	140.0	FT						
Total Depth	=	3.0	FT						
Width	=	45.0	FT						
Blast Required Rock Volume	=	18,900.0	CF	=	700.0	BCY	=	1,050.0	LCY

Concrete Culvert Concrete

Length	=	140.0	FT			
Foundation Concrete						
Bottom Width	=	26.0	FT			
Bottom Thickness	=	2.5	FT			
Volume	=	9,100.0	CF	=	337.0	CY
Vertical concrete						
Height	=	9.0	FT			
width of walls	=	10.0	FT			
Volume	=	12,600.0	CF	=	466.7	CY
Elevated Concrete						
Top Width	=	23.5	FT			
Thickness	=	2.5	FT			
Volume	=	8,225.0	CF	=	304.6	CY
PVC water stops	=	2.0	EA			
area	=	63.5	FT			
Spacing	=	15.0	FT			
Length	=	1,270.0	FT			

Inlet and Outlet Works

Number	=	8.0	EA				assumed intake/outlet are the same assumed 2 per each end gate and bulkhead
Foundation							
Length	=	8.0	FT				
Depth	=	5.0	FT				
Width	=	41.0	FT				
Volume	=	6,560.0	CF	=	243.0	CY	
Head Walls							
Height	=	25.5	FT				
Thickness	=	3.0	FT				
width	=	29.5	FT				
openings	=	128.0	SF				
volume	=	7,491.0	CF	=	277.4	CY	
End walls							
height	=	24.0	FT				
length	=	100.0	FT				total either inlet or outlet
thickness	=	2.0	FT				
volume	=	9,600.0	CF	=	355.6	CY	

Misc Metals

Railing	=	358.0	LF				
Ladders	=	4.0	EACH				
height	=	25.5	FT	=	102.0	FT Total	
Grating	=	400.0	SF per Gate				assumed 20 by 20 section of grating per gate per end.
TOTAL Grating	=	1,600.0	SF				

Gates IN HHD

Height	=	14.0	FT	*** STAINLESS STEEL for opening 7 by 7
Width	=	10.0	FT	
Weight	=	6,500.0	LB	
Weight Per SF	=	46.4	LB/SF	

NEW GATES

number of gates	=	8.0	EA							assumed 2 on each end 1 gate and one bulkhead.
Height	=	15.0	FT							assumed 2 ft larger then similar gate
Width	=	11.0	FT							assumed 2 ft larger then similar gate
Weight % larger	=	10.0	%							assumed
Total Weight of gates	=	8,426.8	LB EA	=	67,414.3	LB	=	33.7	TON	
Motors	=	8.0	EA							
Gear Reduction	=	8.0	EA							
Actuators	=	8.0	EA							
cable reels	=	8.0	EA							
Imbeds for gate	=	496.0	LF							
Gate Seal Length	=	416.0	LF							

Operations building

size	=	315.0	SF	21 x 15
Electrical	=	NEEDED		
Communications	=	NEEDED		

Backfill

Area above Culvert	=	288,960.0	CF	=	10,702.2	ECY	=	12,093.5 LCY

RIP RAP

common both sides						
number of placements	=	2.0	EA		1 each side	
Length	=	20.0	FT			
Width	=	41.0	FT			
thickness	=	4.0	FT			
Volume	=	3,280.0	CF/EA	=	121.5	CY/EA
TOTAL VOLUME	=	243.0	ECY	=	388.7	TON

Boat Barrier

Number	=	2.0	EA
Length	=	140.0	FT
Total Length	=	280.0	FT

SWPPP

Silt Fence	=	620.0	FT
Floating Silt Boom	=	280.0	FT

Site Fence

Length	=	1,000.0	FT	Assumed
gates	=	2.0	FT	Assumed

Feature of Work:	S-621 (CS-2) Gated Spillway 2500 CFS on STA 3/4 Outflow Canal

Scope Given:	The spillway consists of three gates with dimensions of 23 ft wide by 13.5 ft high. The crest elevation is set to 1.0 ft NGVD. The upstream and downstream aprons are set at an elevation of -5.0 ft NGVD, with apron lengths of 30 ft. S 621 is located in line with the STA 3/4 Outflow Canal, just north of the L-5 Canal. The S-621 gated spillway is locate in the STA 3/4 Outflow Canal, and will be used to block flows from the STA 3/4 from entering the L-5 Canal when L- deliveries are being made.

Reference for Scope Basis:	Engineering Appendix, March 2013 and Annexes A.6.3.2.1.4 Water Control Structures A.6.3.3.2.1.2 Gated Spillways A.6.4.1 General Status of Completed and Non-Executed Efforts A.6.4.3 Overflow Spillways A.6.5.2 General Status of Completed and Non-Executed Efforts Location Lat 26 20 25 Lon 80 32 50.10 A.6.1.5 Utility Relocations

Scope Assumptions:	- Assume similar to structure S-65EX. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - Assume bypass canal is the same shape as the existing STA3/4 outflow canal. Length is assumed as 1000 ft. Assum material as 4.5 ft of organic, 3 ft of rippable rock and the remainder will need blasting. - Assume aprons are in addition to the concrete structure shown in the provided drawings. - Assume power for the structure will be provided from local power lines located .5 miles from the structure. - Assume that a diesel generator is needed for backup power. - Assume 60 ft deep sheet pile 1000ft long. - Assume the canal will be plugged, in conjunction with sheet pile, upstream and downstream expanse of the existi canal. - Assume dewatering will be ongoing through feature of work. - Assume 35 KW Diesel Generator with 1000 gallon above ground tank.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

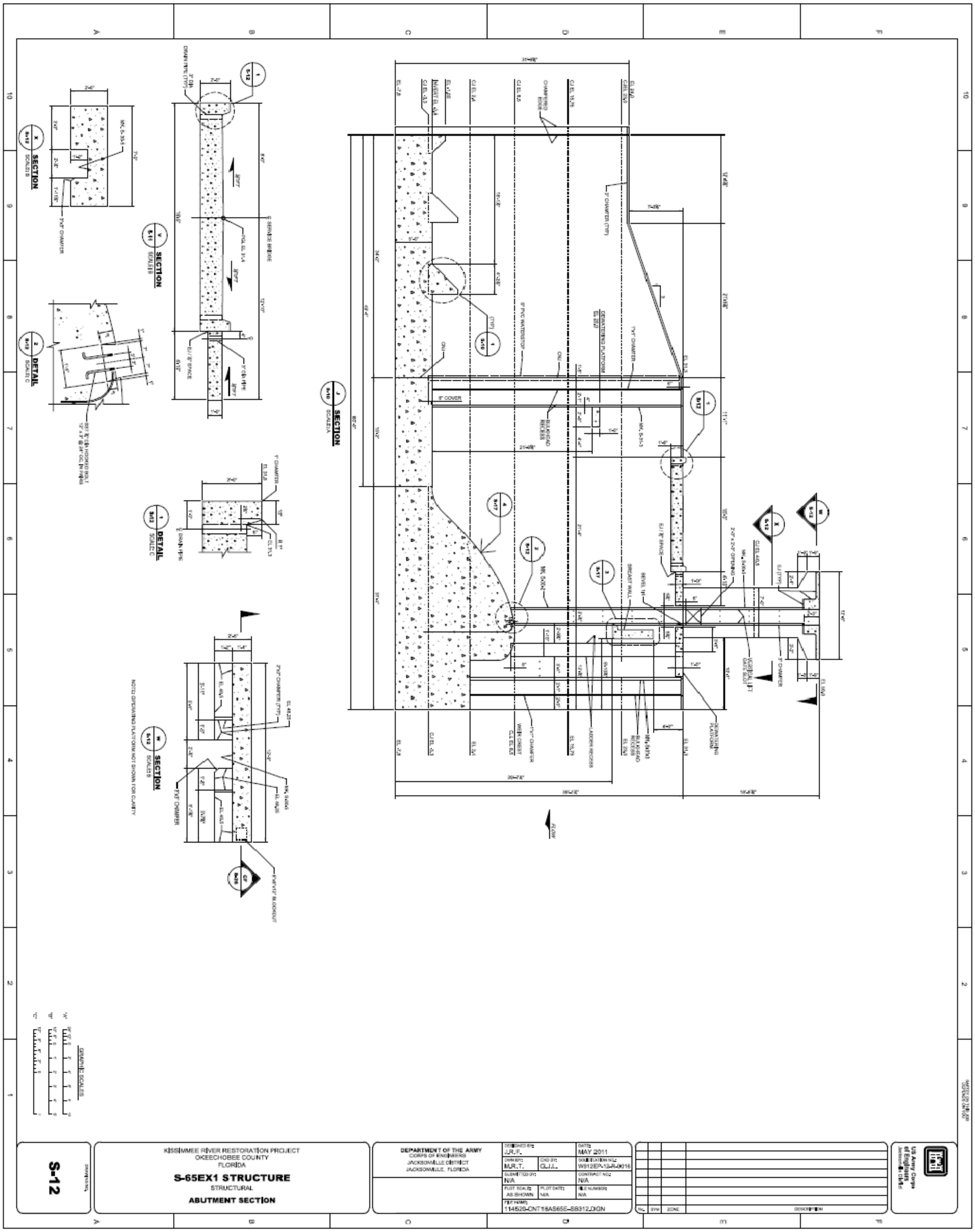
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	-A Bypass canal will be constructed around the location of S-621 to facilitate construction. -Sheet pile will be required to be installed around the entire structure and require 24/7 dewatering. - Excavation of materials to allow for construction of the foundation of the cross canal gate structure and the canal apron/wing wall. Construction of concrete work for structure followed by apron and wing walls. Backfill suitable material around the structure and import riprap. Construct control station, diesel generator, and fuel storage. Pla gates and other associated closure devices for the gate structure. Restore flow to canal and backfill/compact diversion canal.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: S-621



Feature of Work:	S-621 (CS-2) Gated Spillway 2500 CFS on STA 3/4 Outflow Canal

Quantity Take Off:

Structure Dimensions and volumes

Number of Gates	=	3.0	EA			
Superstructure/Gate Structure						
tower cross section	=	144.9	SF			
number of towers	=	4.0	EA			
pier cross section	=	154.1	SF			
number of Piers	=	2.0	EA			
tower width	=	3.5	FT			
Pier Height	=	35.0	FT			
beam cross section	=	15.0	SF			
Beam Length	=	69.0	FT			
volume	=	12,815.6	CF	=	474.7	CY
volume of elevated Beam	=	1,035.0	CF	=	38.3	CY
Width	=	69.0	FT			
Cross section of platform,bridge,brestwall	=	46.5	SF			
Volume	=	3,211.3	CF	=	118.9	CY
OGEE volume						
Cross section	=	143.9	SF			
width	=	69.0	FT			
OGEE Spillway volume	=	9,929.0	CF	=	367.7	CY
Spillway wall volume (Abutment)	=	1,153.3	CY	Structure is 90' long and cross section of wall is 173 SF		
Approach apron	=	460.0	CY	Assumed 36ft long 89 ft wide and 5 ft thick per S-65EX design		
Stilling Basin	=	460.0	CY	Assumed 36ft long 89 ft wide and 5 ft thick per S-65EX design		

Wing Walls Assumed approach wing walls similar to downstream wing wall plan from S-65EX-1 with anchor walls. Construction will consist of driven sheet pile with a 2'x2' concrete pile cap. The anchor walls will be 1 ft thick reinforced concrete. Concrete anchor wall dimensions will match wing wall dimensions. The wing wall and concrete anchor wall will be connected by #10 all thread grade 70. A C8x18.75 channel will be attached to the back of the wing wall where the anchors will be attached to.

wing walls							
Number	=	4.0	Each				
Length average US and DS	=	95.5	FT				
US Depth	=	44.5	FT				
DS Depth	=	26.5	FT				
area of sheet pile	=	13,561.0	SF				
Pile Cap							
height	=	2.0	FT				
width	=	2.0	FT				
volume	=	56.6	CY				
Rod length	=	60.0	FT				
spacing	=	4.0	FT				
number of rods	=	96.0	EA		total length	=	5,760.0
Anchor Walls							
height	=	8.0	FT				
thickness	=	1.0	FT				
length	=	382.0	FT				
volume	=	113.2	CY				
Rip Rap				Lengths and depths assumed to extend beyond aprons.			
Length	=	440.0	FT				
width	=	69.0	FT				
Depth	=	3.0	FT	average of all depths			
volume	=	3,373.3	CY	=	5,397.3	TON	

Excavation for Footing Volume	=	96,000.0	CF	Assume 89' wide (per width of channel) by 60 ft long (per S-65EX) and 10' deep to allow for construction of the underwater seal and structural footings.
	=	3,555.6	BCY	
	=	5,333.3	LCY	
Excavation east and west canal banks for installation of wing	=	139,200.0	CF	Assume top of bank is 13.5 ft NGVD (Per table A-24) and bottom of excavation and bottom of excavation is at -15.5 ft NGVD (Total depth 29'). Assume excavation is 160 ft long and extends the bottom of the canal an additional 15' per bank. Assume material is common or rippable as it is the bank of a levee.
	=	5,155.6	BCY	
	=	7,733.3	LCY	
Sheet pile/cofferdam	=	1,000.0	LF	Assume 1000 LF of sheet pile/cofferdam to go around entire work site.
Area	=	60,000.0	SF	Sheet pile will be driven 60ft deep. All sheet pile used as a coffer dam will be removed.

Gate weight calculations

3/8" Plate steel	=	15.3	lb/sq ft				
1/2" Plate steel	=	20.4	lb/sq ft				
1" Plate Steel	=	40.8	lb/sq ft				
Gate Skin 3/8" Plate Steel	=	392.0	sq ft		Assume Gate dimensions of 14'x28'		
3/8" Plate stiffeners and seal angles	=	87.0	sq ft		Assume 5 sq ft for seal angles and 82 for stiffeners		
Horizontal C-Channels (1/2")	=	607.0	sq ft		Assume each channel is equivalent to 26"x28' (10 Channels).		
Vertical C-Channels (1/	=	303.0	sq ft		Assume each vertical channel is 26"x14' (10 Channels).		
Pull Pad eyes (1")	=	4.0	sq ft		Assume 4 pad eyes per gate @ 1 sq ft each		
Total 3/8" Plus 10% for misc. items	=	526.9	sq ft	=	8,061.6	lbs	
Total 1/2" plus 15% for misc items	=	1,046.5	sq ft	=	21,348.6	lbs	
Total 1" steel	=	4.0	sq ft	=	163.2	lbs	
lbs/sq ft for 28'x14' gate	=	75.4	lb/sq ft				
Area of single S-621 Gate	=	403.0	sq ft			assumed 3 ft bigger then opening in each direction	
Approximate weight of S-621 Gate	=	30,403.2	lb				
Overweight factor for larger gates (10%)	=	33,443.6	LB EA	=	16.7	TON Ea	3 Each Needed.

Precast Concrete Control Building / Generator Shelter

Shelter square footage	=	315.0	sq ft	
Excavation/backfill for shelter	=	163.3	ECY	Building will be set on grade with 12" capillary water barrier and geotextile fabric and a 12" thick concrete curb around the building perimeter.
Generator Fuel Tank	=	1000 Gallon		
Fuel Pad dimensions	=	96.0	SF	Assume 8'x12'x12" thick reinforced concrete slab on grade pad.

Gate embeds/seal lengths

Gate Dimensions

Width	=	26.0	FT			
Height	=	15.5	FT			
Gate well Height	=	42.0	FT			
Gate Well Embed	=	110.0	FT			
Total gate Imbed length	=	330.0	FT	3 gates		
Seal Length	=	57.0	FT	seal length is the perimeter of bottom and both sides.		
Total Seal length	=	171.0	FT	total of 3 gates		
Up and Downstream Bulkhead Slot	=	588.0	FT	6 times vertical plus width of new gate per slot		
Bulkheads	=	33,443.6	LB EA	assume same size as gates		
number	=	6.0	EA	two per gate needed		
total length of imbeds	=	918.0	FT			
Total Weight of gates and stop logs	=	300,992.0	LB	=	150.5	TON
Total length of Seals stop logs and gates	=	513.0	FT			

Backfill

Backfill around structures	=	5,155.6	ECY	=	5,825.78	LCY

Railings and ladders

Railing

Length	=	826.0	FT	assumed 4
Height	=	3.5	FT	

Ladders

Count	=	6.0	EA	assumed ladders on each side of the structure.
Height	=	17.5	FT	average of all three types
total height	=	105.0	FT	

Boat Barrier

Number	=	2.0	EA
Length each	=	205.0	FT
Total Length	=	410	FT

Site Fencing

Length	=	1,000.0	FT	assumed a total of 1000 LF of chain link fencing.
Gates	=	4.0	EA	assumed

SWPPP

Length	=	3,000.0	LF
Floating Silt Boom	=	615.0	LF

Access road

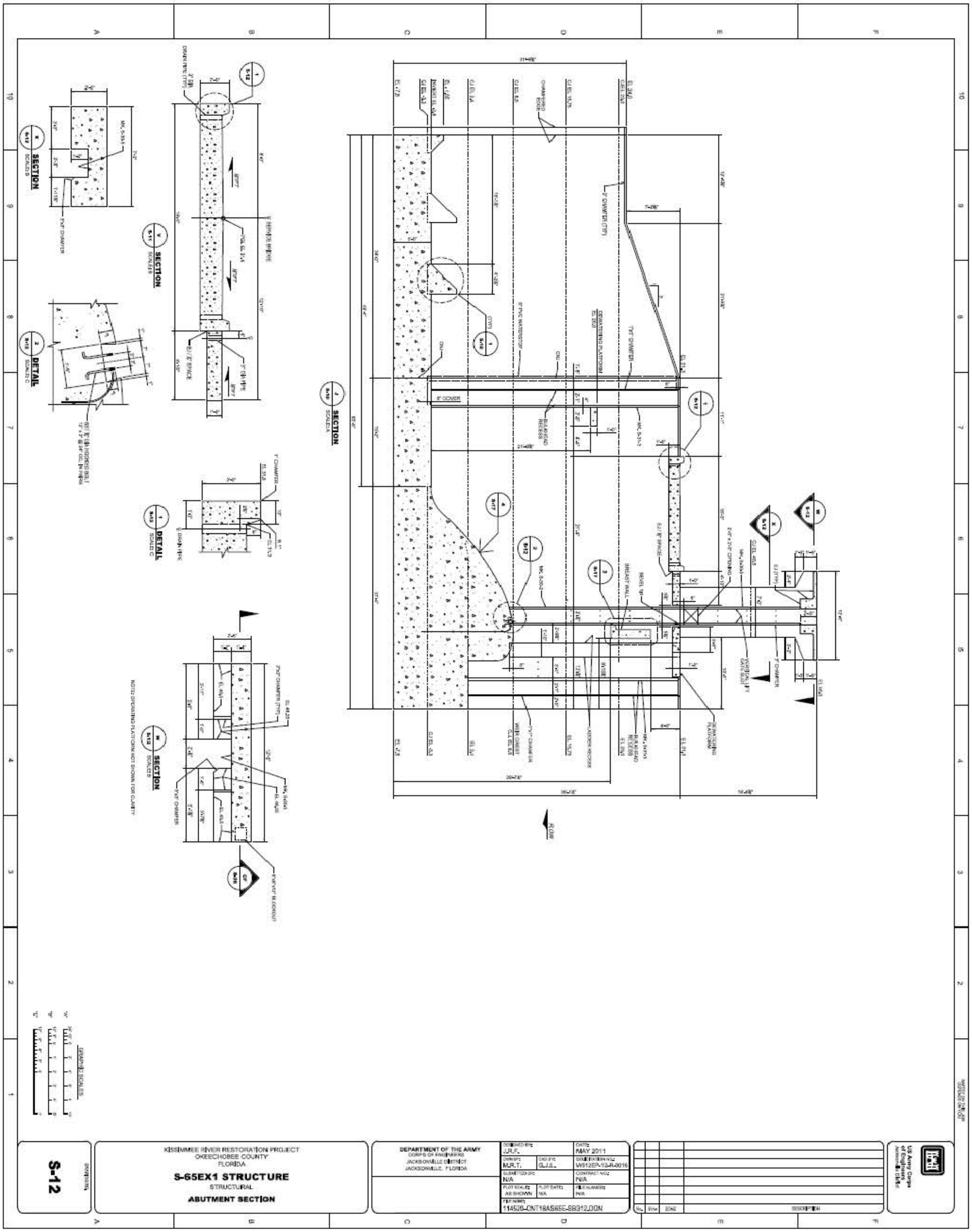
Length	=	300.0	FT	assumed		
Width	=	14.0	FT	assumed		
Area	=	4,200.0	SF	=	466.7	SY

Site Restoration

Area	=	2.0	ACRE	=	9,680.00	SY

Feature of Work:	S-622 (CS-3) Gated spillway 500 CFS In L-5 Canal
Scope Given:	S-622 is a gated spillway that will replace the existing plug in the L-5 Canal to hydraulically connect the eastern and western portions of the canal. S-622 is a three-bay gated spillway. The design flow is 500 cfs with a design hydrauli head of 0.1 feet. The spillway consists of three gates with dimensions of 15 ft wide by 10 ft high. The crest elevatio is set to 5.00 ft NGVD. The approach apron and discharge apron inverts are set at an elevation of 0.00 ft NGVD witl lengths of 33 ft. S-622 is located in line with the L-5 Canal, just south of the former Griffin rock pits near the southwest corner of STA 3/4. The S-622 gated spillway will replace the existing plug in the L-5 Canal, located near t rock pits at the southwest corner of the STA 3/4. The spillway was sized to match the L-6 deliveries quantity of 500 cfs.
Reference for Scope Basis:	Engineering Appendix, March 2013 and Annexes A.6.1.5 Utility Relocations A.6.3.2.1.4 Water Control Structures S-622 Gated Spillway (CS-3) Table A-25. S-622 Gated Spillway
Scope Assumptions:	- Assume similar to structure S-65EX. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - Assume aprons are in addition to the concrete structure shown in the provided drawings. - Assume power for the structure will be provided from local power lines located .5 miles from the structure. - Assume that a diesel generator is needed for backup power. - Assume feature will be constructed internal to the existing plug utilizing excavated material to act as a plug in conjunction with rim ditch dewatering to dewater the site. - Assume dewatering will be ongoing through feature of work. - Assume 35 KW Diesel Generator with 1000 gallon above ground tank.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	- Excavation of the existing plug and placement to act as plugs around the Construction site will be ongoing. rim ditch Dewatering will be utilized to dewater the site which will be ongoing during constrcution. - Excavation of materials to allow for Construction of the foundation of the cross canal gate structure and the cana Apron/wing wall. Construction of concrete work for structure followed by Apron and wing walls. Backfill suitable material around the structure and import riprap. Construct Control station, diesel generator, and fuel storage. Pla gates and other associated closure devices for the gate structure. Remove coffer dam and Remove existing plug ar the backfilled plug.
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: S-622



Feature of Work:	S-622 (CS-3) Gated spillway 500 CFS In L-5 Canal

Quantity Take Off:

Plug in L-5 East Canal Removal

Length	=	450.0	FT						
Top Width	=	100.0	FT						
depth	=	25.0	FT						
Slope	=	2.0	:1						
Bottom Width	=	200.0	FT						
Volume	=	1,687,500.0	CF	=	62,500.0	BCY	=	93,750.0	LCY

Structure Dimensions and volumes

Underwater Concrete Seal Volume (Unreinforced	=	3,851.9	CY	Underwater concrete is not reinforced, 10 ft thick 65 ft wide and 160 ft long			
Number of Gates	=	3.0	EA				
Superstructure/Gate Structure							
tower cross section	=	144.9	SF				
number of towers	=	4.0	EA				
pier cross section	=	154.1	SF				
number of Piers	=	2.0	EA				
tower width	=	3.5	FT				
Pier Height	=	35.0	FT				
beam cross section	=	15.0	SF				
Beam Length	=	45.0	FT				
volume	=	12,815.6	CF		=	474.7	CY
Volume of Elevated Beam	=	675.0	CF		=	25.0	CY
OGEE volume							
Cross section	=	143.9	SF				
width	=	45.0	FT				
OGEE Spillway volume	=	6,475.4	CF		=	239.8	CY
Spillway wall volume (Abutment)	=	1,153.3	CY	Structure is 90' long and cross section of wall is 173 SF			
Approach apron	=	300.0	CY	Assumed 36ft long 45 ft wide and 5 ft thick per S-65EX design			
Stilling Basin	=	300.0	CY	Assumed 36ft long 45 ft wide and 5 ft thick per S-65EX design			

Wing Walls Assumed approach wing walls similar to downstream wing wall plan from S-65EX-1 with anchor walls. Construction will consist of driven sheet pile with a 2'x2' concrete pile cap. The anchor walls will be 1 ft thick reinforced concrete. Concrete anchor wall dimensions will match wing wall dimensions. The wing wall and concrete anchor wall will be connected by #10 all thread grade 70. A C8x18.75 channel will be attached to the back of the wing wall where the anchors will be attached to.

wing walls			
Number	=	4.0	Each
Length average US and DS	=	95.5	FT
US Depth	=	44.5	FT
DS Depth	=	26.5	FT
area of sheet pile	=	13,561.0	SF

Pile Cap						
height	=	2.0	FT			
width	=	2.0	FT			
volume	=	56.6	CY			
Rod length	=	60.0	FT			
spacing	=	4.0	FT			
number of rods	=	96.0	EA			
Total Length	=	5,760.0	LF			
Anchor Walls						
height	=	8.0	FT			
thickness	=	1.0	FT			
length	=	382.0	FT			
volume	=	113.2	CY			
Rip Rap				Lengths and depths assumed to extend beyond aprons.		
Length	=	440.0	FT			
width	=	45.0	FT			
Depth	=	3.0	FT	average of all depths		
volume	=	2,200.0	CY	=	3,520.0	TON

Excavation for Footing Volume	=	39,000.0	CF	Assume 65' wide (per width of channel) by 60 ft long (per S-65EX) and 10' deep to allow for construction of the underwater seal and structural footings. Assume bottom of canal requires blasting to remove rock.
	=	**1,444.4**	BCY	
	=	2,166.7	LCY	
Excavation east and west canal banks for installation of	=	139,200.0	CF	Assume top of bank is 13.5 ft NGVD and bottom of excavation and bottom of excavation is at -15.5 ft NGVD (Total depth 29'). Assume excavation is 160 ft long and extends the bottom of the canal an additional 15' per bank. Assume material is common or rippable as it is the bank of a levee.
	=	**5,155.6**	BCY	
	=	7,733.3	LCY	

Gate weight calculations						
3/8" Plate steel	=	15.3	lb/sq ft			
1/2" Plate steel	=	20.4	lb/sq ft			
1" Plate Steel	=	40.8	lb/sq ft			
Gate Skin 3/8" Plate Steel	=	392.0	sq ft	Assume Gate dimensions of 14'x28'		
3/8" Plate stiffeners and seal angles	=	87.0	sq ft	Assume 5 sq ft for seal angles and 82 for stiffeners		
Horizontal C-Channels (1/2")	=	607.0	sq ft	Assume each channel is equivalent to 26"x28' (10 Channels).		
Vertical C-Channels	=	303.0	sq ft	Assume each vertical channel is 26"x14' (10 Channels).		
Pull Pad eyes (1")	=	4.0	sq ft	Assume 4 pad eyes per gate @ 1 sq ft each		
Total 3/8" Plus 10% for misc. items	=	526.9	sq ft	=	8,061.6	lbs
Total 1/2" plus 15% for misc items	=	1,046.5	sq ft	=	21,348.6	lbs
Total 1" steel	=	4.0	sq ft	=	163.2	lbs
lbs/sq ft for 28'x14' gate	=	75.4	lb/sq ft			

Area of single S-622 Gate	=	150.0	sq ft			assumed 3 ft bigger then opening in each direction	
Approximate weight of S-622 Gate	=	11,316.3	lb				
Overweight factor for larger gates (0%)	=	11,316.3	LB EA	=	5.7	TON EA	3 Each Needed

Precast Concrete Control Building / Generator Shelter

Shelter square footage	=	315.0	sq ft	Assume Shelter will be 10' tall and have a 8" concrete block partition wall full height. Assume one 4'-4" steel door and one 3'-4" door. Assume 4 3' x 5' Louvers along with a generator radiator
Excavation/backfill for shelter	=	163.3	ECY	Building will be set on grade with 12" capillary water barrier and geotextile fabric and a 12" thick concrete curb around the building
Generator Fuel Tank	=	1,000.0	Gallon	
Fuel Pad dimensions	=	96.0	SF	Assume 8'x12'x12" thick reinforced concrete slab on grade pad.

Gate embeds/seal lengths

Gate Dimensions						
Width	=	15.0	FT			
Height	=	10.0	FT			
Gate well Height	=	42.0	FT			
Gate Well Embed	=	99.0	FT			
Total Embed length	=	297.0	FT	3 gates		
Seal Length	=	35.0	FT	seal length is the perimeter of bottom and both sides.		
Total Seal length	=	105.0	FT	total of 3 gates		
Up and Downstream Bulkhead Slot	=	468.0	FT	6 times vertical plus width of new gate per slot		
Bulkheads	=	11,316.3	LB EA	assume same size as gates		
number	=	6.0	EA	two per gate needed		
Total Length of Imbeds	=	765.0	FT			
Total Weight of Gates and Stop Logs	=	101,847.1	LB	=	50.9	TON
Total Length of Seals Stop Logs and Gates	=	315.0	LF			

Backfill

Backfill around structures	=	5,155.6	ECY	=	5,825.78	LCY

Railings and ladders

Railing				
Length	=	826.0	FT	assumed 4 time the length of a wing wall and 6 times the width of the structure and twice the length
Height	=	3.5	FT	
Ladders				
Count	=	6.0	EA	assumed ladders on each side of the structure.
Height	=	17.5	FT	average of all three types
total height	=	105.0	FT	

Boat Barrier

Number	=	2.0	EA				
Length each	=	450.0	FT				
Total Length	=	900	FT				

Site Fencing

Length	=	1,000.0	FT	assumed a total of 1000 LF of chain link fencing.			
Gates	=	4.0	EA	assumed			

SWPPP

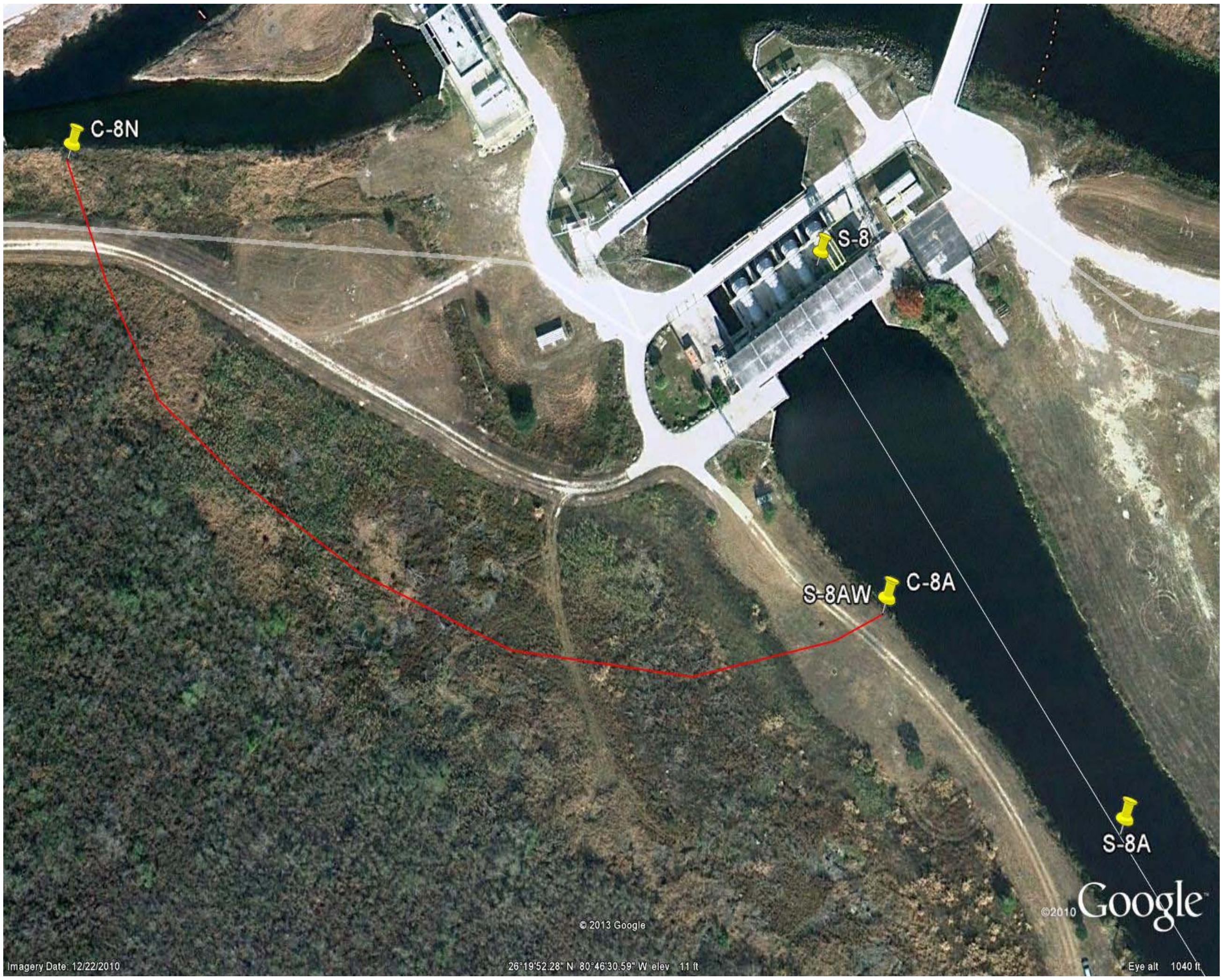
Length	=	-	LF				
Floating Silt Boom	=	2,700.0	LF	assumed 6 times the top width of the canal			

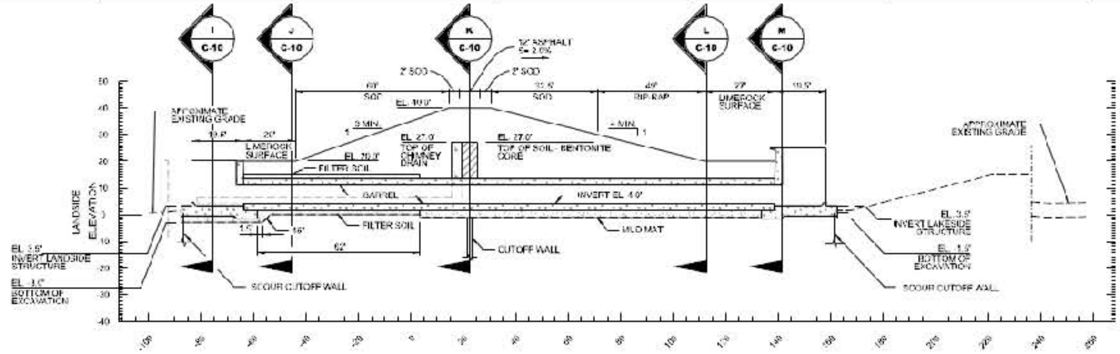
Access road

Length	=	300.0	FT	assumed			
Width	=	14.0	FT	assumed			
Area	=	4,200.0	SF		=	466.7	SY

Feature of Work:	New (S-8A) PS Gated Culverts with New Canal (3080 CFS and 1020 CF: Gated Culvert)
Scope Given:	S-8A new gated culverts to deliver water from the Miami Canal (downstream of S-8, which pulls water from the L-5 Canal) to the L-4 Canal
Reference for Scope Basis:	Engineering Appendix, March 2013 and Annexes A.6.4.1 General Status of Completed and Non-Executed Efforts A.6.5.2 General Status of Completed and Non-Executed Efforts A.2 Recommended Plan
Scope Assumptions:	- Assume two gated Structures similar to S-276 and S-277. - Assume that the size of the 1020 gated culvert is similar to S-628 but upsized. - Assume that the size of the 3080 gated culvert is twice the size of the s-625 structure. - Assume power for both structures will be provided from local power lines located at the existing S-8 pump statior - Assume sequence of work will be such that a two stage cosntruction of the gated culvert in the Miami Canal will b constructed with no diversion canal needed in the Miami Canal. - Assume sequence of work will complete the new structure and canal to the L-4 levee prior to construciton of the 1020 gated culvert in the Miami Canal. - Assume that no diversion canal is needed to construct the gated culvert that will be in the new canal as the culve will be built prior to excavation of the canal. - Assume that the canal will be the same shape as the L-5 Western Canal. - Assume material layering of 1.5 ft of organic material 10 ft of Cap Rock requiring Blasting and the remainder will b interbedded material. -Assume access to the western side of the 1020 Gated culvert will be available by crossing the S-8 pump station an across the 3080 gated culvert.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	General sequence: 3080 CFS Gated Structure, Canal and then the 1020 CFS structure in the Miami Canal. 3080 CFS Gated Structure: - Site survey and stake area of construction. - Install silt fence and maintain as needed. - Excavate and utilize rim ditch dewatering to dewater site. Canal: - Site survey and stake entire length and width of canal. - Install silt fence and maintain as needed. - Clear and grub entire site to remove vegetation and organic materials. Haul to disposal location. - Construct a haul road parallel to the canal. This will be ongoing as needed during construction of the canal. Haul road maintenance will be ongoing during construction of the canal. Assumed same length as the canal will stay in place after construction. Assumed width of 14 ft 1 ft thick. - Excavate material placing on to the haul road and allow draining off excess water. - Load drained material into haul truck and take to processing plant. 1020 CFS Gated Structure: - Site Survey and stake area of construction. - Install silt fence and maintain as needed. - Install sheetpile and dewater working on the eastern side followed by the western half of the gated culvert.
Key Outstanding Questions/Issues:	No Data is provided for the canal and associated levees that will be required. limited data provided for the gated culverts. Concerns with flood protection. Design team has indicated no diversion canal will be needed for the 102C CFS structure to be placed in the Miami canal if the sequence of construction for other features is accomplished pr to its construction.

Representative Drawings/Photos: S-8A





H C-08 **S-276 RECONSTRUCTION CROSS SECTION**
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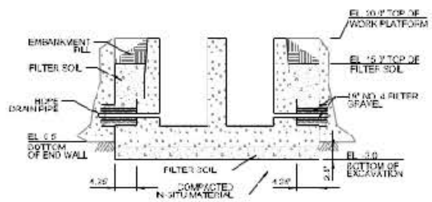

I C-10 **SECTION**
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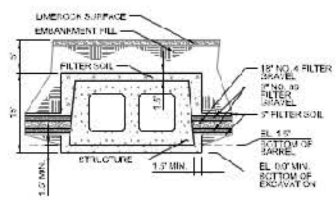

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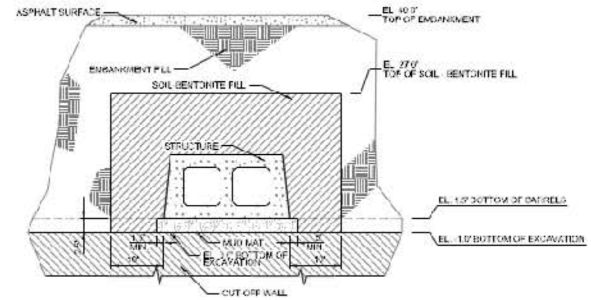
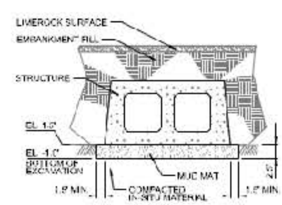
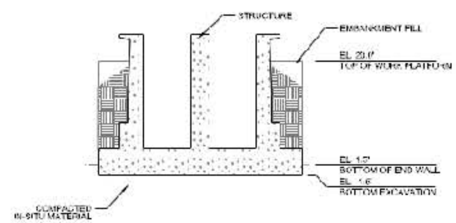


K C-10 **SECTION**
N.T.S.



L C-10 **SECTION**
N.T.S.



M C-10 **SECTION**
N.T.S.

NOTES:

1. FOR DETAILS ON ALL CONCRETE, INCLUDING HEADWALLS AND BARRELS, SEE S-01 TO S-32.
2. SEE C-16 FOR CHIMNEY DRAIN PLAN VIEW.
3. VERTICAL FILL SLOPES ARE CONCEPTUAL. DIMENSIONS OF FILTER SOIL ARE MINIMUM VALUES. FINAL DIMENSIONS SHALL BE THAT REQUIRED FOR CONSTRUCTABILITY.

GRAPHIC SCALES

"A" 20' 0 20' 40'

US Army Corps of Engineers

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT
JACKSONVILLE, FLORIDA

HERBERT HOOVER DIKE REHABILITATION PROJECT
STRUCTURE REPLACEMENTS

S-276 RECONSTRUCTION (C-4A)

CIVIL

RECONSTRUCTION CROSS SECTION

DRAWING NO.

C-10

Feature of Work:	New (S-8A) PS Gated Culverts with New Canal (3080 CFS and 1020 CFS Gated Culvert)

Quantity Take Off:

Gated Culvert 1020 CFS upsized S-628 added an additional culvert

number of culverts	=	3.0	EA						
Miami Canal Plug									
Number	=	2.0	EA						
Length	=	125.0	FT						
Top Width	=	100.0	FT						
Side Slope	=	3.0	:1						
Depth	=	20.0	FT						
Bottom Width	=	220.0	FT						
Volume	=	800,000.0	CF	=	29,629.63	ECY	=	33,481.48	LCY

Remove Canal Plugs

Volume	=	29,629.6	BCY

Gated Culvert Excavation

width	=	57.0	FT	assumed all rippable rock					
depth	=	3.0	FT						
length	=	140.0	FT						
Volume of Ripping	=	23,940.0	CF	=	**886.7**	BCY	=	1,330.0	LCY

Concrete Culvert Concrete

Length	=	140.0	FT			
Foundation Concrete						
Bottom Width	=	39.0	FT			
Bottom Thickness	=	2.5	FT			
Volume	=	13,650.0	CF	=	505.6	CY
Vertical concrete						
Height	=	9.0	FT			
width of walls	=	12.5	FT			
Volume	=	15,750.0	CF	=	583.3	CY
Elevated Concrete						
Top Width	=	34.5	FT			
Thickness	=	2.5	FT			
Volume	=	12,075.0	CF	=	447.2	CY
PVC water stops	=	2.0	EA			
Length	=	87.5	LF			
Spacing	=	15.0	FT			
Total Length	=	1,750.0	LF			

Inlet and Outlet Works

Number	=	12.0	EA		assumed intake/outlet are the same assumed 2 per each end gate and bulkhead					
Foundation										
Length	=	8.0	FT							
Depth	=	5.0	FT							
Width	=	57.0	FT							
Volume	=	9,120.0	CF	=	337.8	CY				
Head Walls										
Height	=	25.5	FT							
Thickness	=	3.0	FT							
width	=	45.5	FT							
openings	=	243.0	SF							
volume	=	11,007.0	CF	=	407.7	CY				
End walls										
height	=	24.0	FT							
length	=	100.0	FT		total either inlet or outlet					
thickness	=	2.0	FT							
volume	=	9,600.0	CF	=	355.6	CY				

Misc Metals

Railing	=	358.0	LF				
Ladders	=	6.0	EACH				
height	=	25.5	FT	=	153.0	FT	
Grating	=	400.0	SF per gate				assumed 20 by 20 per gate per end
TOTAL Grating	=	2,400.0	SF				

Gates IN HHD

Height	=	14.0	FT	*** STAINLESS STEEL for opening 7 by 7
Width	=	10.0	FT	
Weight	=	6,500.0	LB	
Weight Per SF	=	46.4	LB/SF	

NEW GATES

number of gates	=	12.0	EA		assumed 2 on each end 1 gate and one bulkhead.					
Height	=	16.0	FT		assumed 2 ft larger then similar gate					
Width	=	12.0	FT		assumed 2 ft larger then similar gate					
Weight % larger	=	10.0	%		assumed					
Total Weight of gates	=	9,805.7	LB EA	=	117,668.6	LB	=	58.8	TON	
Motors	=	12.0	EA							
Gear Reduction	=	12.0	EA							
Actuators	=	12.0	EA							
cable reels	=	12.0	EA							
Imbeds for gate	=	756.0	LF							
Gate Seal Length	=	672.0	LF							

Operations building

size	=	315.0	SF	21 by 15 ft
Electrical	=	NEEDED		
Communications	=	NEEDED		

Cut off walls

Number	=	1.0	EA	Assumed in FEB perimeter Levee					
Soil Bentonite Fill									
Height	=	25.0	FT						
Width	=	59.0	FT						
Thickness	=	8.0	FT						
Volume	=	11,800.0	CF/EA	=	437.0	CY/EA			
Cutoff Wall									
Height	=	35.0	FT						
Width	=	57.0	FT						
Thickness	=	3.0	FT						
Volume	=	5,985.0	CF/EA	=	221.7	CY/EA			
Area	=	1,995.0	SF/EA						

RIP RAP

common both sides						
number of placements	=	2.0	EA	1 each side		
Length	=	20.0	FT			
Width	=	57.0	FT			
thickness	=	4.0	FT			
Volume	=	4,560.0	CF/EA	=	168.9	CY/EA
Total Volume	=	337.8	ECY	=	540.4	TON

Backfill

around Culvert	=	**886.7**	ECY	=	1,001.9	LCY

Removal

Sheet Pile	=	29,629.6	SF

Boat Barrier

Number	=	2.0	EA
length	=	160.0	FT EA
TOTAL length	=	320.0	FT

SWPPP

Length	=	300.0	FT	
Floating Silt Boom	=	320.0	FT	Assumed same length of Boat Barrier

Site Fence

Length	=	1,000.0	FT	assumed
Gates	=	4.0	EA	assumed

Site Restoration

area	=	4,400.0	SF	=	488.9	SY

Gated Culvert 3080 Doubled S-625 structure

number of culverts	=	6.0	EA

Rim Ditch Excavation

Length	=	140.0	ft	Length of excavation					
Width	=	100.0	ft	Bottom width of excavation					
Canal Dimension	=	3ft deep x 3 ft wide							
Ditch volume	=	2,160.0	CF	=	**80.0**	BCY	=	100.0	LCY

Culvert excavation

Length	=	140.0	FT						
Total Depth	=	28.0	FT						
Thickness of Organic	=	1.5	FT						
Thickness of Blasting Cap Rock	=	10.0	FT						
Thickness of Inter-Bedded Material	=	16.5	FT						
Slope1	=	3.0	:1						
Slope2	=	3.0	:1						
Bottom Width	=	100.0	FT						
Top Width	=	268.0	FT						
Cross Section	=	5,152.0	SF						
Cross Section Organic	=	395.3	SF						
Cross Section of Blasting Cap Rock	=	2,290.0	SF						
Cross section of Inter-Bedded Material	=	2,466.8	SF						
Organic Volume	=	55,335.0	CF	=	**2,049.4**	BCY	=	2,561.8	LCY
Blasted Cap Rock Volume	=	320,600.0	CF	=	**11,874.1**	BCY	=	17,811.1	LCY
Inter-Bedded Material Volume	=	69,069.0	CF	=	**2,558.1**	BCY	=	3,837.2	LCY
	TOTAL			=	16,481.6	BCY			

Concrete Culvert Concrete

Length	=	140.0	FT			
Foundation Concrete						
Bottom Width	=	78.0	FT			
Bottom Thickness	=	2.5	FT			
Volume	=	27,300.0	CF	=	1,011.1	CY
Vertical concrete						
Height	=	9.0	FT			
width of walls	=	17.5	FT			
Volume	=	22,050.0	CF	=	816.7	CY
Elevated Concrete						
Top Width	=	69.0	FT			
Thickness	=	2.5	FT			
Volume	=	24,150.0	CF	=	894.4	CY
PVC water stops	=	2.0	EA			
Length	=	161.0	LF			
Spacing	=	15.0	FT			
Total Length	=	3,220.0	LF			

Inlet and Outlet Works

Number	=	24.0	EA	assumed intake/outlet are the same assumed 2 per each end gate and bulkhead		
Foundation						
Length	=	8.0	FT			
Depth	=	5.0	FT			
Width	=	78.0	FT			
Volume	=	12,480.0	CF	=	462.2	CY
Head Walls						
Height	=	25.5	FT			
Thickness	=	3.0	FT			
width	=	66.5	FT			
openings	=	486.0	SF			
volume	=	14,517.0	CF	=	537.7	CY
End walls						
height	=	24.0	FT			
length	=	100.0	FT	total either inlet or outlet		
thickness	=	2.0	FT			
volume	=	9,600.0	CF	=	355.6	CY

Misc Metals

Railing	=	358.0	LF							
Ladders	=	12.0	EACH							
height	=	25.5	FT	=	306.0	FT				
Grating	=	400.0	SF per gate			assumed 20 by 20 per gate per end				
TOTAL Grating	=	4,800.0	SF							

Gates IN HHD

Height	=	14.0	FT	*** STAINLESS STEEL for opening 7 by 7						
Width	=	10.0	FT							
Weight	=	6,500.0	LB							
Weight Per SF	=	46.4	LB/SF							

NEW GATES

number of gates	=	24.0	EA	assumed 2 on each end 1 gate and one bulkhead.						
Height	=	16.0	FT	assumed 2 ft larger then similar gate						
Width	=	12.0	FT	assumed 2 ft larger then similar gate						
Weight % larger	=	10.0	%	assumed						
Total Weight of gates	=	9,805.7	LB EA	=	235,337.1	LB	=	117.7	TON	
Motors	=	24.0	EA							
Gear Reduction	=	24.0	EA							
Actuators	=	24.0	EA							
cable reels	=	24.0	EA							
Imbeds for gate	=	1,512.0	LF							
Gate Seal Length	=	1,344.0	LF							

Operations building

size	=	315.0	SF	21 by 15 ft						
Electrical	=	NEEDED								
Communications	=	NEEDED								

Cut off walls

Number	=	1.0	EA	Assumed in FEB perimeter Levee						
Soil Bentonite Fill										
Height	=	25.0	FT							
Width	=	98.0	FT							
Thickness	=	8.0	FT							
Volume	=	19,600.0	CF	=	725.9	CY				
Cutoff Wall										
Height	=	35.0	FT							
Width	=	318.0	FT							
Thickness	=	3.0	FT							
Volume	=	33,390.0	CF/EA	=	1,236.7	CY/EA				
Area	=	11,130.0	SF/EA							

RIP RAP

common both sides								
number of placements	=	2.0	EA		1 each side			
Length	=	20.0	FT					
Width	=	78.0	FT					
thickness	=	4.0	FT					
Volume	=	6,240.0	CF/EA	=	231.1	CY/EA		
Total Volume	=	462.2	ECY	=	739.6	TON		

Backfill

Around Culvert	=	**16,481.6**	ECY	=	18,624.2	LCY

Removal

Sheet Pile	=	2,160.0	SF

Boat Barrier

Number	=	2.0	EA
length	=	160.0	FT EA
TOTAL length	=	320.0	FT

SWPPP

Length	=	100.0	FT

Site Fence

Gates	=	4.0	EA	assumed

Site Restoration

Area	=	4,400.0	SF	=	488.9	SY

L-4 Connector Canal

Excavate Canal

Length	=	1,000.0	FT						
Total Depth	=	20.0	FT						
Thickness of Organic	=	1.5	FT						
Thickness of Blasting Cap Rock	=	10.0	FT						
Thickness of Inter-Bedded Material	=	8.5	FT						
Slope2	=	1.5	:1						
Bottom Width	=	100.0	FT						
Top Width	=	160.0	FT						
Cross Section	=	2,600.0	SF						
Cross Section Organic	=	236.6	SF						
Cross Section Blasting Cap Rock	=	1,405.0	SF						
Cross section of Inter-Bedded Material	=	958.4	SF						
Surface Area of Canal	=	160,000.0	SF	=	3.7	ACRE			
Organic Volume	=	236,625.0	CF	=	**8,763.9**	BCY	=	10,954.9	LCY
Blasted Cap Rock Volume	=	1,405,000.0	CF	=	**52,037.0**	BCY	=	78,055.6	LCY
Inter-Bedded Material Volume	=	958,375.0	CF	=	**35,495.4**	BCY	=	53,243.1	LCY

Haul Road

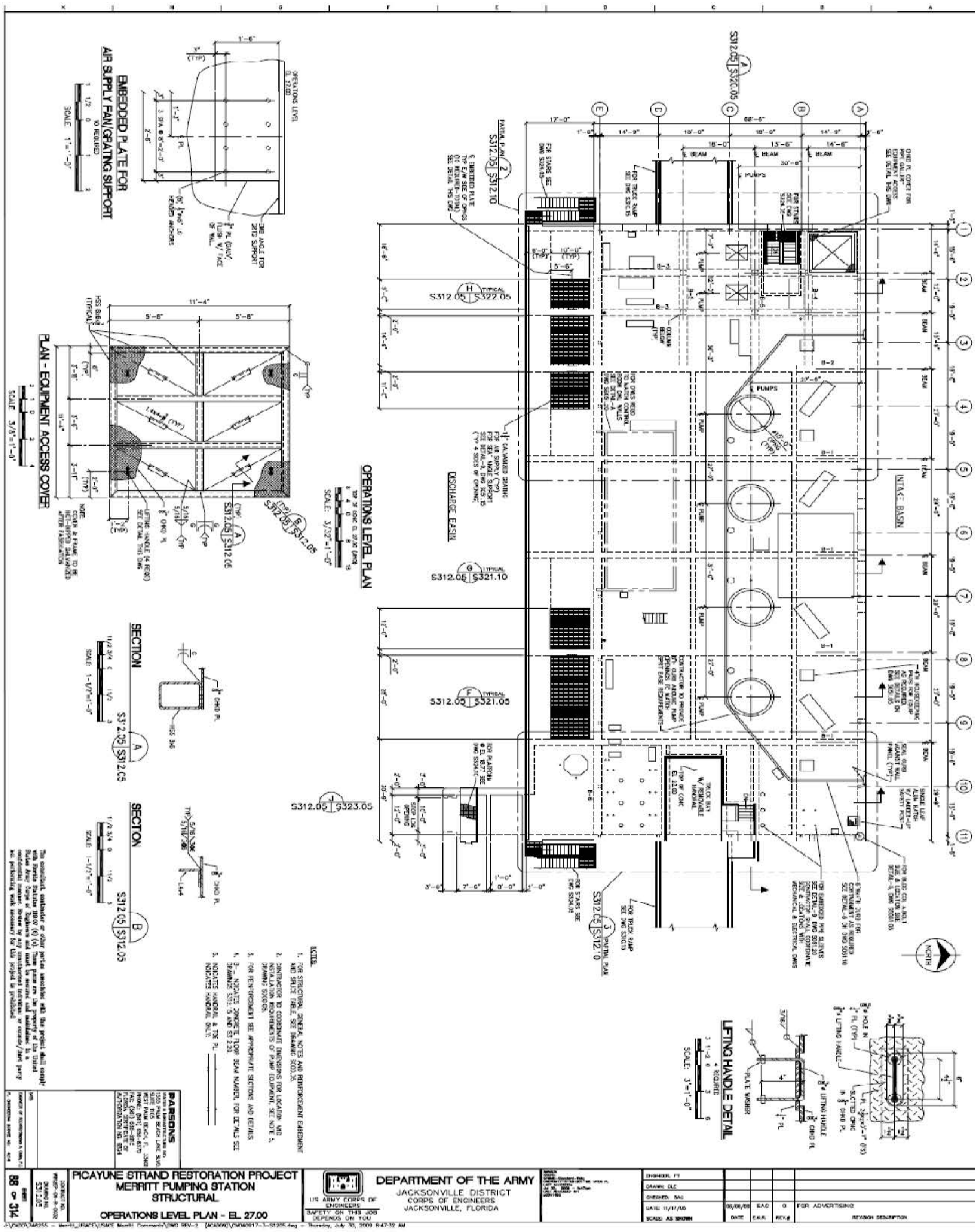
Length	=	1,000.0	FT
width	=	14.0	FT
depth	=	1.0	FT
Area	=	1,555.6	SY
volume	=	518.5	ECY

SWPPP

Silt Fence	=	2,000.0	FT	
Floating Silt Boom	=	480.0	FT	Assumed 3 times the top width of the canal

Feature of Work:	S-630 Pump Station 360 CFS in the L-4 Canal
Scope Given:	S-630 is a 200 cfs pump station to maintain Seminole Tribe water supply deliveries west of the L-4 Canal
Reference for Scope Basis:	Engineering Appendix, March 2013 and Annexes A.2 Recommended Plan A.4.1.2 South of Redline A.6.1.5 Utility Relocation A.6.3.2.1.4 Water Control Structure A.6.3.2.1.4.3 Pump Stations A.6.3.3.2.1.4 Pump Stations A.6.3.4.2 Hydraulics and Hydrology Lowering Risk in Design A.6.5.3 Pumping Station S-630
Scope Assumptions:	Scope Assumptions: - Assume similar to structure Pump Station 357. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - Assume there will be a total of four 90 cfs electric pumps. - Assume discharge of pumps will be directed in line to the L-4 canal via 48" pipes discharging directly onto the discharge apron. - Assume the discharge structure will consist of a concrete headwall full height of the canal 30 ft wide 18 inch thick reinforced concrete, 20'x30' apron 18 inch thick reinforced concrete, wing walls extending 30ft up and downstrean of the discharge point sloping from full height of the canal to 18 inch thick reinforced concrete and riprap lining 13(ft beyond the concrete apron. - Assume the excavation will extend 3 feet below the L-4 canal bottom elevation. The pump station will require removal 3ft inter-bedded materiarl for removal to allow for foundation construction. - Assume pump station will be constructed of reinforced concrete below grade and a combination of cast-in-place columns and reinforced CMU walls. . - Assume a fuel pad will be required for storage tanks for the diesel pump and the diesel generator, assumed size o 20' by 20' 1 feet thick reinforced concrete. -Assume Power provided from local utilities approximately 800 ft from site. - Assume L-4 dimensions are similar to L-5 canal. Depth is 17 ft, side slopes are 1:5. Top width is assumed to be 85 resulting in a calculated bottom width of 39 ft. -Assume a temporary 200 CFS pump will be utilized to pass water around the feature in lieu of a bypass canal. - Assume intake will require driven piers and suction screen. - Assume 900 LF of 48" discharge piping. - Assume pump will be set on a 12'x12' 1' thick concrete slab and the suction and discharge piping will be containe(by piers driven into the canal and supported every 25 ft along the length of pipe. Assume the pipe will be run alon; the top of the L-4 levee.
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	-Site Survey and stake canal for excavation -Install sheet pile/cofferdam up and downstream of structure. -Assume pumping will be required 24/7. - Install silt fence and maintain as needed. -Maintenance of haul route will be ongoing of existing route. -Placement of Headwall foundation structures along with 2 bay pump station to include support facilities. -Backfill around new structure back to the existing elevation and restoration of the access road.
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: S-630



Feature of Work:	S-630 Pump Station 360 CFS in the L-4 Canal

Quantity Take Off:

S-630 Pump Station Excavation.

Length	=	80.0	FT	Assume 50 ft to allow for footprint of pump station						
				Assume Channel depth is 17' with an additional 8' of over excavation for structure.						
Total Depth	=	8.0	FT							
Thickness of Organic	=	1.0	FT							
Thickness of Cap Rock Material	=	7.0	FT							
Slope1	=	-	:1							
				Excavation is interior to the sheet piling						
Slope2	=	-	:1							
Bottom Width	=	45.0	FT	Assume 100 ft to allow for footprint of Pump Station						
Top Width	=	45.0	FT							
Cross Section	=	360.0	SF							
Cross Section Pete	=	45.0	SF							
Cross Section cap Rock Material	=	315.0	SF							
Surface Area of Canal	=	3,600.0	SF	=	0.1	ACRE				
Pete Volume	=	3,600.0	CF	=	133.3	BCY	=	166.7	LCY	
Cap Rock Volume	=	25,200.0	CF	=	933.3	BCY	=	1,400.0	LCY	

Care and Diversion of Water

Construction Sequence:

1 ***Construct perimeter concrete ring beam and rock anchors.

2 Place Sheet piling and connect piling to concrete ring beam. Excavate. Assume sheet pile length of 36 ft

3 Install rock anchors for concrete seal slab. Anchor length 17'-6" slab rock anchor.

4 Place Concrete Seal slab. 6'-0" thick and dimensions of sheet pile

5 Dewater cofferdam and prepare top of concrete base mat slab

6 Place concrete walls to elevation 9'-0" at pump structure monolith prior to abandoning or removing in place cofferdam sheet piles. Remove ring beams in inlet and outlet.

7 install lateral bracing for walls.

8 Construct service bridge slab. Remainder of walls and operating floor slab.

9 Install sheet pile wing walls.

*** May have to utilize a sheet pile setup similar to Herbert Hoover Dike Culvert construction with I beam piers driven in lieu of concrete ring beam.

	# of pump station Bays	=	4.0		
	Cofferdam width per pump station bay	=	15.0	ft	Assume Per S-101
	Total width length	=	60.0	ft	
	Length (Up and downstream) of Cofferdam	=	80.0	ft	Assume per S-101
	Total perimeter length (length of sheet pile/ring beam)	=	280.0	ft	
	Area of Cofferdam sheet pile to ren	=	9,600.0	SF	
	Area of cofferdam to be removed	=	7,200.0	SF	
	Length of Sheet pile to Be utilized as wing wall	=	186.0	ft	
	Volume of ring beam (Reinforced Concrete)	=	65.7	CY	Per detail S-103
	# of 54' ring beam anchors @ 10' OC	=	28	ea	Per detail S-101
***	Number of I beam piers	=	47	ea	Assume I beams 6' OC around perimeter of sheet pile and tied to sheet pile
	# of 17'-6" uplift slab rock anchors	=	48	ea	
	Volume of Concrete seal/uplift slab	=	1,066.7	CY	Assume 6' thick

Backfill around structure

Volume of single side	=	40,800.0	CF
	=	1,511.1	ECY
Total Volume both sides	=	3,022.2	ECY

WINGWALLS Assumed approach wing walls similar to downstream wing wall plan from S-65EX-1 with anchor walls. Construction will consist of 60 ft deep driven sheet pile with a 2'x2' concrete pile cap. The anchor walls will be 1 ft thick reinforced concrete. Concrete anchor wall dimensions will match wing wall dimensions. The wing wall and concrete anchor wall will be connected by #10 all thread grade 70. A C8x18.75 channel will be attached to the back of the wing wall where the anchors will be attached to.

Number	=	4.0	Each
Length each wall	=	62.5	FT
Depth 1	=	37.0	FT
Depth 2	=	16.0	FT
area of sheet pile	=	6,625.0	SF
Pile Cap			
height	=	2.0	FT
width	=	2.0	FT
volume	=	37.0	CY
Rod length	=	60.0	FT
spacing	=	4.0	FT
number of rods	=	63.0	EA
Anchor Walls			
height	=	8.0	FT
thickness	=	1.0	FT
length	=	250.0	FT
volume	=	74.1	CY

Concrete Volumes for Pump Station Building and

Width of each Bay	=	15.00	ft	Assumed per similar PS-357				
Length of Operating Floor	=	45.0	ft					
Width of Operating Floor	=	60.0	ft					
				Total Elevated Flatwork	=	947.2		
Horizontal concrete volume	=	711.1	CY					
Vertical Concrete	=	720.0	CY					
Service Bridge Elevated Flatwork	=	711.1	CY					
Operating Floor (Elevated Flatwork	=	208.3	CY					
Elevated Vertical Work (Operating floor to service bridge)	=	27.8	CY					
SF of Generator, Electric and Office/Control Room	=	900.0	SF	Assume Generator room. Electric Room and Office control room is 20ftx39ft				
Loading Truck Ramp (horizontal Concrete)	=	4,903.0	SF	=	272.4	CY	Assumed From Merritt Pump Station	
Volume of Concrete for Gen, Elec and Office room (Slab on grade)	=	55.6	CY	Assume 18" thick				
Assume 10 18"x18"x26' tall Columns	=	21.7	CY					
Tilt Up 7-1/2" Thick Precast Panels	=	21,072.0	SF	Assume Similar to Merritt Pump Station				
CMU Wall Dimensions (Exterior Surface Area of CMU)	=	8,400.0	SF					
Roof 32" Double tee units 56 ft long required	=	8	each					
Intake Basin Concrete	=	89	CY					
Discharge Basin Concrete Apron	=	133.3	CY	Assume 36" thick concrete				
Stone Protection Riprap discharge	=	1,688.9	CY	Assume 5 ft thick layer of riprap lining the L-4 canal upstream 60 ft and downstream 60 ft.				
Stone Protection inlet	=	1,000.0	CY	Assume 36" thick layer of riprap lining the sides and bottom for 150' upstream				
Total Riprap	=	2,688.9						
Trash Rack Surface Area (total)	=	1,680.0	SF	Assume Trash rake is 28 ft tall and covers the width of the operating floor each individual covers the width of the bays (14ft).				

Roll Up Garage Door	=	168.0	SF	Assume Roll up garage door 12'x14'
# of Doors	=	4.0	ea	Assume 1 set of double doors and two other doors
# louver openings	=	8.0	ea	Assume 8 louver openings 7'-4" square
Overhead Crane	=	2.0	ea	Assume 2 overhead cranes @ 25 tons each
Power Line Connection	=	1,500.0	LF	Assume power available 1500 lf from site
Septic tank system	=	1.0	ea	Assume 1 septic tank system
Potable water	=	1.0	ea	Assume 1 potable water well will be required
Generator Fuel Tank	=	2000 Gallon	ea	Assume two 2000 gallon fuel tanks required
Fuel Pad dimensions	=	400.0	SF	Assume two 20'x20'x1' thick reinforced concrete slab on grade pad.
		14.8	CY	

Discharge Piping

48" discharge pipe	=	50.0	LF/ea	Assume Pumps will have a 48" Discharge Piping
Concrete Encasement	=	279.3	CY	Assume 2 ft of concrete to encase piping
Floor Grating	=	784.0	SF	Assume 14' x14' ft wide for each pump bay.
Ladders	=	120.0	VLF	Assume 30 ft per pump bay
Railings	=	680.0	LF	Assume a handrail on the up and downstream side and one a width of the operating floor, around each bay, exterior stair tower, basin wall platform, interior stair tower, operations plan handrail and the recirculation channel platform.
Haul road length	=	17,731.0	FT	Assume length of road for maintenance
Haul road width	=	14.0		
Haul road thickness	=	1.0	FT	
				SF = 27,581.6 see
Area	=	248,234.0		
Chain link Fence	=	2,280.0	LF	Assume Similar to Merritt Pump Station
Silt Fence	=	3,700.0	LF	Assume similar to Merritt Pump Station
Silt Boom	=	1,000.0	LF	

Bypass Pumping

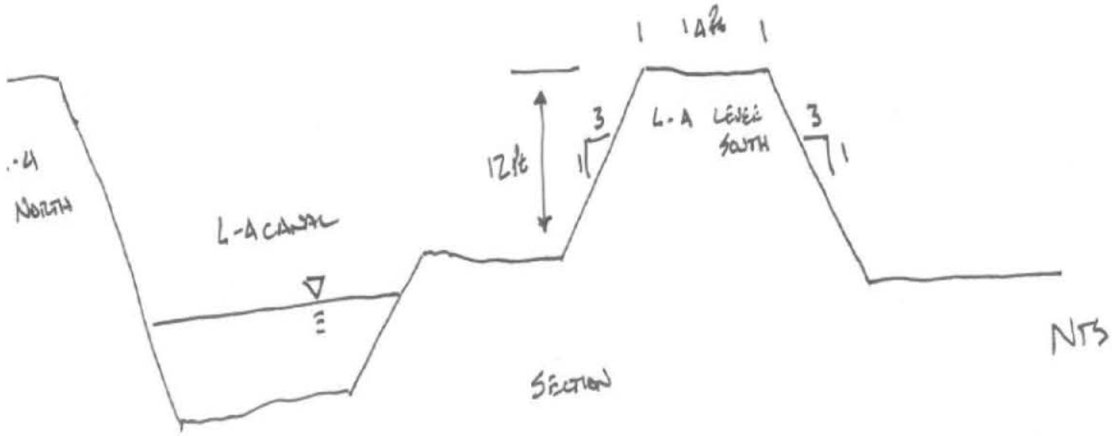
Assume 200 CFS diesel driven pump with 48" discharge

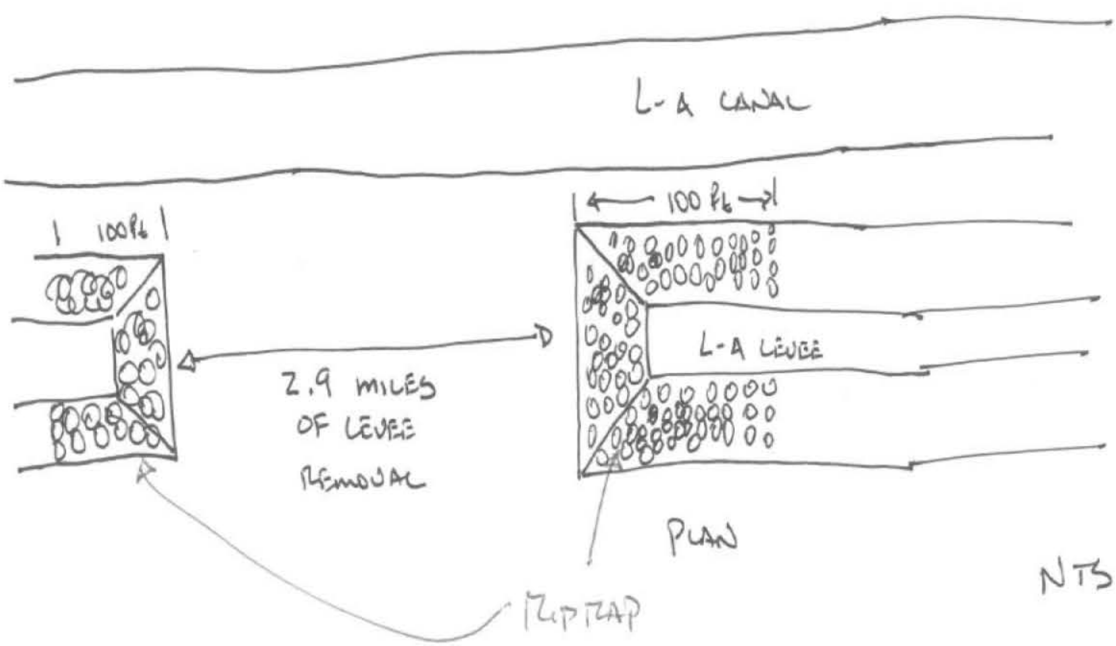
48" Discharge Pipe length	=	900	LF	
# of 50 ft piers	=	44	ea	Assume 4 piers at the suction and 4 at the discharge with 2 piers every 25 ft along the length of pipe. The suction and discharge piers will be driven by barge.
Concrete Slab for pump and fuel	=	5.333333333	CY	Assume 12'x12'x1' slab

Feature of Work:	Levee Removal L-4 Interior Levee
Scope Given:	The slopes shall be cut to a shallower or equal angle than currently that of the original design levee side slopes of 1V:3H. A riprap blanket with bedding may be needed on each cut face depending on design flow velocities through the gap which will be determined during the design phase.
Reference for Scope Basis:	Engineering Appendix dated March 2013 A.7.2 GEOTECHNICAL DESIGN, Paragraph L-4 Degrade Annex C-2 Table A-1
Scope Assumptions:	- Assume all levee material will be reusable - Assume that all material coming from the levee will need processing prior to reuse as backfill. - Assume levee crown width as 10 ft, assume height of 6 ft, assume side slopes of 2.5:1.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	- Survey site and stake entire length of canal. - Install floating turbidity boom and silt fence along the entire length of the canal. Floating turbidity boom and silt fence maintenance will be ongoing during construction of the canal. Maintenance of existing levee access road will be on going throughout construction. - Clear and grub entire site to remove vegetation and organic materials. - Excavate levee, process and place materials - Place Riprap on ends of excavated levee.
Key Outstanding Questions/Issues:	L-4 Plates are referenced in Annex C-2 but none are present. No Data on current levee is given. Only reference to length to be removed is in Table A-1.

Representative Drawings/Photos: L-4 Levee Removal

L-4 REMOVAL





Feature of Work:	Levee Removal L-4 Interior Levee

Quantity Take Off:

Levee Removal

Length	=	15312	FT	2.9	Miles =	15312 FT		
Height	=	6	FT					
Slope1	=	2.5	:1					
Slope2	=	2.5	:1					
Top width	=	10	FT					
Bottom Width	=	40	FT					
Cross Section	=	150.0	SF					
Surface Area of Levee	=	977,696.4	SF	=	22.4	ACRE		
base area of levee	=	612,480.0	SF	=	68,053.3	SY	=	14.1 Acre
side slopes of levee	=	824,576.4	SF	=	91,619.6	SY	=	18.9 Acre
roadway area	=	153,120.0	SF	=	17,013.3	SY	=	3.5 Acre
Total Volume	=	2,296,800.0	CF	=	85,066.7	BCY	=	127,600.0 LCY

Feature of Work:	Miami Canal Backfill

Scope Given:	The Miami Canal is cut nearly perpendicular to topographical contours through WCA-3A. As such, water is "short-circuited" through the wetlands versus historic shallow sheet flow across the floodplain. To investigate how backfilling the canal may impact flow, a 2-dimenisional model using the Adaptive Hydraulics Modeling (AdH) computing software was constructed and simulation of various "plug" or backfill lengths were made with various configurations. It was found that a plug length of simple configuration, e.g. no berm lateral extensions into the marsh, of 4,000 feet caused canal flows to leave the canal, enter the marsh, and continue southerly as sheet flow. Since the design backfill is of longer length, there is little risk that the planned feature will not work as intended.

Reference for Scope Basis:	Engineering Appendix dated March 2013 A.7.2 GEOTECHNICAL DESIGN, Paragraph Backfill Miami Canal Annex C-2 Table A-1

Scope Assumptions:	- A cut fill analysis will be performed on the material. Material will come from the following in order: L-4 Degrade, 5 Degrade and the remainder from surpluses from the FEB (average haul distance for FEB Material is 22 miles one way or 44 mile round trip). - Assumed side slopes of Miami canal 1:1.5 same as new design for L-5 east and west canal. - Assumed width of canal constant at 80 ft. - Assumed depth of the Miami canal 18 ft leading to a bottom width of 26 ft. - Assumed all material will not need to be processed prior to placement. - Assumed spoil mound material is all degraded lime stone and lime stone. - Assumed top 0.5 ft is unsuitable for backfilling the Miami canal. - Assumed dimensions of spoil mounds length 400 ft width 100 ft measured from Google earth. Average height above 10.0 ft elevation is 5 ft. - Assumed spoil mounds will be cleared and grubbed. - Assumed gaps between mounds are at 8.5 ft in elevation 100 FT in length and full width of the spoil mounds. - Assumed removal of S-339 will not be required.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

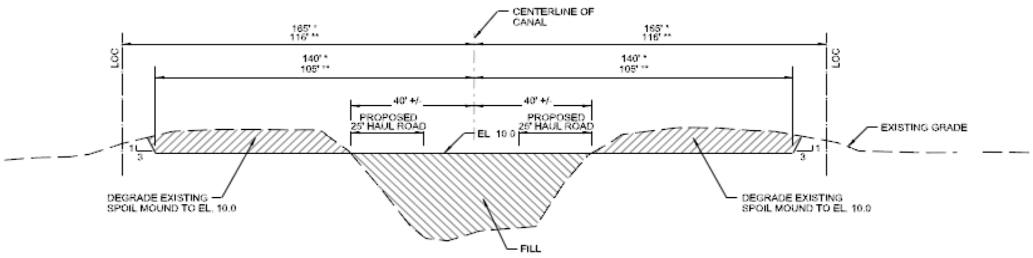
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	- Survey site and stake entire length of canal. - Install floating turbidity boom and silt fence along the entire length of the canal. Floating turbidity boom and silt fence maintenance will be ongoing during construction of the canal. - Clear and grub entire site to remove vegetation and organic materials. Retained for Tree Mounds - Build access road from spoil mound to spoil mound first 1.5 miles on east bank. Utilize spoil mound material for backfill of gaps between mounds. Maintenance of haul road will be on going throughout construction. After a suitable plug for driving haul trucks has been constructed across the Miami canal build a haul road the same mano on the west bank. - Degrade Existing spoil mounds into Miami canal. - Haul fill in from other projects on site after processing all material. Haul in the remainder of the fill from offsite sources. - Backfill material into the Miami Canal. Compaction will be required after the fill has covered the water surface elevation. - Removal of haul road.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: Miami Canal



TYPICAL SECTION
CANAL BACKFILL AND SPOIL MOUND DEGRADE

SCALE: N.T.S.

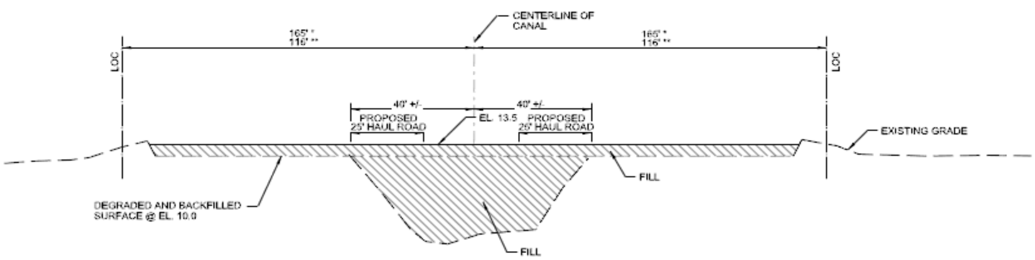
* - STATION a10+00 TO STATION a176+00
** - STATION a176+00 TO STATION b605+00

LOC - LIMITS OF CONSTRUCTION
STA - STATION FOR MIAMI CANAL

INTENT IS TO MAINTAIN A BUFFER FROM EDGES OF SPOIL MOUND ~ 25 FEET SET AS L

PROPOSED 1 MILE SPACING BETWEEN EARTHEN MOUND ABOVE 10' NAVD, ALONG THE MIAMI CANAL.

PROPOSED EARTHEN MOUND DIMENSION ARE 280x280 * & 210x210 ** FEET ALONG CAN



Feature of Work:	Miami Canal Backfill

Quantity Take Off:

Sequence of Work

Assume existing spoil mounds will be cleared and grubbed starting from the north working south on both sides of the Miami Canal. The spoil mounds will be degraded on both sides to allow for construction of a haul road from the S-8 area south to the south terminus of the canal backfill. Material from the degraded levees will be moved into the Miami Canal and additional processed material will be brought from the soil processing site in the vicinity of S-8. Backfill of the canal will progress from the south heading north and the construction of the Tree Islands will be constructed concurrently with the backfill project. The haul road and site restoration will occur in backfilled sections as work progresses north leaving 1 14 ft wide haul road for the tree mound construction. S-339 structure will be abandoned in place and backfilled around.

CANAL

Length	=	78,144.0	FT		14.8	Miles	=	78,144.0	FT	
Top width	=	80.0	FT							
Side slopes	=	1.5	:1							
Depth	=	18.0	FT							
Bottom Width	=	26.0	FT							
Volume of Fill	=	74,549,376.0	CF	=	2,761,088	ECY	=	3,451,360.00	LCY	
								3,666,582.22		

SPOIL MOUNDS

Length	=	400.0	FT							
Spacing	=	125.0	FT							
Number of mounds per side	=	149.0	EA							0.582676587
Total Number of Mounds	=	298.0								
Width of mound	=	100.0	FT							
Depth of mound	=	3.5	FT	Assume 1.5 ft of spoil mound will be unaccessible to to settlement						
unsuitable	=	0.5	FT							
Area to be Stripped	=	14,900,000.0	SF	=	342.06	acres				
Volume of Usable	=	5,960,000.0	CF	=	220,740.74	BCY	=	275,925.93	LCY	
Usable	=	3.0	FT							
Volume of Mounds	=	35,760,000.0	CF	=	1,324,444	BCY	=	1,655,555.56	LCY	

Fill Between Mounds For Haul Roads

Length	=	100.0	FT						
width	=	100.0	FT						
Depth	=	1.5	FT						
Volume of fill	=	4,470,000.0	CF	=	165,556	ECY	=	215,222.22	LCY

Total Volume available for fill from Spoil Mounds

Assume Material needed for fill between mounds for haul roads is wasted

Volume	=	1,152,266.7	ECY	=	1,440,333	LCY
Additional Volume Needed	=	1,608,821.3	ECY	=	2,011,026.67	LCY

SWPPP

Silt Fence	=	156,288.0	LF	Assume silt fence installed along both sides of canal entire length
Silt Boom	=	4,736.0	LF	Assume silt boom installed across the width of the canal every 0.25 miles.

Haul Road

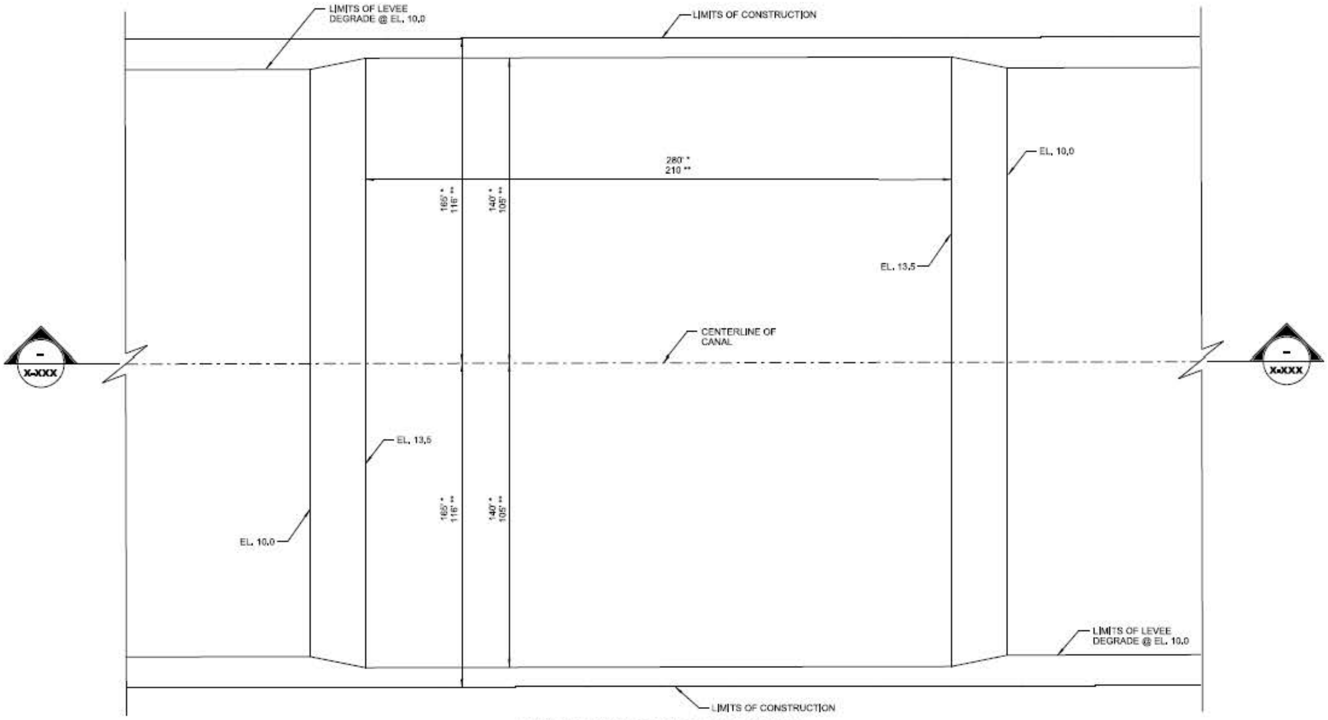
Haul road length	=	156,288.0	FT			
Haul road width	=	14.0	FT			
Haul road thickness	=	1.0	FT			
Area of Haul Road	=	2,188,032.0	SF	=	243,114.7	SY

Site Restoration

Area of disturbed earth	=	25,787,520.0	SF	=	2,865,280	SY
Site restoration less Tree mounds	=	2,621,767.1				

Feature of Work:	Tree Islands Mounds Miami Canal
Scope Given:	Degrade spoil mounds North of S-339 and hybrid (leaving some created mounds in place) approach South of S-339 Create Tree Island Mounds every 1 mile north S-339 and hybrid configuration south of S-339.
Reference for Scope Basis:	Engineering Appendix dated March 2013 A.12 Engineering Plates
Scope Assumptions:	'- Assumed that the earthen mounds referenced in the C-2 Annex are actually the Tree mounds referenced in the Engineering appendix. - Assumed that half the mounds are 280 ft by 280 ft and the other half are 210 ft by 210 ft. - Assumed that 14 mounds will be required in the 13.5 miles of the Miami canal backfill. - Assumed that the top 1 ft of material is organic material from previous excavations to promote plant growth. - assumed that the removal of the haul road will be completed in the backfilling of the Miami canal even though th haul roads will be utilized during this construction.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	'- Survey and stake Tree island locations. - Install floating turbidity booms and silt fence around the affected areas. Floating turbidity booms and silt fence maintenance will be on going throughout construction of the tree islands. - Build tree island mounds on top of backfilled canal to elevation 13.5. - Plant tree island mounds with native trees and grasses.
Key Outstanding Questions/Issues:	

Representative Drawings/Photos:



TYPICAL SECTION - EARTHEN MOUND

SCALE: N.T.S.
STA. XX+XX.XX
STA. XX+XX.XX
STA. XX+XX.XX
STA. XX+XX.XX
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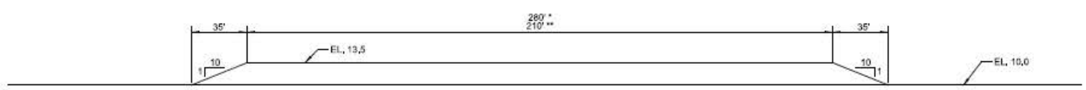


EARTHEN MOUND SECTION

SCALE: N.T.S.

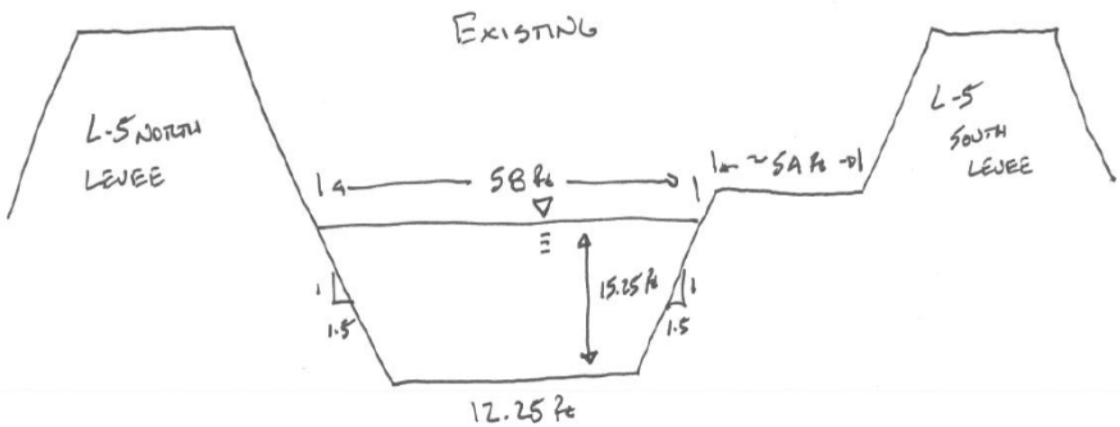
Feature of Work:	Tree Island Mounds Miami Canal

Quantity Take Off:

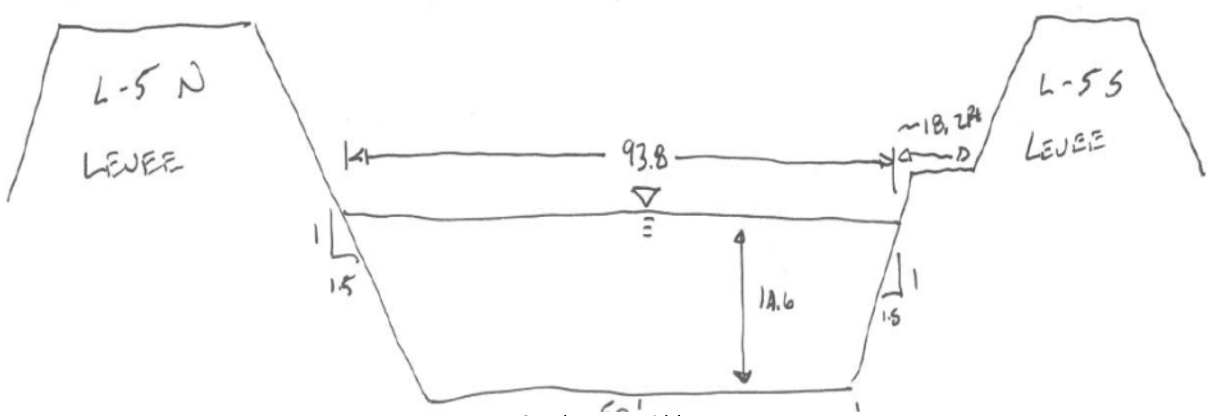
Qty of Islands	=	14.0	EA					
small islands	=	7.0	EA					
large islands	=	7.0	EA					
height of island	=	3.5	FT					
length of small island	=	210.0	FT					
width of small island	=	210.0	FT					
length of large island	=	280.0	FT					
width of large island	=	280.0	FT					
End Slope	=	10.0	:1					
volume of small island	=	154,472.5	CF	=	5,721.2	ECY		
Volume of Large Island	=	274,522.5	CF	=	10,167.5	ECY		
Total volume	=	3,002,965.0	CF	=	111,220.9	ECY	=	125,679.65 LCY
Area of islands	=	1,097,600.0	SF	=	25.2	ACRE		
				=	121,955.6	SY		
SWPPP								
Perimeter of Tree Islands	=	14,280	LF					
Haul Road								
Area of Haul Road	=	121,557.33	SY	Assume 14 ft wide and the length of the Miami Canal Backfilled section				
Total Area for Site Restoration	=	243,512.9	SY					
Trees	=	7547	EA	assumed 150 trees per acre 3 gallon potted trees. Per e-mail from Ehlinger, Gretchen S SAJ dated Thursday, May 30, 2013 11:45 AM				

Feature of Work:	Canal 500 CFS Remnant L-5 Canal East
Scope Given:	The CEPP modifications to the eastern remnant L-5 Canal will accommodate 500 cfs, and the CEPP modifications tc the west L-5 Canal will accommodate 3,000 cfs. The design HW and TW for the improved canal were 12.00 ft NGVD and 10.00 ft NGVD, respectively. From Table A-20 length 31,000 ft, side slope 1:1.5 bottom width 50 FT average depth 14.6 ft.
Reference for Scope Basis:	Engineering Appendix dated March 2013 A.6.3.3.2.1.3 Canals Table A-20 and A-22
Scope Assumptions:	- Assume 1.5 ft of Organic Material, 10 ft of Limestone Cap Rock that will require blasting and Inter-Bedded Materi will be the remainder of the excavation - assumed bottom width references total width of canal after widening. - Assumed average top width of canal is currently 58 FT measured multiple points on Google earth. Assumed curre canal has same side slopes of 1 to 1.5 with average depth of ~15.25 ft from Table A-22 leads to bottom width of ~12.25 ft. - Assume Material will be transported to the Miami Canal for Backfill. (Average of 19 mile one way haul)
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	'- Survey site and stake entire length of canal. - Install floating turbidity boom along the entire length of the canal. Floating turbidity boom maintenance will be ongoing during construction of the canal. - Clear and grub entire site to remove vegetation and organic materials. Haul to disposal location. - Utilize the southern levee on the L-5 Canal as a haul road. Haul road maintenance will be ongoing during construction of the canal. Assumed width of 14 ft 1 ft thick. - Excavate Material and haul to Miami Canal Backfill.
Key Outstanding Questions/Issues:	Unknown current dimensions depth, width, and side slopes of existing canal and distances between levees.

L-5 EAST IMPROVEMENTS



AFTER IMPROVEMENTS



50 FT bottom width

Feature of Work:	Canal 500 CFS Remnant L-5 Canal East

Quantity Take Off:

Length	=	31,000.0	Ft					
Width	=	37.8	Ft					
Depth	=	14.6	Ft					
Depth of Organic	=	1.5	FT					
Depth of Blasted Cap Rock	=	10.0	FT					
Depth of Inter-Bedded Material	=	3.1	FT					
Volume of Organic	=	1,755,375.0	CF	=	65,013.9	BCY	=	81,267 LCY
Volume of Blasted Cap Rock	=	11,702,500.0	CF	=	433,425.9	BCY	=	650,139 LCY
Volume of Inter-Bedded Material	=	3,627,775.0	CF	=	134,362.0	BCY	=	201,543 LCY
Surface Area of Excavation	=	1,170,250.0	SF	=	26.9	ACRE		
Silt Boom	=	9,300.0	LF	Assume Floating Boom installed every 500 ft across the canal.				
Haul Road Maintenance	=	26,009	SY					

Feature of Work:	Canal 3000 CFS L-5 Canal West

Scope Given:	The CEPP modifications to the eastern remnant L-5 Canal will accommodate 500 cfs, and the CEPP modifications tc the west L-5 Canal will accommodate 3,000 cfs. The design HW and TW for the improved canal were 12.00 ft NGVD and 10.00 ft NGVD, respectively. From Table A-21 length 45,000 ft, side slope 1:1.5 bottom width 100 FT average depth 16.0 ft.

Reference for Scope Basis:	Engineering Appendix dated March 2013 A.6.3.3.2.1.3 Canals Table A-21 and A-22

Scope Assumptions:	- Assume 1.5 ft of Organic Material, 10 ft of Limestone Cap Rock that will require blasting and Inter-Bedded Materi will be the remainder of the excavation - Assumed bottom width references total width of canal after widening. - Assumed average top width of canal is currently 120 FT measured multiple points on Google earth. Assumed current canal has same side slopes of 1 to 1.5 with average depth of ~17 ft from Table A-22 leads to bottom width ~69 ft. - Assume Material will be transported to the Miami Canal for Backfill. (Average of 13 mile one way haul)

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

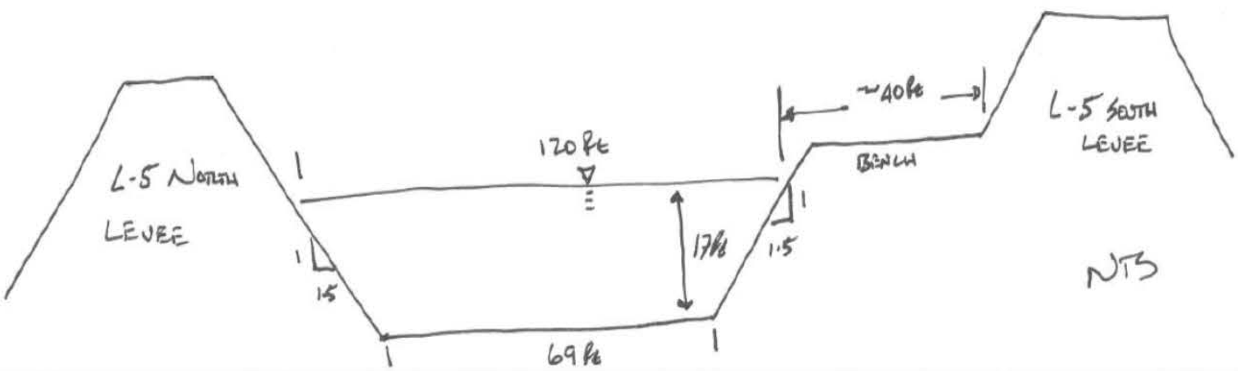
Sequence of Work:	- Survey site and stake entire length of canal. - Install floating turbidity boom along the entire length of the canal. Floating turbidity boom maintenance will be ongoing during construction of the canal. - Clear and grub entire site to remove vegetation and organic materials. Haul to disposal location. - Utilize the southern levee on the L-5 Canal as a haul road. Haul road maintenance will be ongoing during construction of the canal. Assumed width of 14 ft 1 ft thick. - Excavate Material and haul to Miami Canal Backfill.

Key Outstanding Questions/Issues:	Unknown current dimensions depth, width, and side slopes of existing canal and distances between levees.

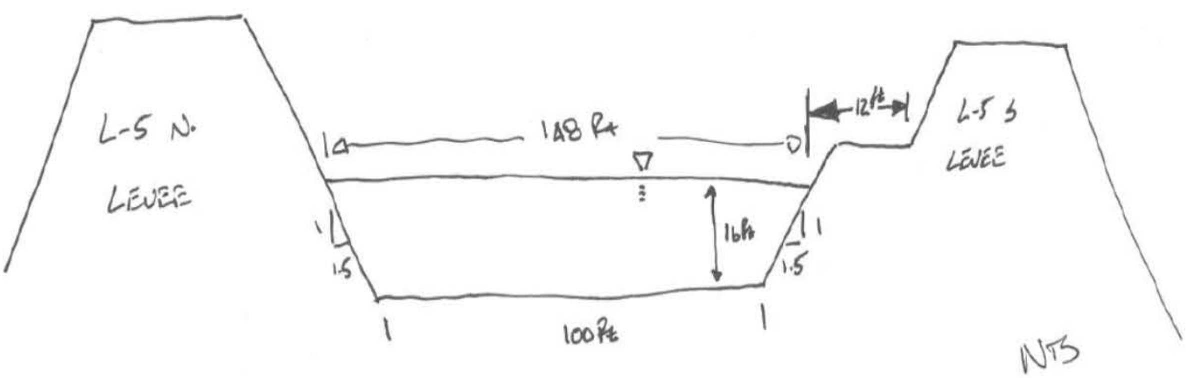
Representative Drawings/Photos: L-5 West Canal

L-5 WEST IMPROVEMENTS

EXISTING



AFTER IMPROVEMENTS



Feature of Work:	Canal 3000 CFS L-5 Canal West

Quantity Take Off:

Length	=	45,000.0	Ft							
Width	=	31.0	Ft							
Depth	=	16.0	Ft							
Depth of Organic	=	1.5	FT							
Depth of Blasted Cap Rock	=	10.0	FT							
Depth of Inter-Bedded Material	=	4.5	FT							
Volume of Organic	=	2,092,500.0	CF	=	77,500.0	BCY	=	96,875	LCY	
Volume of Blasted Cap Rock	=	13,950,000.0	CF	=	516,666.7	BCY	=	775,000	LCY	
'olume of Inter-Bedded Material	=	6,277,500.0	CF	=	232,500.0	BCY	=	348,750	LCY	
					826,666.7	BCY				
Surface Area of Excavation	=	1,395,000.0	SF	=	32.0	ACRE				
Silt Boom	=	13,500.0	LF		Assume Floating Boom installed every 500 ft across the canal.					
Haul Road Maintenar	=	17,796	SY							

Cut Fill Study

	Excavation									
	organic		common		Blasted Cap Rock		Inter-Bedded Material		Levee Excavation	
Structure	BCY	LCY	BCY	LCY	BCY	LCY	BCY	LCY	BCY	LCY
S-620	-	-	-	-	700.0	1,050.00	21,653.3	32,480.00	-	-
S-621	-	-	-	-	-	-	8,711.1	13,066.7	-	-
S-622	-	-	-	-	-	-	-	-	69,100.0	86,375.0
S-8A	10,813.3	13,516.7	-	-	63,911.1	95,866.7	39,020.1	58,530.2	-	-
S-630	133.3	166.7	-	-	933.3	1,400.0	-	-	-	-
L-4	-	-	-	-	-	-	-	-	85,066.7	106,333.3
Miami Canal	-	-	-	-	-	-	-	-	-	-
Tree Islands	-	-	-	-	-	-	-	-	-	-
L-5E	65,013.9	81,267.4	-	-	433,425.9	650,138.9	134,362.0	201,543.1	-	-
L-5W	77,500.0	96,875.0	-	-	516,666.7	775,000.0	232,500.0	348,750.0	-	-
TOTAL	153,460.6	191,825.7	-	-	1,015,637.0	1,523,455.6	436,246.6	654,369.9	154,166.7	192,708.3

Processed LCY	=	2,370,533.8	LCY	5.96%
Needed LCY	=	2,229,348.9	LCY	
rejected/unused processed	=	141,184.9	LCY	

	Fill	
	Levee Quality Material	
Structure	ECY	LCY
S-620	21,653.3	24,468.3
S-621	5,155.6	5,825.8
S-622	5,155.6	5,825.8
S-8A	46,997.9	53,107.7
S-630	3,022.2	3,415.1
L-4	-	-
Miami Canal	1,608,821.3	2,011,026.7
Tree Islands	111,220.9	125,679.6
L-5E	-	-
L-5W	-	-
TOTAL	1,802,026.9	2,229,348.9

Blue-Green-Yellow Line – Distribution, Conveyance and Seepage Management

Feature of Work:	INCREASE S-333 (N) TO 2500 CFS BY ADDING A 1150 CFS GATED STRUCTURE AND DISCHARGE CANAL

Scope Given:	Works in conjunction with S-333 to increase flow capacity (total of 2500 cfs) from WCA-3A to Northeast Shark Rive Slough

Reference for Scope Basis:	Engineering Appendix, March 2013, Section A.7.3.5, p. 113

Scope Assumptions:	- Assume similar to structure S-65EX. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - Assume material as 1.5 ft of organic, 10 ft of cap rock material and the remainder is inter-bedded material. - Assume aprons are in addition to the concrete structure shown in the provided drawings. - Assume power for the structure will be provided from local power lines located .5 miles from the structure. - Assume that a diesel generator is needed for backup power. - Assume 50 ft deep sheet pile and will be driven for wingwalls and components of the structure similar to S-65EX - Assume rim ditch dewatering will be ongoing for the gated structure. - Assume 50 KW Diesel Generator with 1000 gallon above ground tank. - Assume new canal construction will require degrading of levees for these features and the levee dimensions are 14ft high with 3:1 side slopes and a 14ft wide top.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

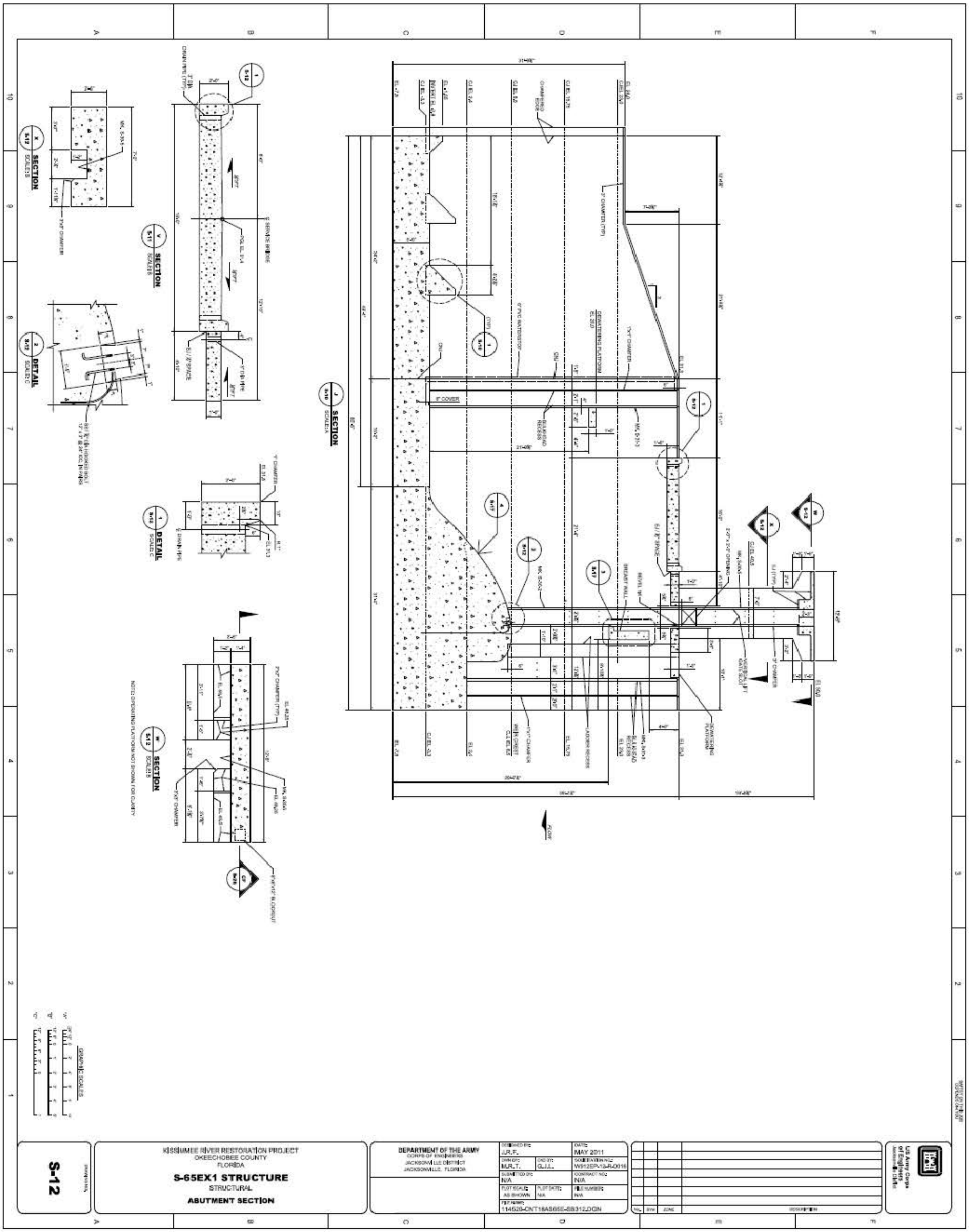
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	-Sheet pile will be required for structural features and rim ditch dewatering will be utilized to dewater the site. -Existing Canal dimensions: Bottom width 35 ft, top width 135 ft, invert- (-)10 NGVD, Top of Bank 15 ft (Total depth 25 ft). Excavation of materials to allow for construction of the foundation of the cross canal gate structure and the canal apron/wing wall. Concrete work for structure followed by apron and wing walls. Backfill suitable material around the structure and import riprap. Construct control station, diesel generator, and fuel storage. Place gates and other associated closure devices for the gate structure. Excavate new canal from overflow structure to L-29 canal. Establish flow to new canal through structure.

Key Challenges, Risks, and Opportunities	

Representative Drawings/Photos: S-333N Gated Spillway w/ New Canal



Feature of Work:	INCREASE S-333 (N) TO 2500 CFS BY ADDING A 1150 CFS GATED STRUCTURE AND DISCHARGE CANAL

Quantity Take Off:

Canal Excavation For New Canal

Length	=	1,300.0	FT						
Total Depth	=	25.0	FT						
Thickness of Organic	=	1.5	FT						
Thickness of Cap Rock Material	=	10.0	FT						
Thickness of Inter-Bedded Material		13.5	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1						
Bottom Width	=	35.0	FT						
Top Width	=	135.0	FT						
Cross Section	=	2,125.0	SF						
Cross Section Organic	=	198.0	SF						
Cross Section of Cap Rock	=	1,090.0	SF						
Cross Section of Inter-Bedded Material	=	837.0	SF						
Surface Area of Canal	=	175,500.0	SF	=	4.0	ACRE			
Organic Volume	=	257,400.0	CF	=	**9,533.3**	BCY	=	11,916.7	LCY
Cap Rock Volume	=	1,417,000.0	CF	=	**52,481.5**	BCY	=	78,722.2	LCY
Inter-Bedded Material Volume	=	1,088,100.0	CF	=	**40,300.0**	BCY	=	60,450.0	LCY

Haul road length	=	1,300.0	FT	
Haul road width	=	14.0	FT	
Haul Road Area	=	2,022.2	FT	

Silt Fence

Silt fence	=	2,600.0	FT	
Floating silt boom	=	810.0	FT	assumed 6 times the width of the canal

Remove Levee

Length	=	168.8	FT						
Height	=	10.0	FT						
Slope1	=	3.0	:1						
Slope2	=	3.0	:1						
Top width	=	10.0	FT						
Bottom Width	=	70.0	FT						
Unsuitable Material	=	0.5	FT						
Cross Section	=	400.0	SF						
Surface Area of Levee	=	12,360.2	SF	=	0.3	ACRE			
volume of unsuitable	=	6,180.1	CF	=	228.9	BCY	=	286	LCY
usable volume	=	61,319.9	CF	=	**2,271.1**	BCY	=	2,839	LCY
Total Volume	=	67,500.0	CF	=	2,500.0	BCY			

Structure Dimensions and volumes

Number of Gates	=	1.0	EA			
Superstructure/Gate Structure						
tower cross section	=	144.9	SF			
number of towers	=	2.0	EA			
pier cross section	=	154.1	SF			
number of Piers	=	-	EA			
tower width	=	3.5	FT			
Pier Height	=	35.0	FT			
beam cross section	=	15.0	SF			
Beam Length	=	25.0	FT			
volume	=	1,389.3	CF	=	51.5	CY
volume of elevated beam	=	375.0	CF	=	13.9	CY
Width	=	69.0	FT			
Cross section of platform,bridge,brestwall	=	46.5	SF			
Volume	=	3,211.3	CF	=	118.9	CY
OGEE volume						
Cross section	=	143.9	SF			
width	=	29.0	FT			
OGEE Spillway volume	=	4,173.1	CF	=	154.6	CY
Spillway wall volume (Abutment)	=	1,153.3	CY	Structure is 90' long and cross section of wall is 173 SF		
Approach apron	=	187.8	CY	Assumed 39ft long 29 ft wide and 5 ft thick per S-65EX design		
Stilling Basin	=	187.8	CY	Assumed 39ft long 29 ft wide and 5 ft thick per S-65EX design		

Wing Walls	Assumed approach wing walls similar to downstream wing wall plan from S-65EX-1 with anchor walls. Construction will consist of driven sheet pile with a 2'x2' concrete pile cap. The anchor walls will be 1 ft thick reinforced concrete. Concrete anchor wall dimensions will match wing wall dimensions. The wing wall and concrete anchor wall will be connected by #10 all thread grade 70. A C8x18.75 channel will be attached to the back of the wing wall where the anchors will be attached to.								
wing walls									
Number	=	4.0	Each						
Length average US and DS	=	95.5	FT						
US Depth	=	44.5	FT						
DS Depth	=	26.5	FT						
area of sheet pile	=	13,561.0	SF						
Pile Cap									
height	=	2.0	FT						
width	=	2.0	FT						
volume	=	56.6	CY						
Rod length	=	60.0	FT						
spacing	=	4.0	FT						
number of rods	=	96.0	EA		total length	=	5,760.0	FT	
Anchor Walls									
height	=	8.0	FT						
thickness	=	1.0	FT						
length	=	382.0	FT						
volume	=	113.2	CY						
Rip Rap				Lengths and depths assumed to extend beyond aprons.					
Length	=	440.0	FT						
width	=	39.0	FT						
Depth	=	3.0	FT		average of all depths				
volume	=	1,906.7	ECY	=	3,050.7	TON			
Rim Ditch Excavation									
Length	**=**	160.0	ft		Length of excavation				
Width	**=**	55.0	ft		Bottom width of excavation				
Canal Dimension	=	3ft deep x 3 ft wide							
Ditch volume	=	3,870.0	CF	=	**143.3**	BCY	=	179.2	LCY
Excavation for Footing Organic Volume	=	13,200.0	CF	Assume 55 ft wide by 160 ft long (per S-65EX) and 10' deep to allow for construction of the underwater seal and structural footings. Assume 1.5 ft Organic and 10 ft of Cap Rock remainder is inter-bedded material					
Excavation for Cap Rock Volume		74,800.0	CF						
Organic Volume	=	**488.9**	BCY						
Cap Rock Volume	=	**2,770.4**	BCY						
Excavation east and west canal banks for installation of wing walls.	=	177,600.0	CF	Assume top of bank is 15 ft NGVD (Per table A-14) and bottom of excavation and bottom of excavation is at -23.5 ft NGVD (Total depth 37'). Assume excavation is 160 ft long and extends the bottom of the canal an additional 15' per bank. Assume material Levee Grade Material					
	=	**6,577.8**	BCY						
	=	9,866.7	LCY						
Sheet pile/cofferdam	=	1,200.0	LF	Assume 1200 LF of sheet pile/cofferdam to go around entire work site. Sheet pile will be driven 60ft deep. All sheet pile used as a coffer dam will be removed.					
Area	=	72,000.0	SF						

Gate weight calculations

3/8" Plate steel	=	15.3	lb/sq ft				
1/2" Plate steel	=	20.4	lb/sq ft				
1" Plate Steel	=	40.8	lb/sq ft				
Gate Skin 3/8" Plate Steel	=	392.0	sq ft				Assume Gate dimensions of 14'x28'
3/8" Plate stiffeners and seal angles	=	87.0	sq ft				Assume 5 sq ft for seal angles and 82 for stiffeners
Horizontal C-Channels (1/2")	=	607.0	sq ft				Assume each channel is equivalent to 26"x28' (10 Channels).
Vertical C-Channels (1/2")	=	303.0	sq ft				Assume each vertical channel is 26"x14' (10 Channels).
Pull Pad eyes (1")	=	4.0	sq ft				Assume 4 pad eyes per gate @ 1 sq ft each
Total 3/8" Plus 10% for misc. items	=	526.9	sq ft	=	8,061.6	lbs	
Total 1/2" plus 15% for misc items	=	1,046.5	sq ft	=	21,348.6	lbs	
Total 1" steel	=	4.0	sq ft	=	163.2	lbs	
lbs/sq ft for 29'x14.6' gate	=	69.8	lb/sq ft				
Area of single S-333N Gate	=	612.5	sq ft				assumed 3 ft bigger then opening in each direction
Approximate weight of S-333N Gate	=	42,781.5	lb				
Overweight factor for larger gates (10%)	=	47,059.7	LB EA				

Control Building / Generator Shelter

Shelter square footage	=	315.0	sq ft	Assume Shelter will be 10' tall and have a 8" concrete block partition wall full height. Assume one 4'-4" steel door and one 3'-4" door. Assume 4 3' x 5' Louvers along with a generator radiator louver and exhaust port.
Excavation/backfill for shelter	=	163.3	ECY	Building will be set on grade with 12" capillary water barrier and geotextile fabric and a 12" thick concrete curb around the building perimeter.
Generator Fuel Tank	=	1000 Gallon		
Fuel Pad dimensions	=	96.0	SF	Assume 8'x12'x12" thick reinforced concrete slab on grade pad.

Gate embeds/seal lengths

Gate Dimensions						
Width	=	29.0	FT			
Height	=	14.0	FT			
Gate well Height	=	42.0	FT			
Gate Well Embed	=	113.0	FT			
Total Embed length	=	113.0	FT	1 Gate		
Seal Length	=	86.0	FT	seal length is the perimeter of bottom and both sides.		
Total Seal length	=	86.0	FT	Total of single gate		
Up and Downstream Bulkhead Slot	=	196.0	FT	6 times vertical plus width of new gate per slot		
Bulkheads	=	47,059.7	LB EA	assume same size as gates		
number	=	2.0	EA	two per gate needed		
Total Length of imbeds	=	309.0	FT			
Total Weight of gates and stop logs	=	141,179.0	LB	=	70.6	TON
TOTAL J BULB for GATES AND STOP LOGS	=	258.0	FT			

Backfill

Structure Backfill	=	**6,577.8**	ECY	=	7,432.9	LCY	

Railings and ladders

Railing				
Length	=	694.0	FT	assumed 4 time the length of a wing wall and 6 times the width of the structure and twice the length
Height	=	3.5	FT	
Ladders				
Count	=	6.0	EA	assumed ladders on each side of the structure.
Height	=	17.5	FT	average of all three types
total height	=	105.0	FT	

Boat Barrier

Number	=	2.0	EA
Length each	=	135.0	FT
Total Length	=	270.0	FT

Site Fencing

Length	=	1,000.0	FT	assumed a total of 1000 LF of chain link fencing.
Gates	=	4.0	EA	assumed

Access road

Length	=	600.0	FT				assumed
Width	=	14.0	FT				assumed
Area	=	8,400.0	SF	=	933.3	SY	

SWPPP

Length	=	3,800.0	LF	
Floating Silt Boom	=	1,350.0	LF	assumed 10 times the top width of the canal

Haul road

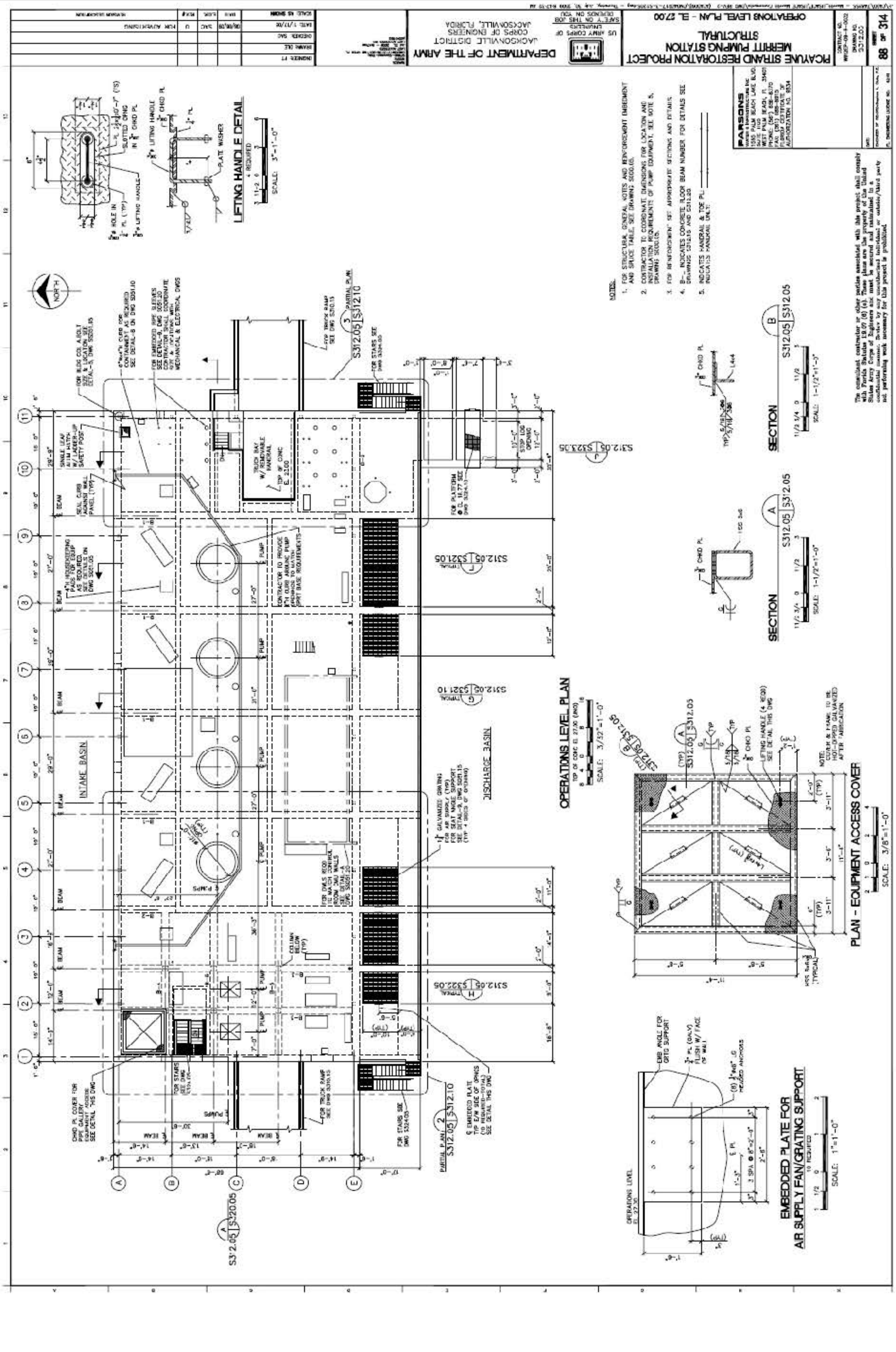
Length	=	3,000.0	LF
width	=	14.0	FT
Area	=	4,666.7	SY

Site Restoration

Area	=	6,666.7	SY

Feature of Work:	New S-356 Pump Station 1000 CFS in vicinity of existing S-356.
Scope Given:	Seepage Control and Water Supply. S-356 Pump station will replace the existing temporary S-356 pump to provide permanent seepage return to Northeast Shark River Slough
Reference for Scope Basis:	Engineering Appendix, March 2013, Section A.7.3.5, p. 115
Scope Assumptions:	Scope Assumptions: - Assume similar to structure Pump Station 357. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - Assume there will be a total of 4 pumps, three 350 cfs diesel pumps and one 150 cfs electric pumps. - Assume existing temporary pump station will remain operational during construction of new pump station. - Assume existing Gated Structure S-334 will remain in operation during and after construction. - Assume new pump station will be installed north of the current S-334/S-356 location and require excavation of a basin at the suction side of the new pump station. - Assume discharge of pumps will be piped by five 60'' diameter steel pipe and will terminate in a discharge structu built into Canal for the 60" discharge pipes. - Assume demolition of the existing temporary pump station will occur after the new pump station is fully operational. - Assume existing pump station contains four 48” pipes that will have to be removed including discharge headwall. Backfill and re-grade to existing levee height. - Assume existing levee is 10.4ft tall and 170 ft long with 2:1 side slopes and a 10 ft crest. - Assume existing piping is buried with 3 ft of cover (total excavation depth 7’ to remove piping). - Assume the discharge structure will consist of a concrete headwall full height of the canal 30 ft wide 18 inch thick reinforced concrete, 20'x30' apron 18 inch thick reinforced concrete, wing walls extending 30ft up and downstrean of the discharge point sloping from full height of the canal to bottom of canal 18 inch thick reinforced concrete anc riprap lining 136 ft beyond the concrete apron. - Assume the excavation will extend 3 feet below the seepage canal bottom elevation. The pump station will requir removal of 7 ft of organic material, and per designer the remaining material is rippable limestone rock. - Assume pump station will be constructed of reinforced concrete below grade and a Combination of cast-in-place columns and reinforced CMU walls. - Assume a fuel pad will be required for storage tanks for the diesel pump and the diesel generator, assumed size o 20’ by 20’ 2 feet thick reinforced concrete.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	Sequence of Work: Sheet pile will be utilized for wingwalls as shown on the similar structure and utilize rim ditch dewatering for the excavation. Cap slab will be placed in bottom of excavation. Structure will be built and excavation for the inlet basin will commence. Suction apron will be placed along with excavation for discharge piping and discharge headwall/discharge apron. New pump station will be operational and the existing temporary pump station will be removed. Excavate out discharge piping and backfill levee.
Key Challenges, Risks, and Opportunities	

Representative Drawings/Photos: New S-356 Pump Station



Feature of Work:	New S-356 Pump Station 1000 CFS in vicinity of existing S-356.

Quantity Take Off:

FEB Seepage Pump Station Excavation.

Length	=	105.0	FT						
Total Depth	=	21.5	FT						
Thickness of Organic	=	7.0	FT						
Thickness of Rippable Rock	=	14.5	FT						
Slope1	=	1.0	:1						
Slope2	=	1.0	:1						
Bottom Width	=	15.0	FT						
Top Width	=	58.0	FT						
Cross Section	=	784.8	SF						
Cross Section Organic	=	357.0	SF						
Cross Section of Cap Rock	=	427.8	SF						
Organic Volume	=	37,485.0	CF	=	1,388.3	BCY	=	1,735.4	LCY
Cap Rock Volume	=	44,913.8	CF	=	1,663.5	BCY	=	2,495.2	LCY
Backfill	=	8,239.9	CF	=	305.2	BCY	=	423.1	LCY
Assume Backfill is 10% of excavated quantity.									
Assume Clear and Grub similar to work area for the Merritt Pumping Station	=	18.0	ACRE	=	87,120.0	SY			

Inflow and outflow Canal Excavation

Length	=	700.0	FT						
Total Depth	=	17.0	FT						
Thickness of Organic	=	7.0	FT						
Thickness of Common	=	-	FT						
Thickness of Cap Rock	=	10.0	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1						
Bottom Width	=	40.0	FT						
Top Width	=	108.0	FT						
Surface Area of Canal	=	75,600.0	SF	=	1.7	ACRE	=	8,400.0	SY
Organic Volume	=	460,600.0	CF	=	17,059.3	BCY	=	21,324.1	LCY
Cap Rock Volume	=	420,000.0	CF	=	15,555.6	BCY	=	23,333.3	LCY

Levee Degrade

Length	=	730.0	FT	Assume Degrade of levee required due to location of new pump station.					
Height	=	10.4	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1						
Top width	=	10.0	FT						
Bottom Width	=	51.6	FT						
Cross Section	=	320.3	SF						
Surface Area of Levee	=	39,946.6	SF	=	0.9	ACRE			
Volume	=	233,833.6	CF	=	8,660.5	BCY	=	9,786.4	LCY
base area of levee	=	37,668.0	SF	=	4,185.3	SY	=	0.9	Acre
side slopes of levee	=	32,646.6	SF	=	3,627.4	SY	=	0.7	Acre
roadway area	=	7,300.0	SF	=	811.1	SY	=	0.2	Acre

Levee Construction

Length	=	880.0	FT							
Height	=	10.4	FT							
Slope1	=	2.0	:1							
Slope2	=	2.0	:1							
Top width	=	10.0	FT							
Bottom Width	=	51.6	FT							
Cross Section	=	320.3	SF							
Surface Area of Levee	=	48,154.8	SF	=	1.1	ACRE	=	5,350.5		
Volume	=	281,881.6	CF	=	10,440.1	ECY	=	11,797.3	LCY	
base area of levee	=	45,408.0	SF	=	5,045.3	SY	=	1.0	Acre	
side slopes of levee	=	39,354.8	SF	=	4,372.8	SY	=	0.9	Acre	
roadway area	=	8,800.0	SF	=	977.8	SY	=	0.2	Acre	

Levee Sub Surface Excavation

Thickness of Organic	=	7.0	FT						
Total depth	=	7.0	FT						
bottom width	=	79.6	FT						
Slope of Excavation	=	2.0	:1						
Top Width of Excavation	=	107.6	FT						
Excavation of Organic	=	655.2	SF						
Volume of Organic	=	576,576.0	CF	=	21,354.7	BCY	=	26,693.3	LCY
Total Excavation	=	576,576.0	CF						
Total Backfill of Excavation	=	576,576.0	CF	=	21,354.7	ECY	=	24,130.8	LCY
Road length	=	880.0	FT						
Road width	=	14.0	FT						
minimum thickness	=	0.5	FT						

Removal of existing S-356 Temporary Pump Station and backfill of Temporary Pump Station Intake

Excavation volume for removal of Piping	=	67,240.0	CF	Assume excavation area is 6,724 SF and excavation is 10 ft deep.						
	=	2,490.4	BCY	=	3,113.0	LCY				
Intake Backfill										
Length	=	142.5	FT	Assume averaged length is 142.5 ft						
Height	=	10.0	FT	Assume average depth is 10 ft						
Slope1	=	2.0	:1	assume side slope of 2:1						
Slope2	=	2.0	:1							
Bottom Width	=	30.0	FT	Assume Bottom width of 30 ft with top width at 70 ft.						
Top Width	=	70.0	FT							
Cross Section	=	500.0	SF							
Backfill Volume	=	71,250.0	CF	=	2,638.9	ECY	=	2,981.9	LCY	
new surface area of backfill	=	9,975.0	SF	=	1,108.3	SY	=	0.2	Acre	
Total Backfill removed temporary pump station	=	5642.2	ECY	=	6375.7	LCY				

Care and Diversion of Water

Construction Sequence:

1 Construct perimeter concrete ring beam and rock anchors.
2 Place Sheet piling and connect piling to concrete ring beam. Excavate. Assume sheet pile length of 36 ft
3 Install rock anchors for concrete seal slab. Anchor length 17'-6" slab rock anchor.
4 Place Concrete Seal slab. 6'-0" thick and dimensions of sheet pile
5 Dewater cofferdam and prepare top of concrete base mat slab
6 Place concrete walls to elevation 9'-0" at pump structure monolith prior to abandoning or removing in place cofferdam sheet piles. Remove ring beams in inlet and outlet.
7 install lateral bracing for walls.
8 Construct service bridge slab. Remainder of walls and operating floor slab.
9 Install sheet pile wing walls.

# of pump station Bays	=	4.0						
Cofferdam width per pump station bay	=	15.0	ft	Assume Per S-101				
Total width length	=	60.0	ft					
Length (Up and downstream) of Cofferdam	=	90.0	ft	Assume per S-101				
Area of Cofferdam sheet pile to remain in place	=	10,800.0	SF					
Area of cofferdam to be removed	=	7,200.0	SF					
Total perimeter length (length of sheet pile/ring beam)	=	300.0	ft					
Length of Sheet pile to Be utilized as wing wall	=	186.0	ft					
Volume of ring beam (Reinforced Concrete	=	70.4	CY	Per detail S-103				
# of 54' ring beam anchors @ 10' OC	=	30	ea	Per detail S-101				
# of 17'-6" uplift slab rock anchors	=	54	ea					
Volume of Concrete seal/uplift slab	=	1,200.0	CY	Assume 6' thick				
Width of each Bay	=	15.00	ft	Assumed per similar PS-357				
Length of Operating Floor	=	45.0	ft					
Width of Operating Floor	=	60.0	ft					
Horizontal concrete volume	=	800.0	CY					
Vertical Concrete	=	1,500.0	CY					
Service Bridge Elevated Flatwork	=	190.1	CY	Total Elevated Flatwork	=	446.4	CY	
Operating Floor (Elevated Flatwork	=	225.0	CY					
Elevated Vertical Work (Operating floor to service bridge)	=	31.3	CY					
Roof slab / Metal Deck	=	220.0	CY					
Loading Truck Ramp (horizontal Concrete)	=	4,903.0	SF	=	272.4	CY	Assumed From Merritt Pump Station	
SF of Generator, Electric and Office/Control	=	900.0	SF	Assume Generator room. Electric Room and Office control room is 20ftx45ft				
Volume of Concrete for Gen, Elec and Office	=	1,500.0	CF	=	55.6	CY	Assume 1.67 ft thick	
Assume 10 18"x18"x26' tall Columns	=	43.3	CY					
Tilt Up 7-1/2" Thick Precast Panels	=	5,250.0	SF	Assume Similar to Merritt Pump Station				
CMU Wall Dimensions (Exterior Surface Area of CMU)	=	8,500.0	SF					
Roof 32" Double tee units 56 ft long required	=	8	each					

Intake Basin Concrete	=	89	CY	
Discharge Basin Concrete Apron	=	133.3	CY	Assume 36" thick concrete
Stone Protection Riprap discharge	=	1,688.9	CY	
				Assume 5 ft thick layer of riprap lining the C-625W canal upstream 60 ft and downstream 60 ft.
Stone Protection inlet	=	750.0	CY	Assume 36" thick layer of riprap lining the sides and bottom for 150' upstream
Trash Rack Surface Area (total)	=	1,680.0	SF	Assume Trash rake is 28 ft tall and covers the width of the operating floor each individual covers the width of the bays (14ft).
Roll Up Garage Door	=	168.0	SF	Assume Roll up garage door 12'x14'
# of Doors	=	4.0	ea	Assume 1 set of double doors and two other doors
# louver openings	=	8.0	ea	Assume 8 louver openings 7'-4" square
Overhead Crane	=	2.0	ea	Assume 2 overhead cranes @ 25 tons each
Power Line Connection	=	2,500.0	LF	Assume power available 2500 lf from site
Septic tank system	=	1.0	ea	Assume 1 septic tank system
Potable water	=	1.0	ea	Assume 1 potable water well will be required
Generator Fuel Tank	=	2000 Gallon	ea	Assume five 2000 gallon fuel tanks required
Fuel Pad dimensions	=	2,000.0	SF	Assume two 100'x20'x8" thick reinforced concrete slab on grade pad.
		49.4	CY	
Discharge Piping				
48" discharge pipe	=	15.0	LF/ea	Assume Pumps will have a 48" Discharge Piping
Concrete Encasement	=	146.6	CY	Assume 2 ft of concrete to encase piping
Floor Grating	=	240.0	SF	Assume 14' x4 ft wide for each pump bay.
Ladders	=	120.0	VLF	Assume 30 ft per pump bay
Railings	=	180.0	LF	Assume a handrail on the up and downstream side and one a width of the operating floor
Haul road length	=	21,120.0	FT	
Haul road width	=	14.0		
Haul road thickness	=	1.0	FT	
				SF = 32,853.3 see
Area	=	295,680.0		
Chain link Fence	=	2,280.0	LF	Assume Similar to Merritt Pump Station
Silt Fence	=	3,700.0	LF	Assume similar to Merritt Pump Station
Silt Boom	=	600.0	LF	Assume similar to Merritt Pump Station

Assume Haul road will require no maintenance only traffic control at the exit of the site onto HW 41 and the entrance to the processor located near S-333

Feature of Work:	S-631 Gated Culvert 500 CFS GATED CULVERT IN L-67A LEVEE

Scope Given:	S-631 conveys flows from the WCA-3A to through the Blue Shanty Flow way to provide flows to the Shark River Slough

Reference for Scope Basis:	Engineering Appendix, March 2013, Section A.7.3.5, p. 112

Scope Assumptions:	- Assume similar to structures S-276 and S-277 contrary to the design guidance provided in the Engineering Appenc paragraph A.7.4.4 which states "S-631, S-632, and S-633 are gated culverts that will be designed similar to the culverts on Decomp." Culvert is listed in Table A-29 as a single 11 ft x 11 ft concrete box culvert not multiple HDPE pipes. - Assume Levee and excavation quantities will be based on the profiles provided by the Decomp drawings and will correlate to the elevations given in the Engineering Appendix. - Assume an earthen cofferdam and rim ditch dewatering will be utilized to dewater the site. - Assume box culvert will be cast-in-place concrete. -Assume Excavation will be to the same depth below finished grade as shown in contract drawings for similar projects. Assume material as 1.5 ft of organic, 10 ft of Cap Rock and the remainder is inter-bedded material. - Assume a distribution canal will extend 500 ft beyond the discharge of the culvert and will taper from -4.5 ft NGVI (Invert elevation) up to 9 ft NGVD (Natural Grade). Initial 150 ft will be lined with 3' of riprap and the new channel will have 1:2 side slopes. - Assume inlet channel will be excavated and will taper from -4.5 ft NGVD (Invert elevation) to 1.4 ft NGVD (Canal Bottom elevation). Assume inlet channel will have 1:2 side slopes and extend from the headwall to the existing channel (140 ft) and will be lined with 3'thick riprap that will extend 20 ft up and downstream L-67A Canal. - Assume power will be provided from power lines in the area approximately 3 miles. - Assume that a diesel generator is needed for backup power.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

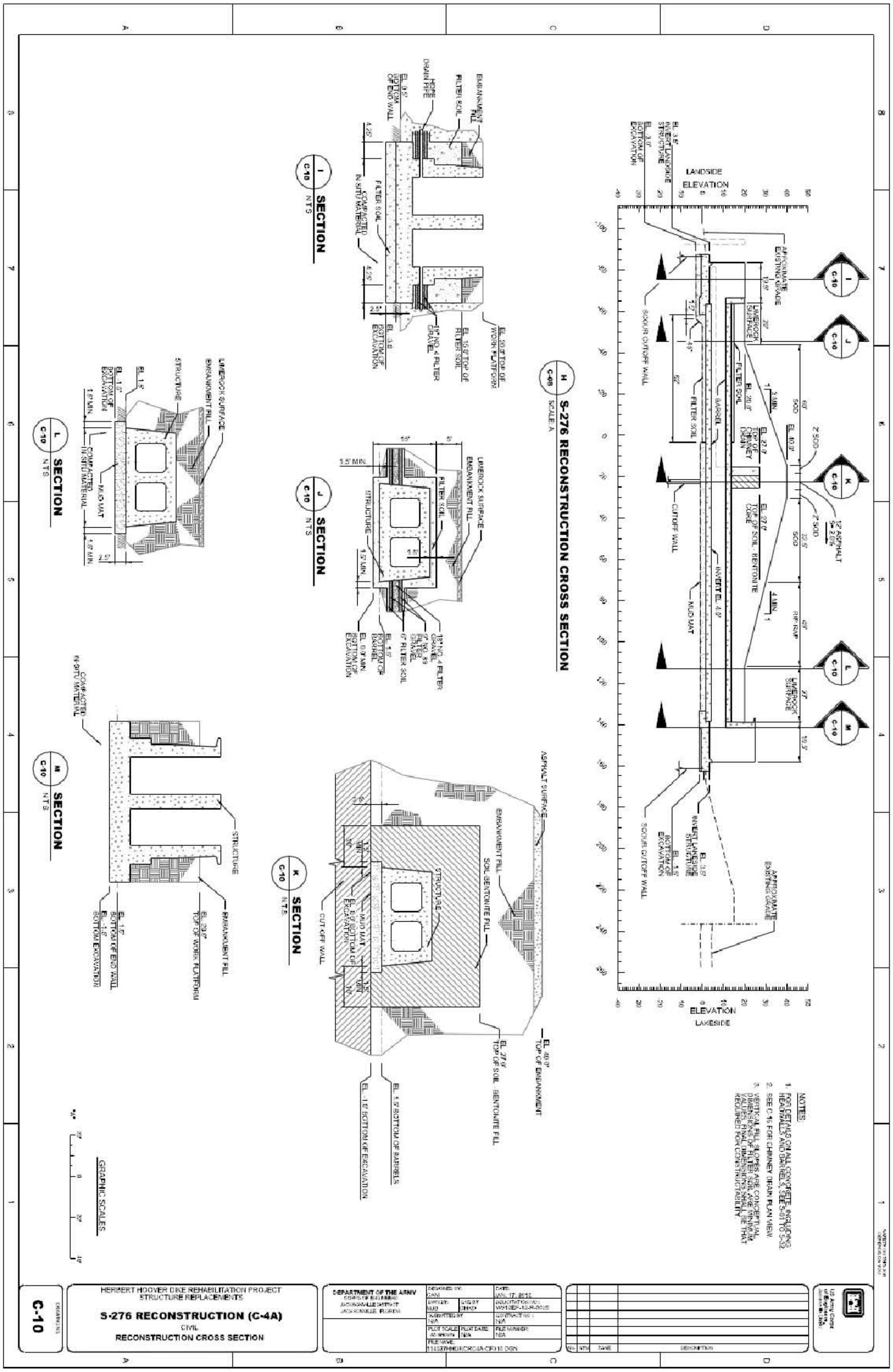
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	Organic (muck) will be excavated and hauled off-site to a disposal facility. Cofferdam material will be imported to construct the cofferdam. Degrade levee and establish the earthen cofferdam around the inflow and outflow canal Excavated outflow canal and levee down to -7 ft NGVD to allow for installation of new box culvert, headwall and outlet/Gated structures with wing walls. Backfill levee to original cross section and line discharge canal with rip raț Remove cofferdam and excavate inlet channel and line with riprap to the existing L-67A Canal. Install emergency backup generator shelter and fuel tank pads and restore site.

Key Outstanding Questions/Issues:	Lacks details on motors needed to operate gate. Lacks details on source of power for said motors.

Representative Drawings/Photos: S-631



Feature of Work:	S-631 Gated Culvert 500 CFS GATED CULVERT IN L-67A LEVEE

Quantity Take Off:

Culvert Excavation

Thickness of Organic	=	1.5	FT						
Thickness of Cap Rock	=	3.0	FT						
Total depth	=	4.5	FT						
bottom width	=	58.0	FT						
Length	=	600.0	FT						
Slope of Excavation	=	2.0	:1						
Top Width of Excavation	=	76.0	FT						
Excavation of Organic	=	109.5	SF						
Excavation of Cap Rock	=	192.0	SF						
Volume of Organic	=	65,700.0	CF	=	**2,433.3**	BCY	=	3,041.7	LCY
Volume of Cap Rock	=	115,200.0	CF	=	**4,266.7**	BCY	=	5,333.3	LCY
Total Excavation	=	180,900.0	CF						
Total Backfill of Excavation	=	180,900.0	CF	=	6,700.0	ECY	=	7,571.0	LCY

Canal Excavation

Includes excavation under levee but excludes the levee degrade (captured in next section below)

Length	=	650.0	FT	Length from L-67 canal to end of discharge canal					
Total Depth	=	6.8	FT	Assume average depth of canal					
Thickness of Organic	=	1.5	FT						
Thickness of Cap Rock	=	5.3	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1						
Bottom Width	=	40.0	FT						
Top Width	=	67.0	FT						
Cross Section	=	361.1	SF						
Cross Section Organic	=	96.0	SF						
Cross Section of Cap Rock	=	267.1	SF						
Surface Area of Canal	=	43,550.0	SF	=	1.0	ACRE			
Pete Organic	=	62,400.0	CF	=	**2,311.1**	BCY	=	2,888.9	LCY
Cap Rock Volume	=	173,628.0	CF	=	**6,430.7**	BCY	=	9,646.0	LCY
Haul road length	=	650.0	FT						
Haul road width	=	14.0	FT						
Haul road thickness	=	1.0	FT						

Levee Degrade (Degrade down to surface elevation canal/box culvert excavation captured above)

Length	=	175.0	FT						
Height	=	7.0	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1						
Top width	=	14.0	FT						
Bottom Width	=	42.0	FT						
Cross Section	=	196.0	SF						
Surface Area of Levee	=	13,406.7	SF	=	0.3	ACRE			
Volume	=	34,300.0	CF	=	**1,270.4**	BCY	=	1,588.0	LCY
base area of levee	=	7,350.0	SF	=	816.7	SY	=	0.2	Acre
side slopes of levee	=	10,956.7	SF	=	1,217.4	SY	=	0.3	Acre
roadway area	=	2,450.0	SF	=	272.2	SY	=	0.1	Acre

Inlet and Outlet Works

Number	=	4.0	EA	assumed intake/outlet are the same assumed 2 per each end gate and bulkhead		
Foundation						
Length	=	8.0	FT			
Depth	=	5.0	FT			
Width	=	30.5	FT			
Volume	=	4,880.0	CF	=	180.7	CY
Head Walls						
Height	=	20.5	FT			
Thickness	=	3.0	FT			
width	=	19.0	FT			
openings	=	121.0	SF			
volume	=	3,222.0	CF	=	119.3	CY
End walls						
height	=	20.5	FT			
length	=	100.0	FT	total either inlet or outlet		
thickness	=	2.0	FT			
volume	=	8,200.0	CF	=	303.7	CY
Railing	=	358.0	LF			
Ladders	=	2.0	EACH			
height	=	20.5	FT			

Gates IN HHD

Height	=	14.0	FT	*** STAINLESS STEEL for opening 7 by 7
Width	=	10.0	FT	
Weight	=	6,500.0	LB	
Weight Per SF	=	46.4	LB/SF	

NEW GATES									
number of gates	=	4.0	EA	assumed 2 on each end 1 gate and one bulkhead.					
Height	=	18.0	FT	assumed 4 ft larger than similar gate					
Width	=	14.0	FT	assumed 4 ft larger than similar gate					
Weight % larger	=	10.0	%	assumed					
Total Weight of gates	=	12,870.0	LB EA						
Motors	=	4.0	EA						
Gear Reduction	=	4.0	EA						
Actuators	=	4.0	EA						
cable reels	=	4.0	EA						
Imbeds for gate	=	138.0	LF						
Gate Seal Length	=	256.0	LF						
Operations building									
size	=	315.0	SF	8 by 8					
Electrical	=	NEEDED							
Communications	=	NEEDED							
Backfill									
Area above Culvert	=	180,900.0	CF	=	**6,700.0**	ECY	=	7,571.0	LCY
Levee Construction	=	34,300.0	CF	=	**1,270.4**	ECY	=	1,435.5	LCY
Cut off walls									
Number	=	1.0	EA	Assumed in FEB perimeter Levee					
Soil Bentonite Fill									
Height	=	25.0	FT						
Width	=	50.5	FT						
Thickness	=	8.0	FT						
Volume	=	10,100.0	CF/EA	=	374.1	CY/EA			
Cutoff Wall									
Height	=	35.0	FT						
Width	=	50.5	FT						
Thickness	=	3.0	FT						
Volume	=	5,302.5	CF/EA	=	196.4	CY/EA			
Area	=	1,767.5	SF/EA						
RIP RAP									
common both sides									
number of placements	=	2.0	EA	1 each side					
Length	=	20.0	FT						
Width	=	30.5	FT						
thickness	=	4.0	FT						
Volume	=	2,440.0	CF/EA	=	90.4	CY/EA			
Total Volume	=	180.7	ECY	=	289.2	TON			

Boat Barrier

Number	=	2.0	EA						
Length	=	67.0	FT						
Total Length	=	134.0	FT						

SWPPP

Silt Fence	=	1,750.0	FT						

Site Fence

Length	=	1,000.0	FT	Assumed					
gates	=	4.0	FT	assumed					

Earthen Cofferdam

Length	=	350.0	FT	Assumed					
Cross Section	=	196.0	SF	ASSUMED SAME AS LEVEE DEGRADE					
Fill volume	=	68,600.0	CF	=	2,540.74	ECY	=	2,871.04	LCY
removal volume	=	68,600.0	CF	=	2,540.74	BCY	=	3,175.9	LCY

Feature of Work:	S-632 Gated Culvert 500 CFS GATED CULVERT IN L-67A LEVEE

Scope Given:	S-631 conveys flows from the WCA-3A to through the Blue Shanty Flow way to provide flows to the Shark River Slough

Reference for Scope Basis:	Engineering Appendix, March 2013, Section A.7.3.5, p. 112

Scope Assumptions:	- Assume similar to structures S-276 and S-277 contrary to the design guidance provided in the Engineering Append paragraph A.7.4.4 which states "S-631, S-632, and S-633 are gated culverts that will be designed similar to the culverts on Decomp." Culvert is listed in Table A-29 as a single 11 ft x 11 ft concrete box culvert not multiple HDPE pipes. - Assume Levee and excavation quantities will be based on the profiles provided by the Decomp drawings and will correlate to the elevations given in the Engineering Appendix. - Assume an earthen cofferdam and rim ditch dewatering will be utilized to dewater the site. - Assume box culvert will be cast-in-place concrete. -Assume Excavation will be to the same depth below finished grade as shown in contract drawings for similar projects. Assume material as 1.5 ft of organic, 10 ft of Cap Rock and the remainder is inter-bedded material. - Assume a distribution canal will extend 500 ft beyond the discharge of the culvert and will taper from -4.5 ft NGVI (Invert elevation) up to 9 ft NGVD (Natural Grade). Initial 150 ft will be lined with 3' of riprap and the new channel will have 1:2 side slopes. - Assume inlet channel will be excavated and will taper from -4.5 ft NGVD (Invert elevation) to 1.4 ft NGVD (Canal Bottom elevation). Assume inlet channel will have 1:2 side slopes and extend from the headwall to the existing channel (140 ft) and will be lined with 3'thick riprap that will extend 20 ft up and downstream L-67A Canal. - Assume power will be provided from power lines in the area approximately 3 miles. - Assume that a diesel generator is needed for backup power.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

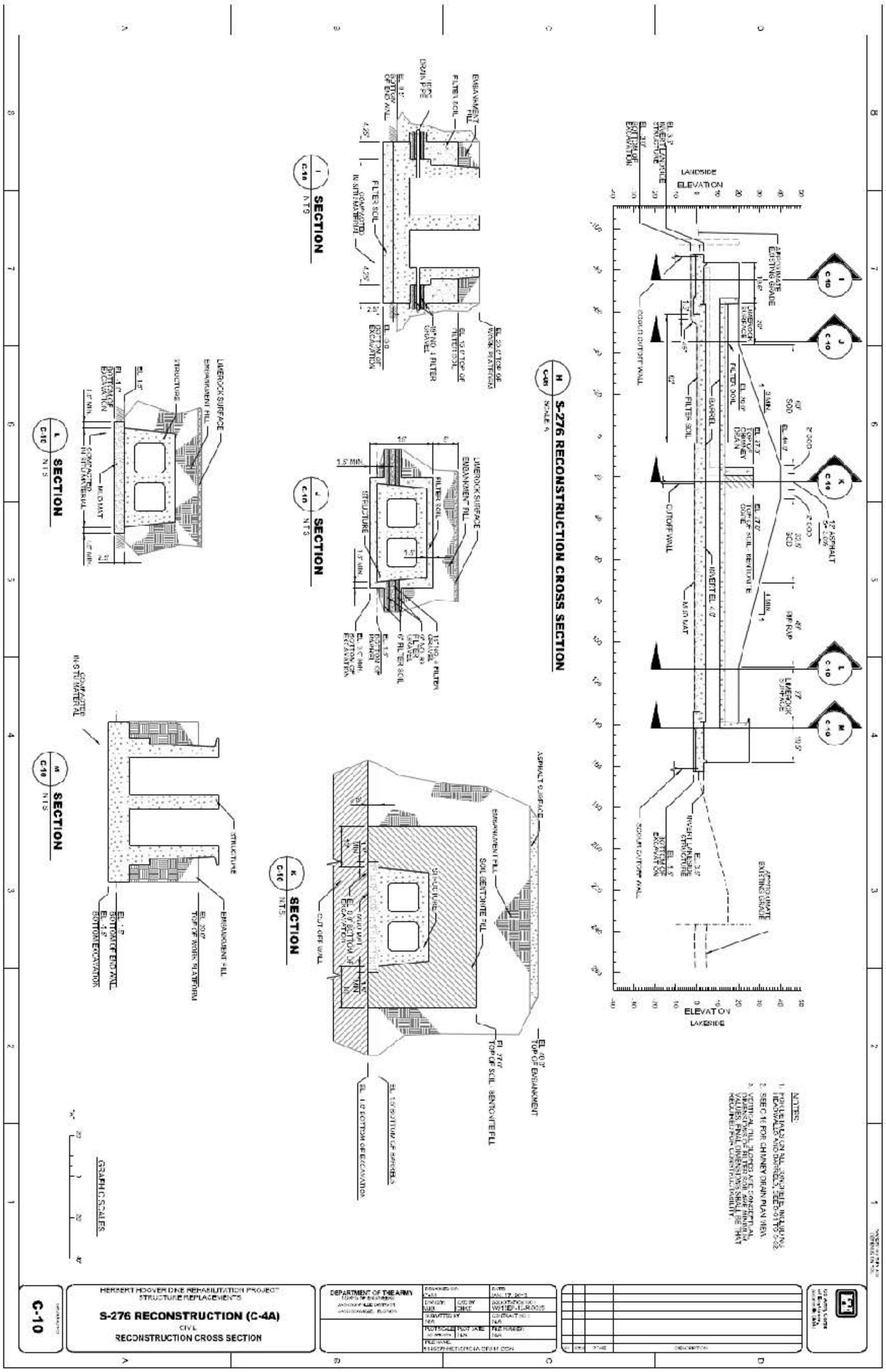
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	Organic (muck) will be excavated and hauled off-site to a disposal facility. Cofferdam material will be imported to construct the cofferdam. Degrade levee and establish the earthen cofferdam around the inflow and outflow canal Excavated outflow canal and levee down to -7 ft NGVD to allow for installation of new box culvert, headwall and outlet/Gated structures with wing walls. Backfill levee to original cross section and line discharge canal with rip rap Remove cofferdam and excavate inlet channel and line with riprap to the existing L-67A Canal. Install emergency backup generator shelter and fuel tank pads and restore site.

Key Outstanding Questions/Issues:	Lacks details on motors needed to operate gate. Lacks details on source of power for said motors.

Representative Drawings/Photos: S-632



Feature of Work:	S-632 Gated Culvert 500 CFS GATED CULVERT IN L-67A LEVEE

Quantity Take Off:

Culvert Excavation

Thickness of Organic	=	1.5	FT						
Thickness of Cap Rock	=	3.0	FT						
Total depth	=	4.5	FT						
bottom width	=	58.0	FT						
Length	=	600.0	FT						
Slope of Excavation	=	2.0	:1						
Top Width of Excavation	=	76.0	FT						
Excavation of Organic	=	109.5	SF						
Excavation of Cap Rock	=	192.0	SF						
Volume of Organic	=	65,700.0	CF	=	**2,433.3**	BCY	=	3,041.7	LCY
Volume of Cap Rock	=	115,200.0	CF	=	**4,266.7**	BCY	=	5,333.3	LCY
Total Excavation	=	180,900.0	CF						
Total Backfill of Excavation	=	180,900.0	CF	=	6,700.0	ECY	=	7,571.0	LCY

Canal Excavation

Includes excavation under levee but excludes the levee degrade (captured in next section below)

Length	=	650.0	FT	Length from L-67 canal to end of discharge canal
Total Depth	=	6.8	FT	Assume average depth of canal

Thickness of Organic	=	1.5	FT							
Thickness of Cap Rock	=	5.3	FT							
Slope1	=	2.0	:1							
Slope2	=	2.0	:1							
Bottom Width	=	40.0	FT							
Top Width	=	67.0	FT							
Cross Section	=	361.1	SF							
Cross Section Organic	=	96.0	SF							
Cross Section of Cap Rock	=	267.1	SF							
Surface Area of Canal	=	43,550.0	SF	=	1.0	ACRE				
Pete Organic	=	62,400.0	CF	=	**2,311.1**	BCY	=	2,888.9	LCY	
Cap Rock Volume	=	173,628.0	CF	=	**6,430.7**	BCY	=	9,646.0	LCY	
Haul road length	=	650.0	FT							
Haul road width	=	14.0	FT							
Haul road thickness	=	1.0	FT							

Levee Degrade (Degrade down to surface elevation canal/box culvert excavation captured above)

Length	=	175.0	FT						
Height	=	7.0	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1						
Top width	=	14.0	FT						
Bottom Width	=	42.0	FT						
Cross Section	=	196.0	SF						
Surface Area of Levee	=	13,406.7	SF	=	0.3	ACRE			
Volume	=	34,300.0	CF	=	**1,270.4**	BCY	=	1,588.0	LCY
base area of levee	=	7,350.0	SF	=	816.7	SY	=	0.2	Acre
side slopes of levee	=	10,956.7	SF	=	1,217.4	SY	=	0.3	Acre
roadway area	=	2,450.0	SF	=	272.2	SY	=	0.1	Acre

Inlet and Outlet Works

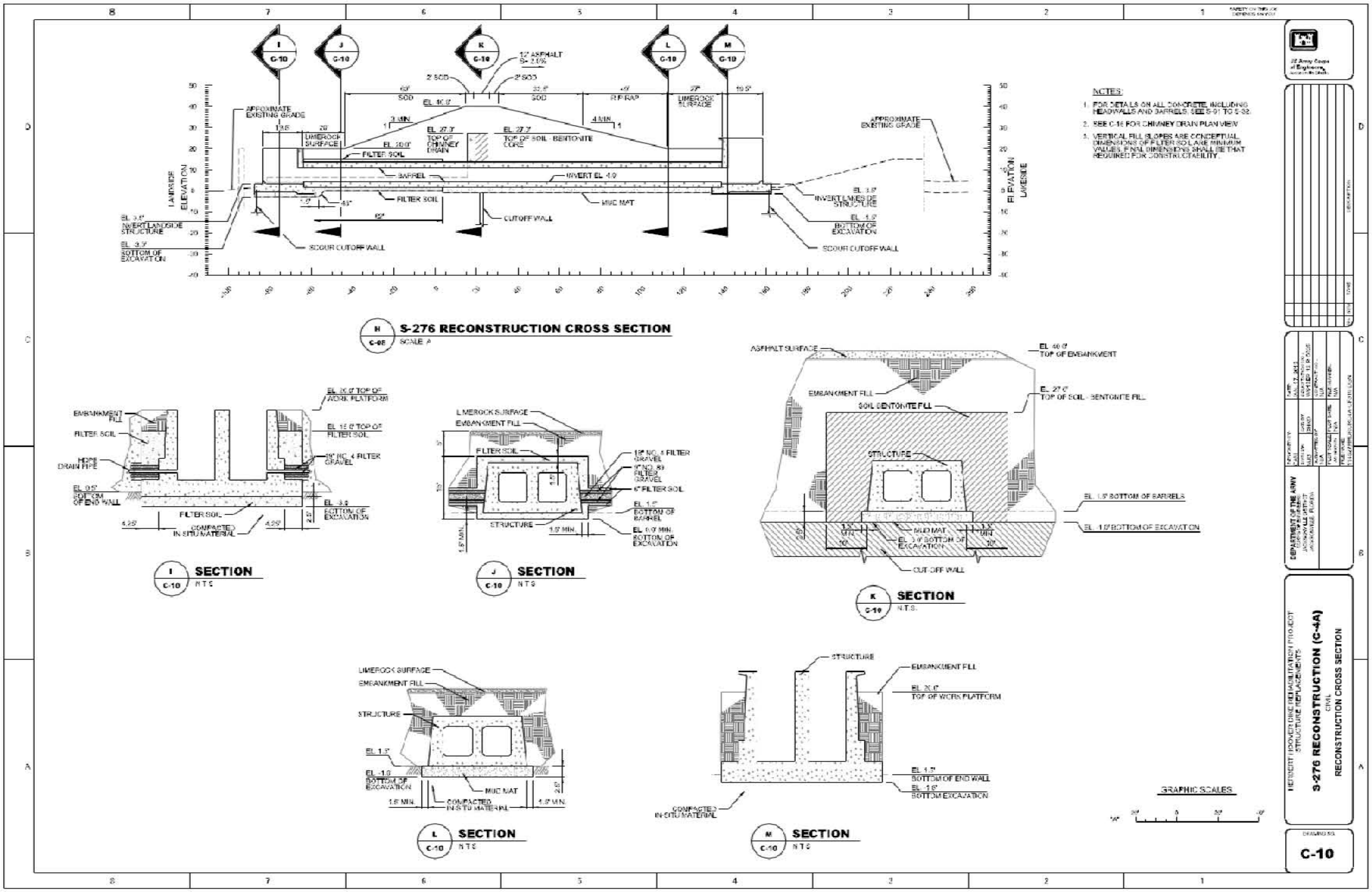
Number	=	4.0	EA	assumed intake/outlet are the same assumed 2 per each end gate and bulkhead
Foundation				

Length	=	8.0	FT					
Depth	=	5.0	FT					
Width	=	30.5	FT					
Volume	=	4,880.0	CF	=	180.7	CY		
Head Walls								
Height	=	20.5	FT					
Thickness	=	3.0	FT					
width	=	19.0	FT					
openings	=	121.0	SF					
volume	=	3,222.0	CF	=	119.3	CY		
End walls								
height	=	20.5	FT					
length	=	100.0	FT	total either inlet or outlet				
thickness	=	2.0	FT					
volume	=	8,200.0	CF	=	303.7	CY		
Railing	=	358.0	LF					
Ladders	=	2.0	EACH					
height	=	20.5	FT					
Gates IN HHD								
Height	=	14.0	FT	*** STAINLESS STEEL for opening 7 by 7				
Width	=	10.0	FT					
Weight	=	6,500.0	LB					
Weight Per SF	=	46.4	LB/SF					
NEW GATES								
number of gates	=	4.0	EA	assumed 2 on each end 1 gate and one bulkhead.				
Height	=	18.0	FT	assumed 4 ft larger than similar gate				
Width	=	14.0	FT	assumed 4 ft larger than similar gate				
Weight % larger	=	10.0	%	assumed				
Total Weight of gates	=	12,870.0	LB EA					
Motors	=	4.0	EA					
Gear Reduction	=	4.0	EA					
Actuators	=	4.0	EA					
cable reels	=	4.0	EA					
Imbeds for gate	=	138.0	LF					
Gate Seal Length	=	256.0	LF					
Operations building								
size	=	315.0	SF	8 by 8				
Electrical	=	NEEDED						
Communications	=	NEEDED						
Backfill								
Area above Culvert	=	180,900.0	CF	=	**6,700.0**	ECY	=	7,571.0 LCY
Levee Construction	=	34,300.0	CF	=	**1,270.4**	ECY	=	1,435.5 LCY
Cut off walls								
Number	=	1.0	EA	Assumed in FEB perimeter Levee				
Soil Bentonite Fill								

Height	=	25.0	FT						
Width	=	50.5	FT						
Thickness	=	8.0	FT						
Volume	=	10,100.0	CF/EA	=	374.1	CY/EA			
Cutoff Wall									
Height	=	35.0	FT						
Width	=	50.5	FT						
Thickness	=	3.0	FT						
Volume	=	5,302.5	CF/EA	=	196.4	CY/EA			
Area	=	1,767.5	SF/EA						
RIP RAP									
common both sides									
number of placements	=	2.0	EA	1 each side					
Length	=	20.0	FT						
Width	=	30.5	FT						
thickness	=	4.0	FT						
Volume	=	2,440.0	CF/EA	=	90.4	CY/EA			
Total Volume	=	180.7	ECY	=	289.2	TON			
Boat Barrier									
Number	=	2.0	EA						
Length	=	67.0	FT						
Total Length	=	134.0	FT						
SWPPP									
Silt Fence	=	1,750.0	FT						
Site Fence									
Length	=	1,000.0	FT	Assumed					
gates	=	4.0	FT	assumed					
Earthen Cofferdam									
Length	=	350.0	FT	Assumed					
Cross Section	=	196.0	SF	ASSUMED SAME AS LEVEE DEGRADE					
Fill volume	=	68,600.0	CF	=	2,540.74	ECY	=	2,871.04	LCY
removal volume	=	68,600.0	CF	=	2,540.74	BCY	=	3,175.9	LCY

Feature of Work:	S-633 Gated Culvert 500 CFS GATED CULVERT IN L-67A LEVEE
Scope Given:	S-631 conveys flows from the WCA-3A to through the Blue Shanty Flow way to provide flows to the Shark River Slough
Reference for Scope Basis:	Engineering Appendix, March 2013, Section A.7.3.5, p. 112
Scope Assumptions:	- Assume similar to structures S-276 and S-277 contrary to the design guidance provided in the Engineering Append paragraph A.7.4.4 which states "S-631, S-632, and S-633 are gated culverts that will be designed similar to the culverts on Decomp." Culvert is listed in Table A-29 as a single 11 ft x 11 ft concrete box culvert not multiple HDPE pipes. - Assume Levee and excavation quantities will be based on the profiles provided by the Decomp drawings and will correlate to the elevations given in the Engineering Appendix. - Assume an earthen cofferdam and rim ditch dewatering will be utilized to dewater the site. - Assume box culvert will be cast-in-place concrete. -Assume Excavation will be to the same depth below finished grade as shown in contract drawings for similar projects. Assume material as 1.5 ft of organic, 10 ft of Cap Rock and the remainder is inter-bedded material. - Assume a distribution canal will extend 500 ft beyond the discharge of the culvert and will taper from -4.5 ft NGV (Invert elevation) up to 9 ft NGVD (Natural Grade). Initial 150 ft will be lined with 3' of riprap and the new channel will have 1:2 side slopes. - Assume inlet channel will be excavated and will taper from -4.5 ft NGVD (Invert elevation) to 1.4 ft NGVD (Canal Bottom elevation). Assume inlet channel will have 1:2 side slopes and extend from the headwall to the existing channel (140 ft) and will be lined with 3'thick riprap that will extend 20 ft up and downstream L-67A Canal. - Assume power will be provided from power lines in the area approximately 3 miles. - Assume that a diesel generator is needed for backup power.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	Organic (muck) will be excavated and hauled off-site to a disposal facility. Cofferdam material will be imported to construct the cofferdam. Degrade levee and establish the earthen cofferdam around the inflow and outflow canal Excavated outflow canal and levee down to -7 ft NGVD to allow for installation of new box culvert, headwall and outlet/Gated structures with wing walls. Backfill levee to original cross section and line discharge canal with rip ra Remove cofferdam and excavate inlet channel and line with riprap to the existing L-67A Canal. Install emergency backup generator shelter and fuel tank pads and restore site.
Key Outstanding Questions/Issues:	Lacks details on motors needed to operate gate. Lacks details on source of power for said motors.

Representative Drawings/Photos: S-633



Feature of Work:	S-633 Gated Culvert 500 CFS GATED CULVERT IN L-67A LEVEE

Quantity Take Off:

Culvert Excavation

Thickness of Organic	=	1.5	FT						
Thickness of Cap Rock	=	3.0	FT						
Total depth	=	4.5	FT						
bottom width	=	58.0	FT						
Length	=	600.0	FT						
Slope of Excavation	=	2.0	:1						
Top Width of Excavation	=	76.0	FT						
Excavation of Organic	=	109.5	SF						
Excavation of Cap Rock	=	192.0	SF						
Volume of Organic	=	65,700.0	CF	=	**2,433.3**	BCY	=	3,041.7	LCY
Volume of Cap Rock	=	115,200.0	CF	=	**4,266.7**	BCY	=	5,333.3	LCY
Total Excavation	=	180,900.0	CF						
Total Backfill of Excavation	=	180,900.0	CF	=	6,700.0	ECY	=	7,571.0	LCY

Canal Excavation

Includes excavation under levee but excludes the levee degrade (captured in next section below)

Length	=	650.0	FT	Length from L-67 canal to end of discharge canal
Total Depth	=	6.8	FT	Assume average depth of canal

Thickness of Organic	=	1.5	FT						
Thickness of Cap Rock	=	5.3	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1						
Bottom Width	=	40.0	FT						
Top Width	=	67.0	FT						
Cross Section	=	361.1	SF						
Cross Section Organic	=	96.0	SF						
Cross Section of Cap Rock	=	267.1	SF						
Surface Area of Canal	=	43,550.0	SF	=	1.0	ACRE			
Pete Organic	=	62,400.0	CF	=	**2,311.1**	BCY	=	2,888.9	LCY
Cap Rock Volume	=	173,628.0	CF	=	**6,430.7**	BCY	=	9,646.0	LCY
Haul road length	=	650.0	FT						
Haul road width	=	14.0	FT						
Haul road thickness	=	1.0	FT						

Levee Degrade (Degrade down to surface elevation canal/box culvert excavation captured above)

Length	=	175.0	FT						
Height	=	7.0	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1						
Top width	=	14.0	FT						
Bottom Width	=	42.0	FT						
Cross Section	=	196.0	SF						
Surface Area of Levee	=	13,406.7	SF	=	0.3	ACRE			
Volume	=	34,300.0	CF	=	**1,270.4**	BCY	=	1,588.0	LCY
base area of levee	=	7,350.0	SF	=	816.7	SY	=	0.2	Acre
side slopes of levee	=	10,956.7	SF	=	1,217.4	SY	=	0.3	Acre
roadway area	=	2,450.0	SF	=	272.2	SY	=	0.1	Acre

Inlet and Outlet Works

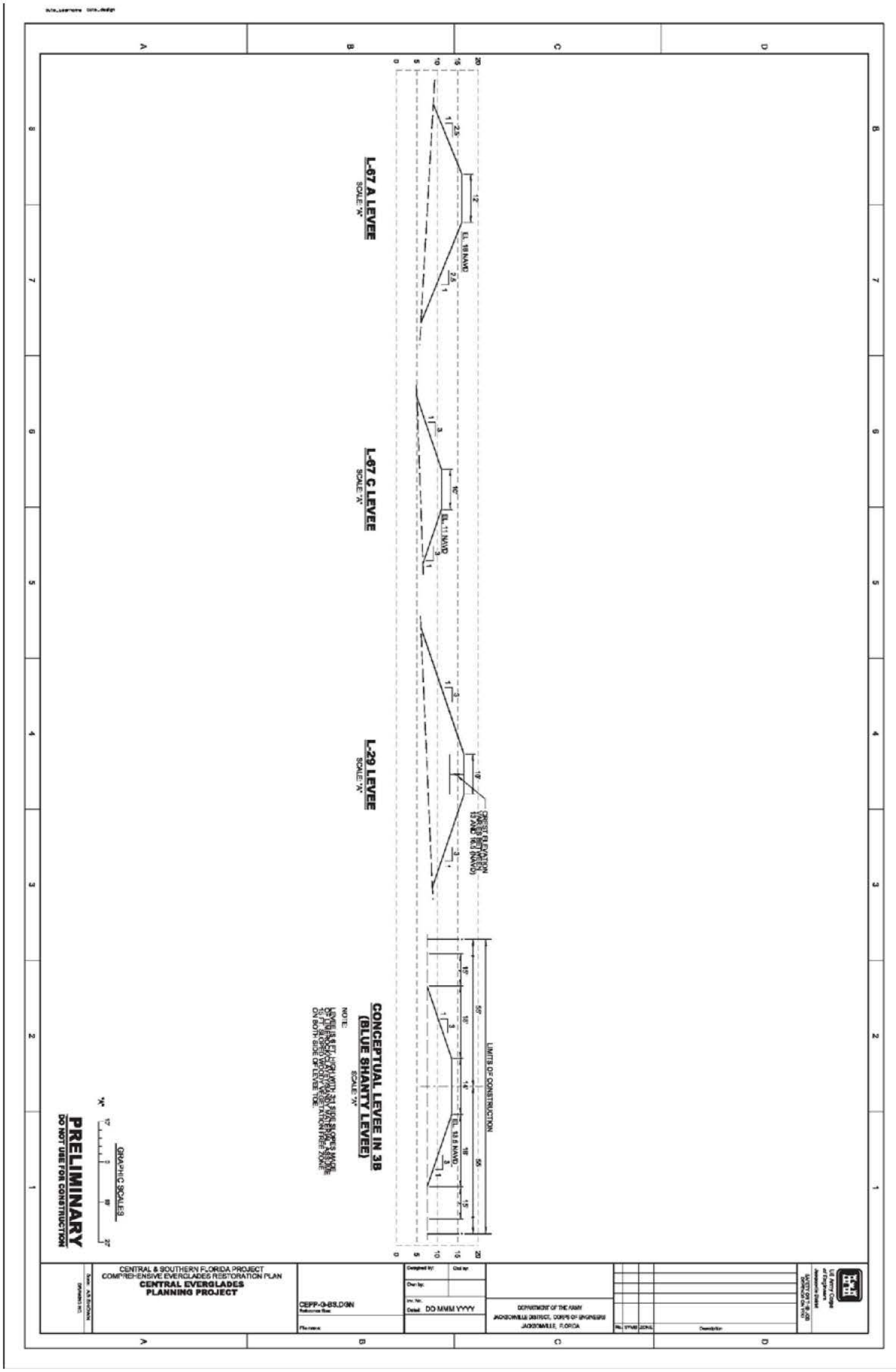
Number	=	4.0	EA	assumed intake/outlet are the same assumed 2 per each end gate and bulkhead
Foundation				

Length	=	8.0	FT						
Depth	=	5.0	FT						
Width	=	30.5	FT						
Volume	=	4,880.0	CF	=	180.7	CY			
Head Walls									
Height	=	20.5	FT						
Thickness	=	3.0	FT						
width	=	19.0	FT						
openings	=	121.0	SF						
volume	=	3,222.0	CF	=	119.3	CY			
End walls									
height	=	20.5	FT						
length	=	100.0	FT	total either inlet or outlet					
thickness	=	2.0	FT						
volume	=	8,200.0	CF	=	303.7	CY			
Railing	=	358.0	LF						
Ladders	=	2.0	EACH						
height	=	20.5	FT						
Gates IN HHD									
Height	=	14.0	FT	*** STAINLESS STEEL for opening 7 by 7					
Width	=	10.0	FT						
Weight	=	6,500.0	LB						
Weight Per SF	=	46.4	LB/SF						
NEW GATES									
number of gates	=	4.0	EA	assumed 2 on each end 1 gate and one bulkhead.					
Height	=	18.0	FT	assumed 4 ft larger than similar gate					
Width	=	14.0	FT	assumed 4 ft larger than similar gate					
Weight % larger	=	10.0	%	assumed					
Total Weight of gates	=	12,870.0	LB EA						
Motors	=	4.0	EA						
Gear Reduction	=	4.0	EA						
Actuators	=	4.0	EA						
cable reels	=	4.0	EA						
Imbeds for gate	=	138.0	LF						
Gate Seal Length	=	256.0	LF						
Operations building									
size	=	315.0	SF	8 by 8					
Electrical	=	NEEDED							
Communications	=	NEEDED							
Backfill									
Area above Culvert	=	180,900.0	CF	=	**6,700.0**	ECY	=	7,571.0	LCY
Levee Construction	=	34,300.0	CF	=	**1,270.4**	ECY	=	1,435.5	LCY
Cut off walls									
Number	=	1.0	EA	Assumed in FEB perimeter Levee					
Soil Bentonite Fill									

Height	=	25.0	FT					
Width	=	50.5	FT					
Thickness	=	8.0	FT					
Volume	=	10,100.0	CF/EA	=	374.1	CY/EA		
Cutoff Wall								
Height	=	35.0	FT					
Width	=	50.5	FT					
Thickness	=	3.0	FT					
Volume	=	5,302.5	CF/EA	=	196.4	CY/EA		
Area	=	1,767.5	SF/EA					
RIP RAP								
common both sides								
number of placements	=	2.0	EA	1 each side				
Length	=	20.0	FT					
Width	=	30.5	FT					
thickness	=	4.0	FT					
Volume	=	2,440.0	CF/EA	=	90.4	CY/EA		
Total Volume	=	180.7	ECY	=	289.2	TON		
Boat Barrier								
Number	=	2.0	EA					
Length	=	67.0	FT					
Total Length	=	134.0	FT					
SWPPP								
Silt Fence	=	1,750.0	FT					
Site Fence								
Length	=	1,000.0	FT	Assumed				
gates	=	4.0	FT	assumed				
Earthen Cofferdam								
Length	=	350.0	FT	Assumed				
Cross Section	=	196.0	SF	ASSUMED SAME AS LEVEE DEGRADE				
Fill volume	=	68,600.0	CF	=	2,540.74	ECY	=	2,871.04 LCY
removal volume	=	68,600.0	CF	=	2,540.74	BCY	=	3,175.9 LCY

Feature of Work:	GAP LEVEE L-67C FOR ~6000 LF
Scope Given:	Degrade 6000 feet of L-67C just east of L-67D and export material.
Reference for Scope Basis:	Engineering Appendix, March 2013
Scope Assumptions:	- Assume levee cross section is 10 ft wide top, 5 ft tall (10ft NGVD and Ground elevation 5 ft NGVD) with 3:1 side slopes for the entire 6000 LF length per Annex C2. Assume that top 6 in of material on levee is unsuitable and will be hauled to a disposal site. - Assume that all material coming from the levee will need processing prior to reuse as backfill.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	- Survey site and stake entire length of canal. - Install floating turbidity boom and silt fence along the entire length of the canal. Floating turbidity boom and silt fence maintenance will be ongoing during construction of the canal. Maintenance of existing levee access road will be on going throughout construction. - Clear and grub entire site to remove vegetation and organic materials. Haul to disposal location. - Excavate levee haul to processing. - Place Riprap on ends of excavated levee.
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: L-67C Gap



Feature of Work:	GAP LEVEE L-67C FOR ~6000 LF

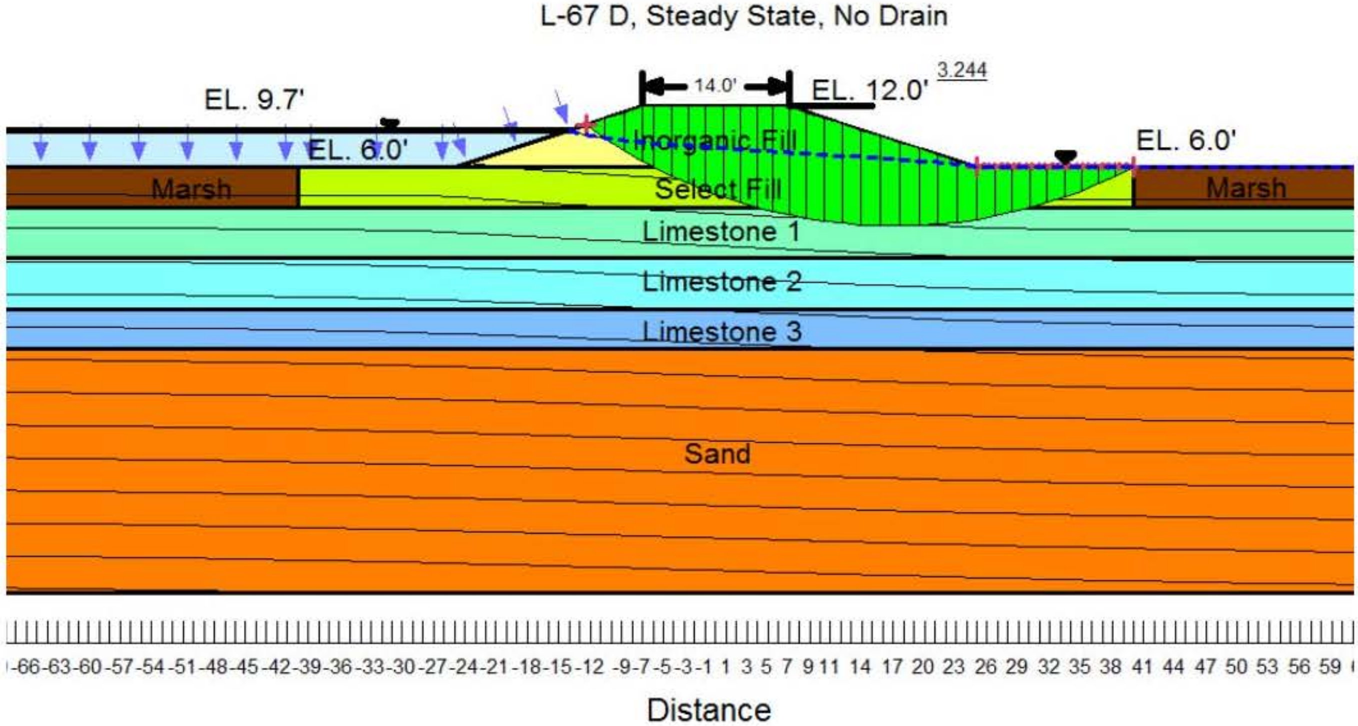
Quantity Take Off:

Levee Removal

Length	=	6000.0	FT		1.14	Miles	=	6000	FT
Height	=	5.0	FT						
Slope1	=	3.0	:1						
Slope2	=	3.0	:1						
Top width	=	10.0	FT						
Bottom Width	=	40.0	FT						
Unsuitable Material	=	0.5	FT						
Cross Section	=	125.0	SF						
Surface Area of Levee	=	439,473.3	SF	=	10.1	ACRE			
base area of levee	=	240,000.0	SF	=	26,666.7	SY	=	5.5	Acre
side slopes of levee	=	379,473.3	SF	=	42,163.7	SY	=	8.7	Acre
roadway area	=	60,000.0	SF	=	6,666.7	SY	=	1.4	Acre
volume of unsuitable	=	219,736.7	CF	=	8,138.4	BCY	=	10,173	LCY
usable volume	=	530,263.3	CF	=	19,639.4	BCY	=	24,549	LCY
Total Volume	=	750,000.0	CF	=	27,777.8	BCY			

Feature of Work:	L-67D NEW LEVEE IN WCA 3B
Scope Given:	L-67D is a new levee in WCA 3B. L-67D is approximately 8.5 miles long and connects from L-67A to L-29. It has a 14 crest width, 3:1 side slopes, and is 6 ft high.
Reference for Scope Basis:	Engineering Appendix, March 2013, Table A-1, p. 10
Scope Assumptions:	- Assumed material must be removed to the level of the rippable rock to allow for a stable levee foundation. - Assumed side slopes of excavation at a 1:2 slope. Assumed the excavated area will be backfilled with levee material. - Assume 6 ft of organic material will be removed and re-spread on the constructed levee. - Assumed Plantings: All plantings on levees will be native grasses.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	- Site survey and stake entire length and width of Levee. - Silt Fence the entire site. Silt fence maintenance will be ongoing during construction of the Levee. - Clear and grub entire site to remove vegetation and organic materials. Organic materials will be stockpiled on site to be spread as dressing on the new levee.. - Excavate Common Material to rock depth. Common material will be hauled to on site processing plant assumed side slopes of excavation at 1V:2H. - Build Levee compacting in 6-12 inch lifts hauling processed material from processing plant to levee location. - Plant Grasses on side slopes.
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: L-67D



Feature of Work:	L-67D NEW LEVEE IN WCA 3B

Quantity Take Off:

Levee Construction

Length	=	44,880.0	FT		8.5	Miles	=	44,880.0	FT
Height	=	6.0	FT						
Slope1	=	3.0	:1						
Slope2	=	3.0	:1						
Top width	=	14.0	FT						
Bottom Width	=	50.0	FT						
Cross Section	=	192.0	SF						
Surface Area of Levee	=	4,602,164.6	SF	=	105.7	ACRE			
Volume	=	8,616,960.0	CF	=	**319,146.7**	ECY	=	360,635.7	LCY
base area of levee	=	2,244,000.0	SF	=	249,333.3	SY	=	51.5	Acre
side slopes of levee	=	3,973,844.6	SF	=	441,538.3	SY	=	91.2	Acre

Levee Sub Surface Excavation

Thickness of Organic	=	6.0	FT						
Total depth	=	6.0	FT						
bottom width	=	86.0	FT						
Slope of Excavation	=	2.0	:1						
Top Width of Excavation	=	110.0	FT						
Excavation of Organic	=	588.0	SF						
Volume of Organic	=	26,389,440.0	CF	=	**977,386.7**	BCY	=	1,221,733.3	LCY
Total Excavation	=	26,389,440.0	CF						
Total Backfill of Excavation	=	26,389,440.0	CF	=	**977,386.7**	ECY	=	1,104,446.9	LCY

Site Restoration

area next to levees	=	2,692,800.0	SF	=	299,200.0	SY
Road length	=	44,880.0	FT			
Road width	=	14.0	FT			
minimum thickness	=	0.5	FT			
Volume to Remove	=	11,635.6	BCY	=	14,544.4	LCY

Feature of Work:	LEVEE REMOVAL OF ~8 MILES OF L-67C LEVEE

Scope Given:	The levee removal of 8 miles from L-67C levee south to intersection of L-67A/L-67C for new 3B Levee. L-67C canal i not backfilled.

Reference for Scope Basis:	Engineering Appendix, March 2013, Table A-1, p. 10

Scope Assumptions:	- Assume levee cross section is 10 ft wide top, 5 ft tall (10ft NGVD and Ground elevation 5 ft NGVD) with 3:1 side slopes for the entire 8 Mile length. - Assume that top 0.5 ft of material on levee is unsuitable and will be hauled to a disposal site. - Assume that all material coming from the levee will need processing prior to reuse as backfill.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

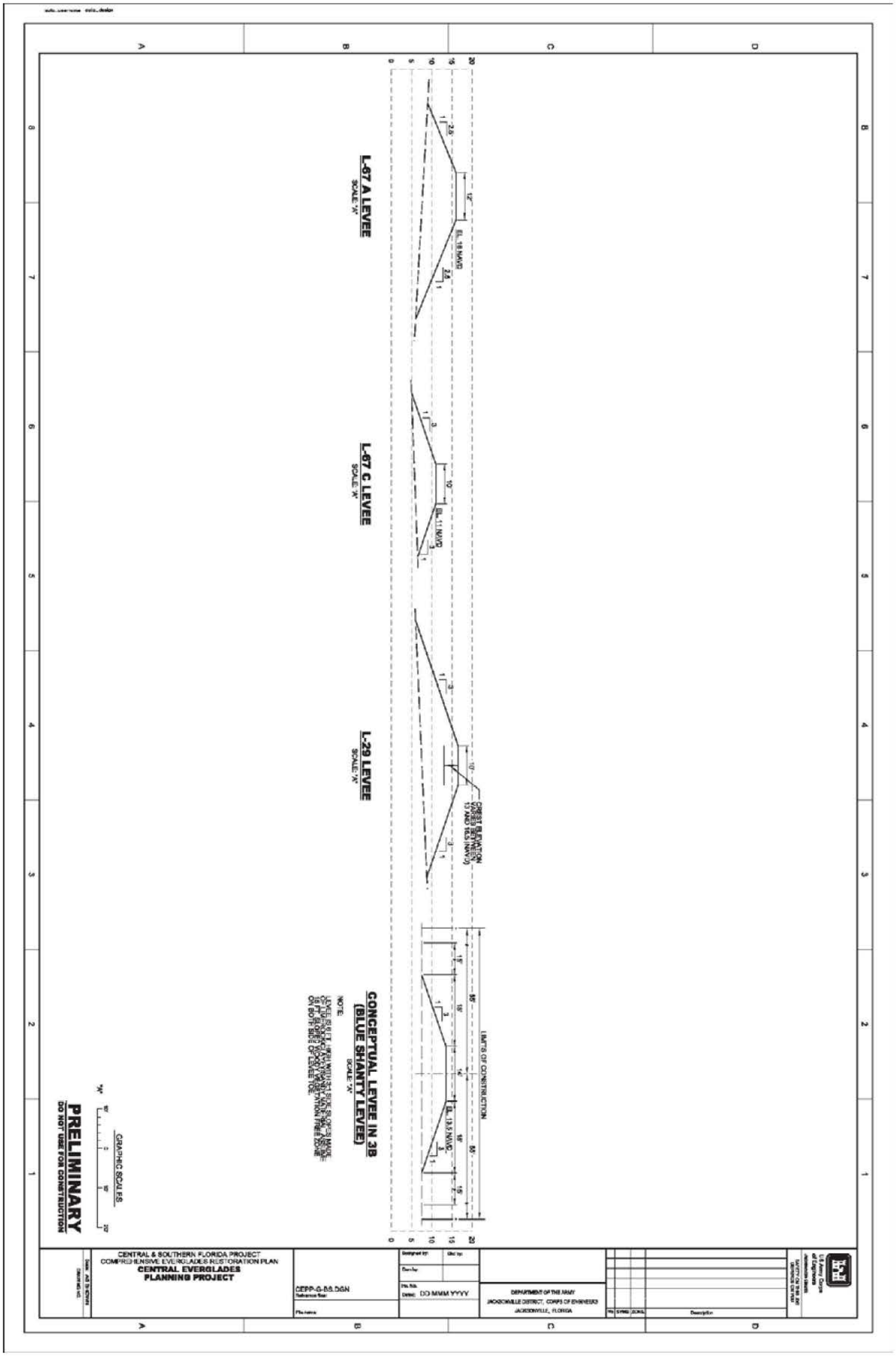
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	- Survey site and stake entire length of canal. - Install floating turbidity boom and silt fence along the entire length of the canal. Floating turbidity boom and silt fence maintenance will be ongoing during construction of the canal. Maintenance of existing levee access road will be on going throughout construction. - Clear and grub entire site to remove vegetation and organic materials. Haul to disposal location. - Excavate levee haul to processing. - Place Riprap on ends of excavated levee.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: L-67C Removal



Feature of Work:	LEVEE REMOVAL OF ~8 MILES OF L-67C LEVEE

Quantity Take Off:

Levee Removal

Length	=	42240.0	FT		8.0	Miles	=	42240	FT
Height	=	5.0	FT						
Slope1	=	3.0	:1						
Slope2	=	3.0	:1						
Top width	=	10.0	FT						
Bottom Width	=	40.0	FT						
Unsuitable Material	=	0.5	FT						
Cross Section	=	125.0	SF						
Surface Area of Levee	=	3,093,892.2	SF	=	71.0	ACRE			
base area of levee	=	1,689,600.0	SF	=	187,733.3	SY	=	38.8	Acre
side slopes of levee	=	2,671,492.2	SF	=	296,832.5	SY	=	61.3	Acre
roadway area	=	422,400.0	SF	=	46,933.3	SY	=	9.7	Acre
volume of unsuitable	=	1,546,946.1	CF	=	57,294.3	BCY	=	71,618	LCY
usable volume	=	3,733,053.9	CF	=	138,261.3	BCY	=	172,827	LCY
Total Volume	=	5,280,000.0	CF	=	195,555.6	BCY			

Feature of Work:	S-355W - Gated Spillway 1230 CFS In L29 Canal, East of L67 D

Scope Given:	The S-355W structure is a gated spillway located at the southern extent of the proposed L-67D levee. The purpose the S-355W is to convey water from the L-29 Canal within the Blue Shanty Flow way, eastward towards the existing 334 spillway to provide assistance in meeting ENP ecological objectives. The structure is a three-bay gated spillway with a design capacity of 1,230 cfs and hydraulic head of 1.0 foot. The design flow was set to match the capacity of 334. The spillway consists of three bays with dimensions of 12 ft wide by 8 ft high. The crest invert elevation is set 4.00 ft NGVD. The upstream and downstream aprons are set at elevation -4.00 ft NGVD with a width and length of 36.0 feet and 42.5 feet, respectively.

Reference for Scope Basis:	Engineering Appendix, March 2013 Table A-31 A.7.4.3 Overflow Spillways A.7.3.3.2.1.2 Gated Spillways

Scope Assumptions:	- Assume similar to structure S-65EX. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure. - Assume aprons are in addition to the concrete structure shown in the provided drawings. - Assume power for the structure will be provided from local power lines located .5 miles from the structure. - Assume Structure will be constructed in two phases and not require a bypass canal. - Assume 0 ft of organic material, 7.5 ft of cap rock requiring blasting and the remainder will be inter-bedded material. - Assume 50 ft deep sheet pile 1000 ft long. - Assume dimensions of existing canal L-29 canal, top width 140 ft, bottom width, 50 ft, 22.5 ft deep with side slope of 1:2. - Assume dewatering will be ongoing through feature of work utilizing rim ditch dewatering - Assume 35 KW Diesel Generator with 1000 gallon above ground tank.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

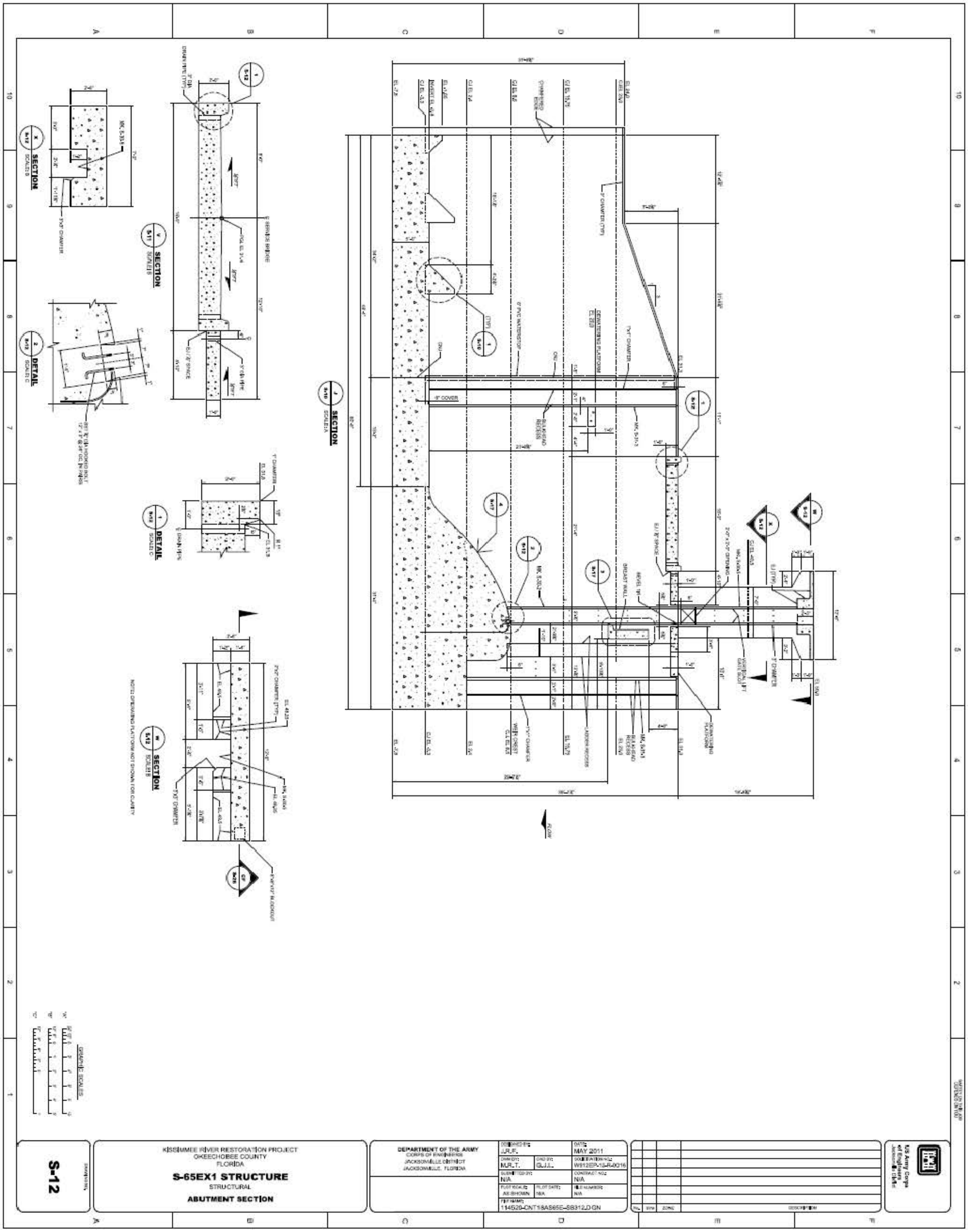
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	- Sheet pile will be installed to work on each of the two phases of construction working from the north to the south - Excavation of materials to allow for construction of the foundation of the cross canal gate structure and the canal apron/wing wall. Construction of concrete work for structure followed by apron and wing walls. Backfill suitable material around the structure and import riprap. Construct control station, diesel generator, and fuel storage. Pla gates and other associated closure devices for the gate structure.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: S-355W Gated Spillway 1230 CFS



Feature of Work:	DISTRIBUTION - LEVEE REMOVAL OF L67C FOR NEW 3B LEVEE

Quantity Take Off:

Structure Dimensions and volumes

Underwater Concrete Seal Volume (Unreinforced	=	3,318.5	CY	Underwater concrete is not reinforced, 10 ft thick 56 ft wide and 160 ft long			
Number of Gates	=	3.0	EA				
tower cross section	=	144.9	SF				
number of towers	=	4.0	EA				
pier cross section	=	154.1	SF				
number of Piers	=	2.0	EA				
tower width	=	3.5	FT				
Pier Height	=	35.0	FT				
beam cross section	=	15.0	SF				
volume of elevated beam	=	540.0	CF	=	20.0	CY	
OGEE volume							
OGEE Spillway volume	=	5,180.4	CF	=	191.9	CY	
Spillway wall volume (Abutment)	=	1,153.3	CY	Structure is 90' long and cross section of wall is 173 SF			
Approach apron	=	283.3	CY	Assumed 36ft long 42.5 ft wide and 5 ft thick per S-65EX design			
Stilling Basin	=	283.3	CY	Assumed 36ft long 42.5 ft wide and 5 ft thick per S-65EX design			

Wing Walls Assumed approach wing walls similar to downstream wing wall plan from S-65EX-1 with anchor walls. Construction will consist of driven sheet pile with a 2'x2' concrete pile cap. The anchor walls will be 1 ft thick reinforced concrete. Concrete anchor wall dimensions will match wing wall dimensions. The wing wall and concrete anchor wall will be connected by #10 all thread grade 70. A C8x18.75 channel will be attached to the back of the wing wall where the anchors will be attached to.

wing walls						
Number	=	4.0	Each			
Length average US and DS	=	95.5	FT			
US Depth	=	44.5	FT			
DS Depth	=	26.5	FT			
area of sheet pile	=	13,561.0	SF			
Pile Cap						
height	=	2.0	FT			
width	=	2.0	FT			
volume	=	56.6	CY			
Rod length	=	60.0	FT			
spacing	=	4.0	FT			
number of rods	=	96.0	EA	total length	=	5,760.0 FT
Anchor Walls						
height	=	8.0	FT			
thickness	=	1.0	FT			
length	=	382.0	FT			
volume	=	113.2	CY			

Rip Rap				Lengths and depths assumed to extend beyond aprons.
Length	=	440.0	FT	
width	=	36.0	FT	
Depth	=	3.0	FT	average of all depths
volume	=	1,760.0	CY	

Excavation for Footing Volume	=	89,600.0	CF	Assume 56' wide (per width of channel) by 60 ft long (per S-65EX) and 10' deep to allow for construction of the underwater seal and structural footings. Assume bottom of canal requires blasting to remove rock.
	=	**3,318.5**	BCY	
	=	4,977.8	LCY	
Excavation east and west canal banks for installation of	=	108,000.0	CF	Total depth 22.5'. Assume excavation is 160 ft long and extends the bottom of the canal an additional 15' per bank. Assume material is common or rippable as it is the bank of a levee.
	=	**4,000.0**	BCY	
	=	6,000.0	LCY	
Sheet pile/cofferdam	=	1,000.0	LF	Assume 1000 LF of sheet pile/cofferdam to go around entire work site. Sheet pile will be driven 60ft deep. All sheet pile used as a coffer dam will be removed.
Area	=	60,000.0	SF	

Gate weight calculations

3/8" Plate steel	=	15.3	lb/sq ft				
1/2" Plate steel	=	20.4	lb/sq ft				
1" Plate Steel	=	40.8	lb/sq ft				
Gate Skin 3/8" Plate Steel	=	392.0	sq ft	Assume Gate dimensions of 14'x28'			
3/8" Plate stiffeners and seal angles	=	87.0	sq ft	Assume 5 sq ft for seal angles and 82 for stiffeners			
Horizontal C-Channels (1/2")	=	607.0	sq ft	Assume each channel is equivalent to 26"x28' (10 Channels).			
Vertical C-Channels	=	303.0	sq ft	Assume each vertical channel is 26"x14' (10 Channels).			
Pull Pad eyes (1")	=	4.0	sq ft	Assume 4 pad eyes per gate @ 1 sq ft each			
Total 3/8" Plus 10% for misc. items	=	526.9	sq ft	=	8,061.6	lbs	
Total 1/2" plus 15% for misc items	=	1,046.5	sq ft	=	21,348.6	lbs	
Total 1" steel	=	4.0	sq ft	=	163.2	lbs	
lbs/sq ft for 28'x14' gate	=	75.4	lb/sq ft				
Area of single S-355W Gate	=	165.0	sq ft				assumed 3 ft bigger then opening in each direction
Approximate weight of S-355W Gate	=	12,448.0	lb				
Overweight factor for larger gates (10%)	=	13,692.8	LB EA	total of 3 needed.			

Precast Concrete Control Building / Generator Shelter

Shelter square footage	=	315.0	sq ft	Assume Shelter will be 10' tall and have a 8" concrete block partition wall full height. Assume one 4'-4" steel door and one 3'-4" door. Assume 4 3' x 5' Louvers along with a generator radiator
Excavation/backfill for shelter	=	163.3	ECY	Building will be set on grade with 12" capillary water barrier and geotextile fabric and a 12" thick concrete curb around the building
Generator Fuel Tank	=	1000 Gallon		
Fuel Pad dimensions	=	96.0	SF	Assume 8'x12'x12" thick reinforced concrete slab on grade pad.

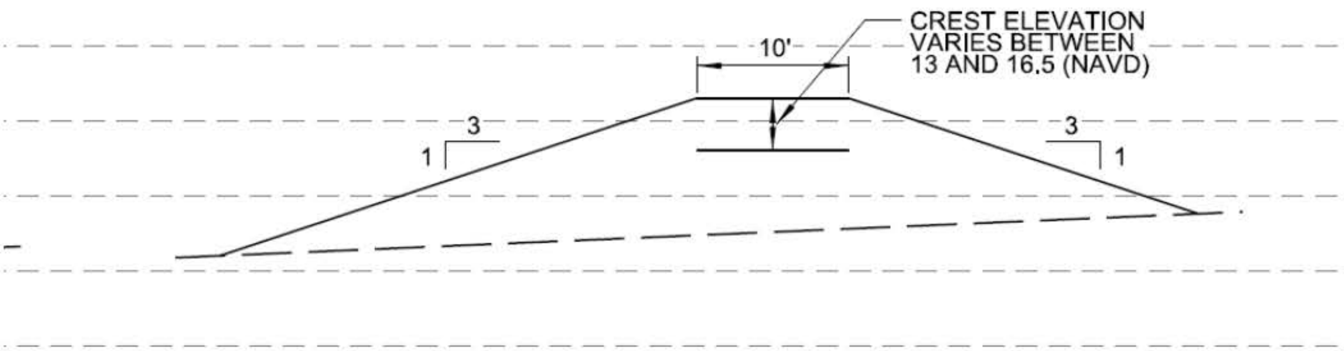
Gate embeds/seal lengths

Gate Dimensions						
Width	=	15.0	FT			
Height	=	11.0	FT			
Gate well Height	=	42.0	FT			
Gate Well Embed	=	99.0	FT			
Total Embed length	=	297.0	FT	3 gates		
Seal Length	=	52.0	FT	seal length is the perimeter of bottom and both sides.		
Total Seal length	=	156.0	FT	total of 3 gates		
Up and Downstream Bulkhead Slot	=	588.0	FT	6 times vertical plus width of new gate per slot		
Bulkheads	=	13,692.8	LB EA	assume same size as gates		
number	=	6.0	EA	two per gate needed		
Total Length of imbeds	=	885.0	FT			
Total Weight of gates and stop logs	=	123,234.9	LB	=	61.6	TON

'OTAL J BULB for GATES AND STOP LOGS	=	468.0	FT			
Backfill						
Backfill around structures	=	**4,000.0**	ECY	=	4,520.00	LCY
Removal of Sheet Pile	=	1,000.0	LF	@ 60 ft deep		
Area	=	60,000.0	SF			
Railings and ladders						
Railing						
Length	=	760.0	FT	assumed 4 time the length of a wing wall and 6 times the width of the structure and twice the length		
Height	=	3.5	FT			
Ladders						
Count	=	6.0	EA	assumed ladders on each side of the structure.		
Height	=	17.5	FT	average of all three types		
total height	=	105.0	FT			
Boat Barrier						
Number	=	2.0	EA			
Length each	=	142.0	FT			
Total Length	=	284.0	FT			
Site Fencing						
Length	=	1,000.0	FT	assumed a total of 1000 LF of chain link fencing.		
Gates	=	4.0	EA	assumed		
Access road						
Length	=	300.0	FT	assumed		
Width	=	14.0	FT	assumed		
Area	=	4,200.0	SF	=	466.7	SY
SWPPP						
Length	=	800.0	LF			
Floating Silt Boom	=	600.0	LF			

Feature of Work:	LEVEE REMOVAL OF L-29
Scope Given:	The levee removal of 4.3 miles from ValuJet monument to L-67D levee intersection with L-29 levee.
Reference for Scope Basis:	Engineering Appendix, March 2013, Table A-1, A.7.2 GEOTECHNICAL DESIGN, ANNEX C2. CIVIL PLATES
Scope Assumptions:	- Assume that top 0.5 ft of material on levee is unsuitable and will be hauled to a disposal site. - Assume that all material coming from the levee will need processing prior to reuse as backfill. - Assume top width is 10 ft, base elevation of 6 ft NAVD and average crest elevation of 16 ft NAVD.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	- Survey site and stake entire length of levee. - Install floating turbidity boom and silt fence along the entire length of the canal. Floating turbidity boom and silt fence maintenance will be ongoing during construction. Maintenance of existing levee access road will be on going throughout construction. - Clear and grub entire site to remove vegetation and organic materials. Haul to disposal location. - Excavate levee haul to processing. - Place Riprap on ends of excavated levee.
Key Outstanding Questions/Issues:	

Representative Drawings/Photos: Levee Removal of L-29



L-29 LEVEE

SCALE: "A"

Feature of Work:	LEVEE REMOVAL OF L-29

Quantity Take Off:

Levee Removal

Length	=	22704.0	FT		4.3	Miles =	=	22704	FT
Height	=	10.00	FT						
Slope1	=	3.0	:1						
Slope2	=	3.0	:1						
Top width	=	10.0	FT						
Bottom Width	=	70.0	FT						
Unsuitable Material	=	0.5	FT						
Cross Section	=	400.0	SF						
Surface Area of Levee	=	1,662,967.0	SF	=	38.2	ACRE			
base area of levee	=	1,589,280.0	SF	=	176,586.7	SY	=	36.5	Acre
side slopes of levee	=	1,435,927.0	SF	=	159,547.4	SY	=	33.0	Acre
roadway area	=	227,040.0	SF	=	25,226.7	SY	=	5.2	Acre
volume of unsuitable	=	831,483.5	CF	=	30,795.7	BCY	=	38,495	LCY
usable volume	=	8,250,116.5	CF	=	305,559.9	BCY	=	381,950	LCY
Total Volume	=	9,081,600.0	CF	=	336,355.6	BCY			

Feature of Work:	ROAD REMOVAL OF TAMIAMI TRAIL

Scope Given:	Remove approximately 6 miles of Old Tamiami Trail between the Everglades National Park (ENP) Tram Road and th L-67 Extension Levee.

Reference for Scope Basis:	Engineering Appendix, March 2013, Section A-2, p. 8

Scope Assumptions:	- Assume road is covered with 3 inches of asphalt. - Assume road width is 30 FT. - Assume height of road is 5 ft above natural grade with side slopes of 2:1. - Assume power lines will have to be relocated along the current Tamiami Trail. - Assume that all material coming from the levee will need processing prior to reuse as backfill. - Assume all asphalt is hauled off site to disposal. - Assume dense vegetation on the side slopes of the road will need to be removed.

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

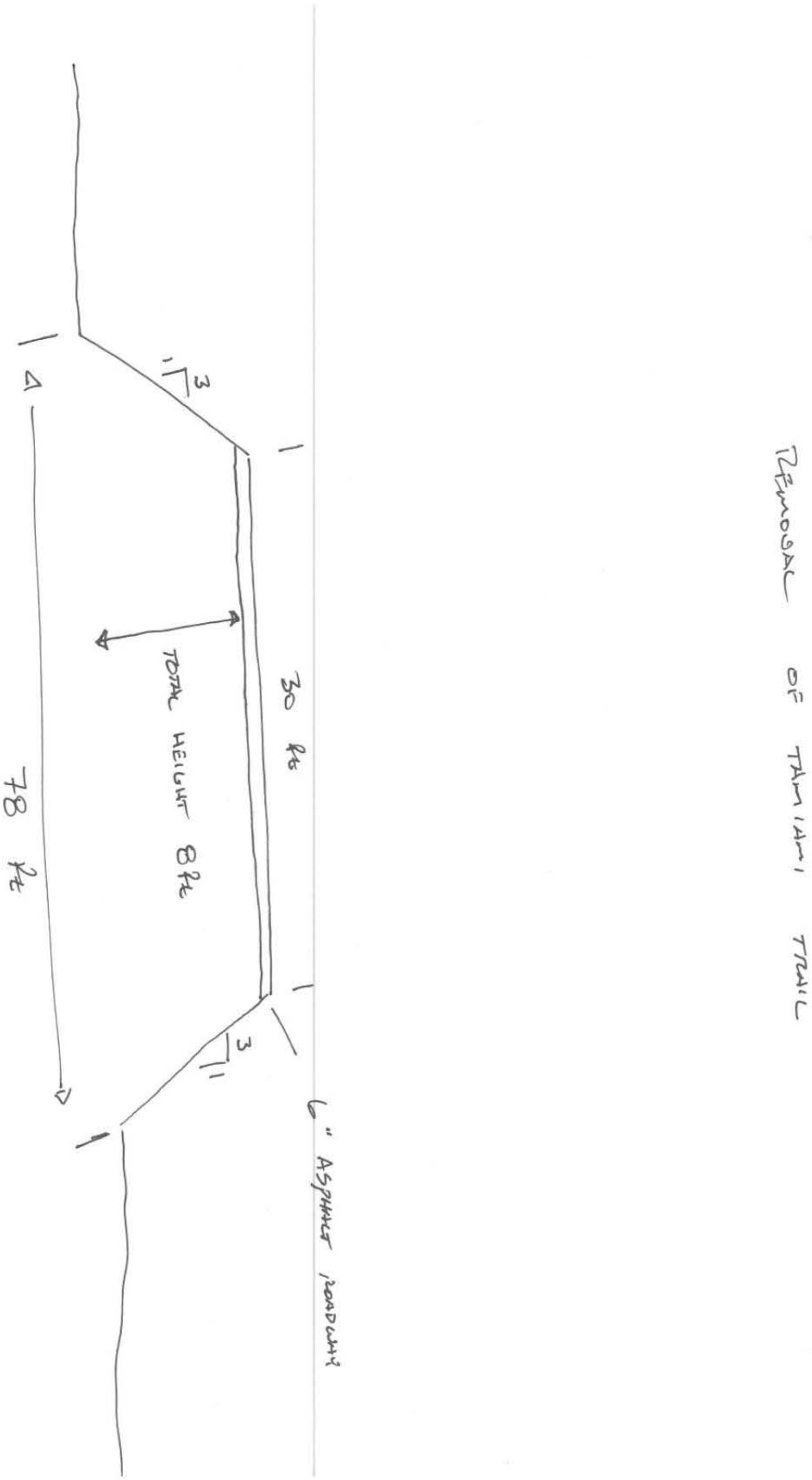
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	- Site survey and stake entire area of the road removal. - Silt Fence and floating turbidity boom the entire site. Silt fence and floating turbidity boom maintenance will be ongoing during construction. - Install new power lines along the Current alignment of the Tamiami Trail. - Remove existing power lines along the old Tamiami Trail. - Remove asphalt and haul to offsite disposal. - Remove road prism and haul to processing.

Key Outstanding Questions/Issues:	No information for dimensions of road (depth, width, material, etc.) and no information on extent of road removal was provided.

Representative Drawings/Photos: Road Removal of Tamiami Trail



Feature of Work:	ROAD REMOVAL OF TAMIAMI TRAIL

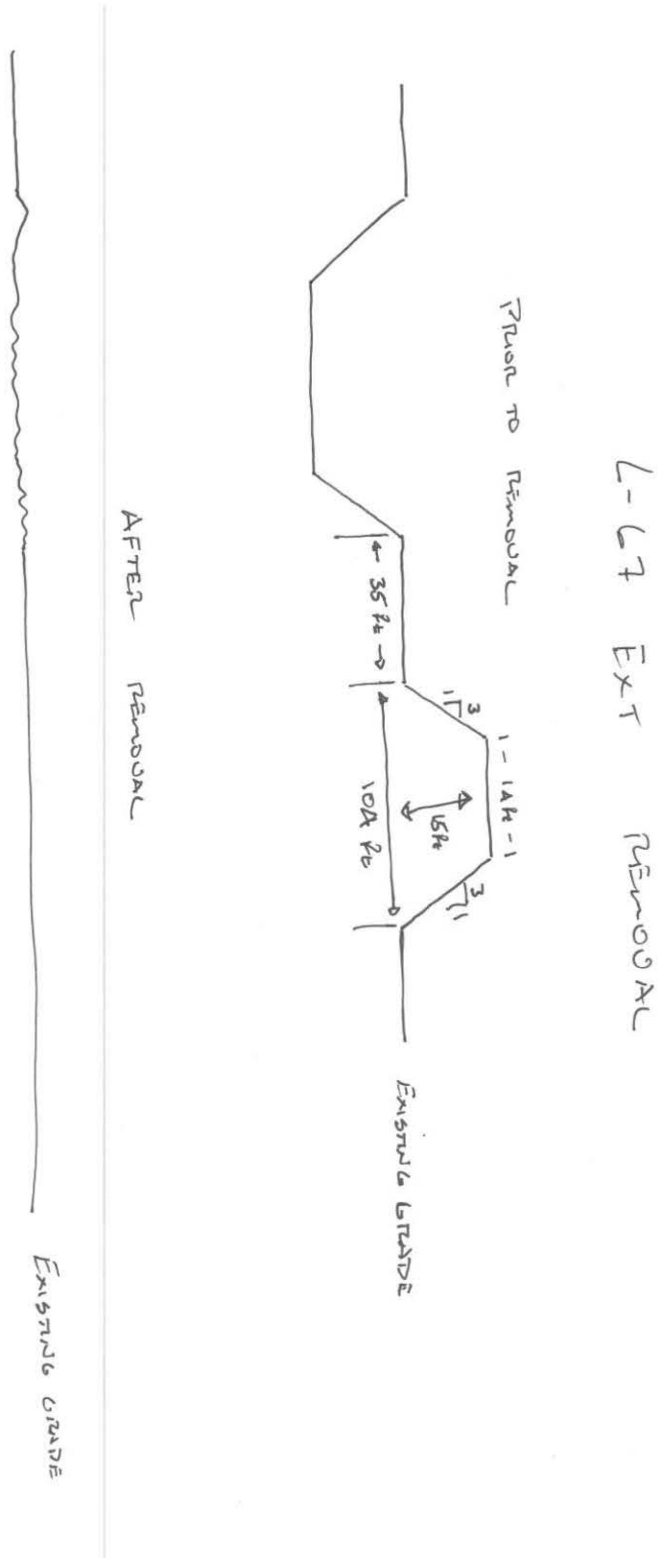
Quantity Take Off:

Road Way Removal

Length	=	31,680.0	FT		6.0	Miles	=	31,680.0	FT
Height	=	5.0	FT						
Slope1	=	2.0	:1						
Slope2	=	2.0	:1						
Top width	=	30.0	FT						
Bottom Width	=	50.0	FT						
Cross Section	=	200.0	SF						
Surface Area of Prism	=	5,200,718.0	SF	=	119.4	ACRE			
Volume	=	6,336,000.0	CF	=	**234,666.7**	BCY	=	293,333.3	LCY
base area of Prism	=	1,584,000.0	SF	=	176,000.0	SY	=	36.4	Acre
side slopes of Prism	=	4,250,318.0	SF	=	472,257.6	SY	=	97.6	Acre
roadway area	=	950,400.0	SF	=	105,600.0	SY	=	21.8	Acre
Asphalt Thickness	=	3.0	IN						
Asphalt Volume	=	237,600.0	CF	=	8,800.0	BCY			

Feature of Work:	DEGRADE LEVEE L-67 EXTENSION FOR 5.5 MILE SECTION
Scope Given:	Complete removal of approximately 5.5 miles of L-67 Extension Levee. The material removed from the L-67 Extens Levee will then be used to backfill the L-67 Extension Canal.
Reference for Scope Basis:	Engineering Appendix, March 2013, Table A-1, p. 11
Scope Assumptions:	- Assume Height of levee is 8 ft top width of levee is 10 ft side slopes of levee are 3:1. - Assume canal dimensions will allow for full disposal of levee. - Assumed 35 ft between canal and levee western toe. - Assume that no processing will be required prior to placing into the canal. - Assume no compaction of material required.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	- Site survey and stake entire area of the levee removal. - Silt Fence and floating turbidity boom the entire site. Silt fence and floating turbidity boom maintenance will be ongoing during construction. - Excavate levee and back fill canal. Material will be piled in the canal and allowed to settle. - Plant native vegetation, remove silt fence and survey site.
Key Outstanding Questions/Issues:	No dimensions of levee to be degraded and no dimensions of canal to be filled were given.

Representative Drawings/Photos: Degrade L-67 EXT



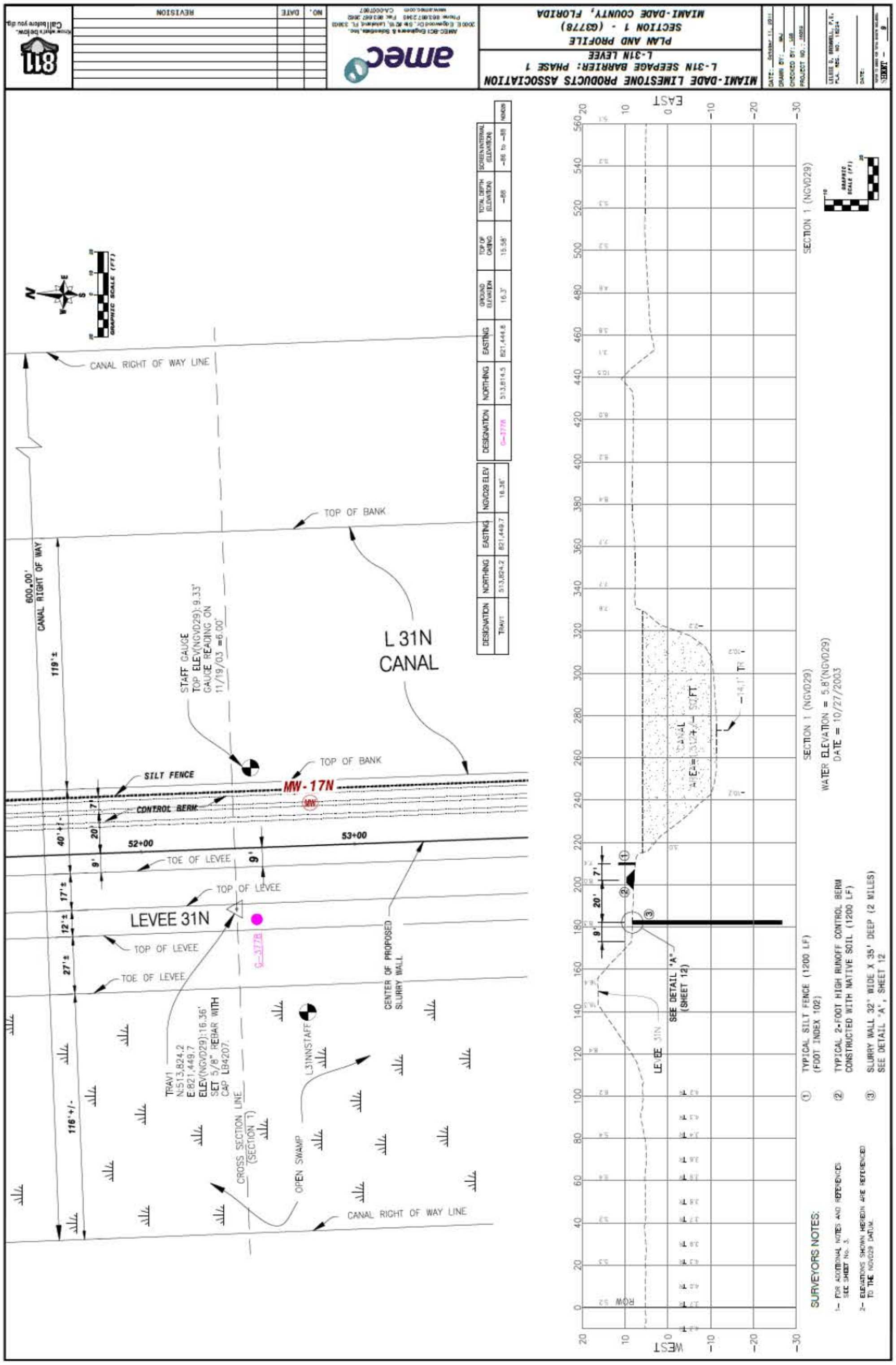
Feature of Work:	DEGRADE LEVEE L-67 EXTENSION FOR 5.5 MILE SECTION

Quantity Take Off:

Levee Removal or Construction

Length	=	29,040.0	FT		5.5	Mi		29040.00	FT
Height	=	8.0	FT						
Slope1	=	3.0	:1						
Slope2	=	3.0	:1						
Top width	=	10.0	FT						
Bottom Width	=	58.0	FT						
Cross Section	=	272.0	SF						
Surface Area of Levee	=	2,068,970.9	SF	=	47.5	ACRE			
Volume	=	7,898,880.0	CF	=	**292,551.1**	BCY	=	365,688.9	LCY
base area of levee	=	1,684,320.0	SF	=	187,146.7	SY	=	38.67	Acre
side slopes of levee	=	1,836,650.9	SF	=	204,072.3	SY	=	42.16	Acre
roadway area	=	290,400.0	SF	=	32,266.7	SY	=	6.67	Acre

Feature of Work:	SEEPAGE BARRIER CUTOFF WALL IN L-31N LEVEE
Scope Given:	Construct a seepage barrier cutoff wall in the L-31N Levee just south of the Tamiami Trail. The Wall will be made from Soil Cement Bentonite (SCB) and approximately 3.5 miles long, 3 feet wide, and 35 feet deep.
Reference for Scope Basis:	Engineering Appendix, March 2013, Table A-1, p. 11
Scope Assumptions:	- Assume similar to structure L-31N Seepage Barrier – Phase 1. - Assume given dimensions in the engineering appendix govern over provided design documents for similar structu if no dimensions are given in the engineering appendix all dimensions will come from the similar structure.
Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)
Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.
Sequence of Work:	- Site survey and stake entire area of the cutoff wall. - Silt Fence and floating turbidity boom the entire site. Silt fence and floating turbidity boom maintenance will be ongoing during construction. - Install Monitoring Wells. - Install soil-cement-Bentonite wall, backfill and compact top of wall and plant with native grasses.
Key Outstanding Questions/Issues:	


L 31N
CANAL
LEVEE 31N
CANAL RIGHT OF WAY LINE
TOP OF BANK
SILT FENCE
MW-17N
CONTROL BERM
TOE OF LEVEE
TOP OF LEVEE
CENTER OF PROPOSED SLURRY WALL
OPEN SWAMP
CROSS SECTION LINE (SECTION 1)
STAFF GAUGE
SECTION 1 (NGVD29)
SURVEYORS NOTES:
TYPICAL SILT FENCE (1200 LF) (FOOT INDEX 102)
TYPICAL 2-FOOT HIGH RUNOFF CONTROL BERM CONSTRUCTED WITH NATIVE SOIL (1200 LF)
SLURRY WALL 32" WIDE X 35' DEEP (2 MILES) SEE DETAIL "A", SHEET 12
EAST
WEST

Feature of Work:	SEEPAGE BARRIER CUTOFF WALL IN L-31N LEVEE

Quantity Take Off:

Seepage Cut Off								
Length	=	22,176.0	FT					
Depth	=	35.0	FT					
thickness	=	3.0	FT					
Area of wall	=	776,160.0	SF					
volume of wall	=	2,328,480.0	CF	=	86,240.0 BCY			
Borings								
Spacing	=	200.0	FT					
Number per spacing	=	1.0	EA					
total number needed	=	111.0	EA					
Depth	=	35.0	FT		assumed full depth			
Diameter	=	4.0	IN	=	339.0 CF	=	2536 Gallon	
Total Depth	=	3,885.0	FT					
S-C-B mixture								
weight of mix	=	2,300	LB/CY					
weight of instiu material	=	3,800	LB/CY					
Weight of mix installed	=	850	LB/CY					
Material removed from site	=	22%						
Volume removed from site	=	19,291	BCY	=	24,113.2 LCY			
Site Work								
Silt Fence	=	22,176.0	FT					
Silt Boom	=	22,176.0	FT					
Clearing and Grubbing	=	665,280.0	SF	=	73,920.0 SY		assumed a 30 ft width	
Site Restoration	=	73,920.0	SY	=	15.3 ACRE			
Haul Road Maintenance	=	34,496.0	SY					
Berm Size	=	0.25	ECY/LF					
Volume of berm	=	5,544.0	ECY					

Feature of Work:	STRUCTURAL REMOVAL OF FLASH BOARD CULVERT

Scope Given:	Remove flash board culvert S-346 from old Tamiami Trail if approximately 5.5 miles of the L-67 Extension Levee is removed.

Reference for Scope Basis:	Engineering Appendix, March 2013, Table A-1, p. 11

Scope Assumptions:	- Assume road to be removed is 250 feet in length - Assume road is covered with 3 inches of asphalt. - Assume road width is 30 FT. - Assume height of road is 12 ft above bottom of culvert with side slopes of 2:1. - Assume that all material coming from the levee will need processing prior to reuse as backfill. - Assume all asphalt is hauled off site to disposal. - Assume dense vegetation on the side slopes of the road will need to be removed. - Assume culvert length is 100 ft - Assume culvert dimensions from the design documentation of similar structures is correct. - Assume all culvert steel material will be hauled off site -Assume no backfill is needed

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

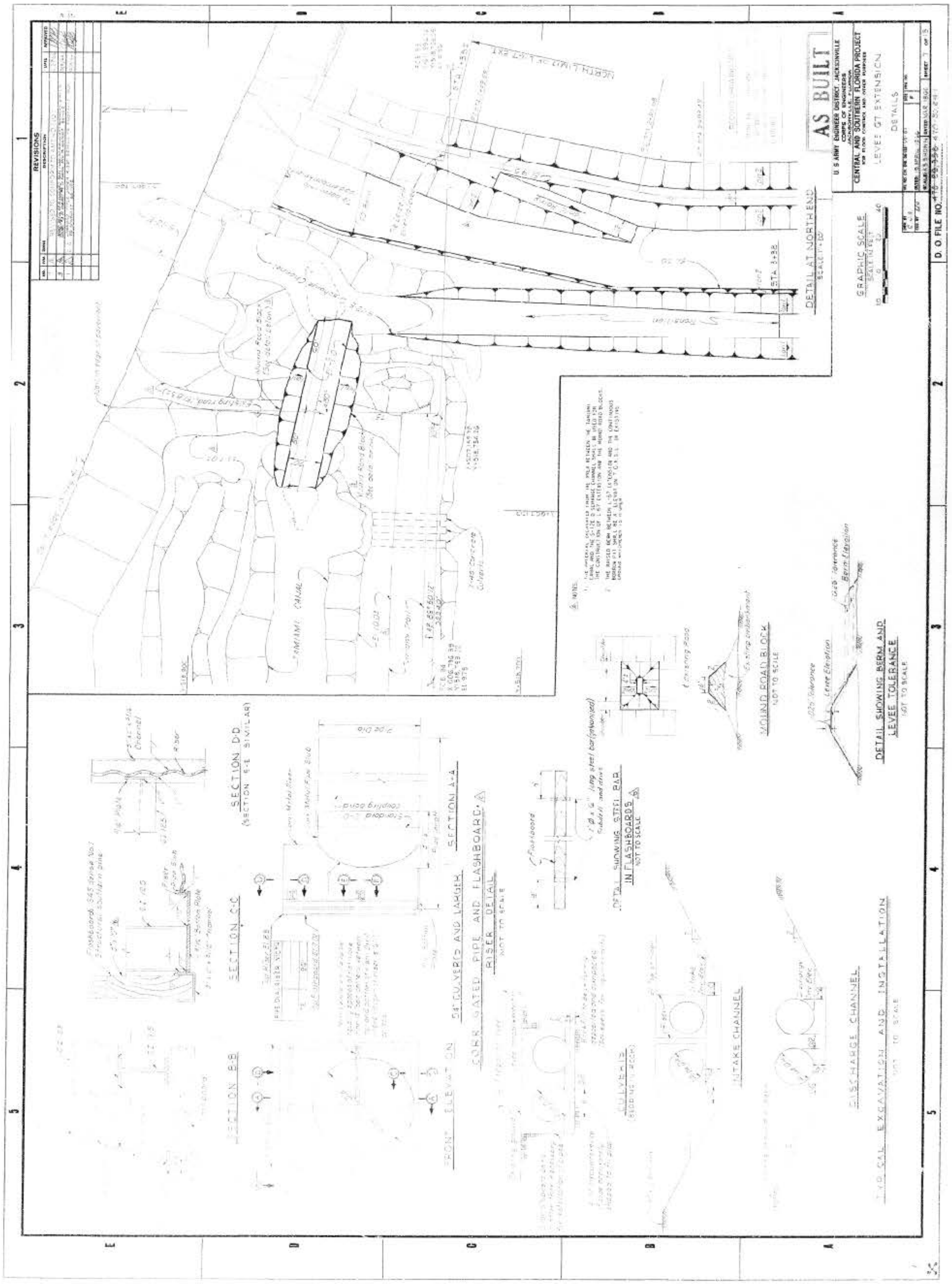
Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	- Site survey and stake entire area of the road removal. - Silt Fence and floating turbidity boom the entire site. Silt fence and floating turbidity boom maintenance will be ongoing during construction. - Remove asphalt and haul to offsite disposal. - Remove road prism and haul to processing. - Remove existing flashboard culvert and haul to offsite disposal - Remove silt fence and turbidity boom and restore site.

Key Outstanding Questions/Issues:	Appendix mentions a design capacity of 165 CFS. This is the only mention in Table A-1 of a structure being removec having a design capacity. At this time there is not sufficient data to estimate the removal of the structure more information is needed. Drawings of Structure and drawings or condition of site after removal are needed to estima this feature. Information was provided.

Representative Drawings/Photos: Structural Removal of Flashboard Culvert



Feature of Work:	STRUCTURAL REMOVAL OF FLASH BOARD CULVERT

Quantity Take Off:

Road Way Removal

Length	=	250.0	FT							
Height	=	12.0	FT							
Slope1	=	2.0	:1							
Slope2	=	2.0	:1							
Top width	=	30.0	FT							
Bottom Width	=	78.0	FT							
Cross Section	=	648.0	SF							
Surface Area of Prism	=	41,041.0	SF	=	0.9	ACRE				
Volume	=	162,000.0	CF	=	6,000.0	BCY	=	7,500.0	LCY	
base area of Prism	=	19,500.0	SF	=	2,166.7	SY	=	0.4	Acre	
side slopes of Prism	=	33,541.0	SF	=	3,726.8	SY	=	0.8	Acre	
roadway area	=	7,500.0	SF	=	833.3	SY	=	0.2	Acre	
Asphalt Thickness	=	3.0	IN							
Asphalt Volume	=	1,875.0	CF	=	69.4	BCY				

Structure Demo

CMP

No. of Barrels	=	2.0	EA		
Diameter of Culvert	=	72.0	IN	6.0	FT
Length of Culvert	=	100.0	FT		
Diameter of Riser	=	96.0	IN	8.0	FT
Height of Riser	=	12.0	FT		

Misc Metal Demo

C3x2x3/16 Weight	=	4.5	LB/FT		
Total length	=	64.0	FT	288.0	LB
I 6x12.5 Weight	=	12.5	LB/FT		
Total length	=	80.0	FT	1000.0	LB
PL 3/16" Weight	=	7.7	LB/FT^2		
Total Area	=	64.0	FT^2	490.2	LB
Total Metal Weight	=	1778.2	LB	0.9	TONS

Feature of Work:	L-67A Spoil Mounds in the Vicinity of S-631, 632 and 633

Scope Given:	Removal of spoil along the western L-67A canal in the vicinity of the new control structures.

Reference for Scope Basis:	Engineering Appendix, March 2013, p. A-8 Line 77.

Scope Assumptions:	- Assume Spoil mound dimensions similar to those along the Miami Canal and average 475 ft long and 130 ft wide a measured from Google Earth. Average height above 10.0 ft elevation is 3.5 ft. - Assume top width of L-67A is 110 ft (as measured from Google Earth). - Assume L-67A canal is 20 ft deep. - Assume a flexible float barge and conveyor will transport excavated mound material across canal to the crest of tl levee and deposited into a dump truck be transported to a spoil site for later use. - Assume a Dozer and excavator will excavate the spoil mound and load onto the conveyor. - Assume 3 upstream and 3 downstream of the proposed structures will be degraded (18 total). - Assume each spoil mound is 1.5 acres. - Assume silt fence will be required around perimeter of spoil mound and a floating silt boom required up and dow stream of the spoil mound. - Assume all material is levee grade material. - Assume excavated material will be hauled and stored near S-333 for later use or material is deposited along the L 67D levee for immediate use and average haul distance to the spoil mounds is 10 miles

Supporting Documentation: (by Cost Team)	Quantity Takeoff, Material Quotes

Class of Estimate	Class 3 - Baseline (Feasibility/DPR/LRR)

Estimate Methodology:	When possible a corollary approach to the estimate development was utilized. Plans and specifications for recent similar work were utilized to capture the necessary scope and assumptions to construct the feature. The scope anc assumptions were documented and sent to the design team for review. After reaching consensus on the scope anc major assumptions, the labor, equipment, materials, and production rates were developed for the estimate.

Sequence of Work:	- Site survey and stake entire area of the road removal. - Silt Fence and floating turbidity boom the entire site. Silt fence and floating turbidity boom maintenance will be ongoing during construction. - Install and anchor floating plant and conveyor. - Excavate material and deposited it on the east side of the levee for a truck turnaround. -Excavate and haul material to S-333 area for use on L-67D levee.

Key Outstanding Questions/Issues:	

Representative Drawings/Photos: L-67A Spoil Mounds in the Vicinity of S-631, 632 and 633

Feature of Work:	L-67A Spoil Mounds in the Vicinity of S-631, 632 and 633

Quantity Take Off:

Spoil Mounds

Length	=	475.0	LF			
Width	=	130.0	LF			
depth	=	3.5	LF			
Perimeter	=	1,210.0				
Surface Area	=	61,750.0	SF			
Volume	=	216,125.0	CF	=	8,005	BCY

Total volume for all 18 spoil mounds = 144,090.0 BCY

Haul Road Maintenance

Assume 15 ft wide and 10 miles long

88,000.0 SY

Cut Fill Study

	Excavation									
	organic		common		Cap Rock Material		Inter-bedded Material		Levee Excavation	
Structure	BCY	LCY	BCY	LCY	BCY	LCY	BCY	LCY	BCY	LCY
S-333	10,022.2	12,527.8	-	-	52,970.4	79,455.6	40,443.3	60,665.0	8,848.9	11,061.1
S-356	39,802.3	49,752.8	-	-	17,219.0	25,828.5	-	-	11,150.9	13,938.6
S-631	4,744.4	5,930.6	-	-	10,697.3	16,046.0	-	-	3,811.1	4,763.9
S-632	4,744.4	5,930.6	-	-	10,697.3	16,046.0	-	-	3,811.1	4,763.9
S-633	4,744.4	5,930.6	-	-	10,697.3	16,046.0	-	-	3,811.1	4,763.9
L-67C Gap	8,138.4	10,173.0	-	-	-	-	-	-	19,639.4	24,549.2
L-67D	977,386.7	1,221,733.3	-	-	-	-	-	-	11,635.6	14,544.4
L-67C	57,294.3	71,617.9	-	-	-	-	-	-	138,261.3	172,826.6
S-355W	-	-	-	-	3,318.5	4,977.8	4,000.0	6,000.0	-	-
L-29	30,795.7	38,494.6	-	-	-	-	-	-	305,559.9	381,949.8
Remove TT	-	-	-	-	-	-	-	-	234,666.7	293,333.3
L-67Ext	-	-	-	-	-	-	-	-	292,551.1	365,688.9
L-31N	-	-	-	-	-	-	-	-	86,240.0	107,800.0
S-346	-	-	-	-	-	-	-	-	6,000.0	7,500.0
L-67A Spoils									144,090.0	180,112.5
TOTAL	1,137,672.9	1,422,091.1	-	-	105,599.9	158,399.9	44,443.3	66,665.0	1,270,076.9	1,587,596.2

	Fill	
	Levee Quality Material	
Structure	ECY	LCY
S-333	6,577.8	7,432.9
S-356	37,436.9	42,303.7
S-631	10,511.1	11,877.6
S-632	10,511.1	11,877.6
S-633	10,511.1	11,877.6
L-67C Gap	-	-
L-67D	1,296,533.3	1,465,082.7
L-67C	-	-
S-355W	4,000.0	4,520.0
L-29	-	-
Remove TT	-	-
L-67Ext	292,551.1	330,582.8
L-31N	-	-
S-346	-	-
L-67A Spoils	-	-
TOTAL	1,668,632.5	1,885,554.7

Processed LCY	=	1,812,661.0	LCY
Needed LCY	=	1,885,554.7	LCY
rejected/unused processed	=	(72,893.6)	LCY
Needs Removed From Site	=	-4.02%	

Due to construction Sequence L-29 Levee will degraded after all other features are in place.

Processed LCY	=	1,430,711.2	LCY
Needed LCY	=	1,885,554.7	LCY
rejected/unused processed	=	(454,843.5)	LCY
Needs Removed From Site	=	-31.79%	