

Appendix III

POST JOB ANALYSIS & REVIEW

Job #:	#2510	Job Name:	84" Waterline Section I
Owner:	Any County DPW	Location:	Any State
Contract Type:	Unit Price	CM/GC:	GC
Public/Private:	Public	Low Bid or other:	Low Bid
Owner's Rep:		Owners Representative's. Phone:	
Inspector:			

Constr Mgr:		Project Mgr:	J. Smith
Expeditor:		Scheduler:	S. Smith
Project Engineer:	M. Smith	Safety:	
QA/QC:		Contract Admin:	
Bid Captain:		Office Manager:	
Project Supt:	G. Smith	Corp. Project Acct:	
Estimator:	G. Smith		

Brief Work Description:
Installation of approximately 3020' of 84" steel waterline pipe, including 4 valve vaults and a 1700' 108" tunnel. All of the tunnel work was completed by a subcontractor who was largely finished prior to XYZ Contractor setting up on the job site. The tunnel and several large underground vaults were up to 50 feet deep in certain areas.

Schedule Review– (Attachments if necessary)			
Milestone	Estimated	Actual	Variance (Description)
Notice to proceed	7/3/1996	7/3/1996	
Begin main pipe work	7/6/1996	12/17/1996	Approximately 19 days behind.
Complete tunnel	1/9/1997	1/23/1997	Approximately 8 days ahead of schedule (on top
Complete pipe	2/20/1997	9/30/1997	Final completion per XYZ Contractor.
Finish Vaults	7/7/1997	9/26/1997	Approximately 81 days behind schedule.
Job complete	8/26/1997	2/3/1998	Approximately 161 days behind schedule.
<p>This project was planned to start late due to XYZ's belief the schedule included more time than was necessary. In addition, there was a lack of crews because of other large projects - such as "355" and NFL Stadium work. There were a series of management changes including the project manager, superintendent, and project engineer which impacted the ability to smoothly complete this project. The tunnel construction proceeded from one end to the other without incident (subcontractor completed), but pipe installation went poorly. Approximately 180 feet of pipe collapsed due to grout blockage. The repair of the various pipe problems was complicated by a delay in constructing the vaults which blocked access to the pipe. The failure of the cathartic testing of the line slowed completion as the reason for the failure was investigated. It was never determined what exactly went wrong and XYZ engineered an alternative solution which resulted in a claim on project that was \$23,000. The owner assessed liquidated damages of \$500 a day per the contract which were not ultimately paid.</p>			

Appendix III

Financial Cost Review - Unit Cost Presentation									
Original Contract *	Budget			Actual			Variance		
	Units	Cost	Unit Cost	Units	Cost	Unit Cost	Units	Cost	Unit Cost
80-10-21: Survey	1	36,415	36,415	1	12,905	12,905	-	23,510	23,510
80-11-01: Topsoil F/P	100	2,000	20	1,130	32,806	29	(1,030)	(30,806)	(9)
80-20-06: Subbase for Haul	1	18,039	18,039	1	34,429	34,429	-	(16,390)	(16,390)
80-80-02: E/L/B 84" Main	1,313	224,598	171	1,313	365,030	278	-	(140,432)	(107)
80-80-03: Cement Lining	1	135,900	135,900	1	165,244	165,244	-	(29,344)	(29,344)
80-80-05: Materials Testing	1	54,300	54,300	1	20,422	20,422	-	33,878	33,878
80-80-20: Access Air Release Valve	1	30,759	30,759	1	100,362	100,362	-	(69,603)	(69,603)
80-80-21: Access Dewatering	1	63,169	63,169	1	74,335	74,335	-	(11,166)	(11,166)
80-80-22: Support of Exc.	1	88,121	88,121	1	102,552	102,552	-	(14,431)	(14,431)
80-80-30: Tunnel Installation (Sub)	1	1,553,370	1,553,370	1	1,536,717	1,536,717	-	16,653	16,653
80-80-31: Corrosion Control (Sub)	1	107,596	107,596	1	130,061	130,061	-	(22,465)	(22,465)
80-80-99: 54" Water Main & Ftgs	1	11,907	11,907	1	30,484	30,484	-	(18,577)	(18,577)
80-90-11: Remove West Stockpile			#DIV/0!	1	18,426	18,426	(1)	(18,426)	#DIV/0!
All other unit types		2,049,033	#DIV/0!		1,949,814	#DIV/0!	-	99,219	#DIV/0!
Gen Con - Labor		\$ 130,146.07			\$ 132,996.24			\$ (2,850)	
Gen Con - Materials		\$ 5,903.00			\$ 12,254.17			\$ (6,351)	
Gen Con - Subcontracts		\$ 475,795.02			\$ 467,456.58			\$ 8,338	
Gen Con - Equipment		\$ 48,241.00			\$ 92,921.77			\$ (44,681)	
Gen Con - Other								\$ -	
								\$ -	
Overhead/Profit		\$ 691,474			\$ 331,901			\$ (359,573)	
								\$ -	

Change Orders	Budget			Actual			Variance		
	Units	Cost	Unit Cost	Units	Cost	Unit Cost	Units	Cost	Unit Cost
Unit type 1			#DIV/0!			#DIV/0!	-	-	#DIV/0!
Unit type 2			#DIV/0!			#DIV/0!	-	-	#DIV/0!
Unit type 3			#DIV/0!			#DIV/0!	-	-	#DIV/0!
Unit type 4			#DIV/0!			#DIV/0!	-	-	#DIV/0!
Unit type 5			#DIV/0!			#DIV/0!	-	-	#DIV/0!
All other unit types			#DIV/0!			#DIV/0!	-	-	#DIV/0!
Overhead			#DIV/0!			#DIV/0!	-	-	#DIV/0!
Profit			#DIV/0!			#DIV/0!	-	-	#DIV/0!

* ATTACHED COST REPORTS AS NECESSARY

Appendix III

Financial Cost Review - Standard Presentation							
Original Contract *	General Conditions			Direct Costs			Descriptions
	Estimated	Actual	Variance	Estimated	Actual	Variance	
Labor	130,146	132,996	(2,850)	138,441	342,223	(203,782)	General conditions on this project were in excess of the budget in large part due to the lengthy delays which were not planned.
Burden			0			0	
Premium			0			0	
Material	5,903	12,254	(6,351)	1,488,792	1,518,378	(29,586)	
Subcontracts	475,795	467,457	8,338	2,558,810	2,425,338	133,472	
Equipment	48,241	92,922	(44,681)	189,164	287,648	(98,484)	
Miscellaneous			0			0	
Overhead & Profit	691,474	331,901	359,573			0	
			-			-	
			-			-	

Contract Reconciliation			
	%	\$	Descriptions
Estimated	12.07%	\$ 5,726,766	
Actual	5.92%	\$ 5,611,117	
Change Orders / Extras	-2.02%	\$ (115,649)	
TOTAL:		\$ 5,611,117	

Major Suppliers Rating			
Work Description	Company	Rating Scale: (X) Poor-Average-Good-Excellent	Explanation
84" steel water line (80-80-01)	Pipe	Average	Material quality control was below average but this is in large part due to the owner designing very thin pipe. This frequently resulted in out of round connections that would not fit together. Corrective response time was good and firm was flexible in dealing with problems.
Butterfly valves - 84" & 54" (80-80-23)	Valve	Excellent	No Problems and very timely delivery.
Aggregate/sand/ topsoil	Aggregate Supplier 1	Poor	Provided a specialty material (stone dust) which was delivered by the truck load but was contracted for by the ton. This created problems in determining exactly what amount of material was delivered to the job site. Sand deliveries were satisfactory. Would not recommend this supplier again..
Misc. Metal Supplier	Contracor Inc.	Good	

Appendix III

Major Subcontractors Rating (Subcontractor reports MUST BE attached)			
Work Description	Company	Rating Scale: (X) Poor-Average-Good-Excellent	Explanation
Tunnel boring and pipe-in-tunnel installation & grouting	Company 1	Good	Overall good performance. Caused a delay due to defective grouting procedures.
Construction of concrete vaults	Company 2	Poor	Terminated for non-performance; subcontractor abandoned site and was never heard from again they ultimately went bankrupt. This firm was selected to meet the 15% minority requirement.
Construction of concrete vaults	Company 3	Excellent	On time delivery of structures; quality product; proactive resolution of problems.
Installation of reinforcing steel	Company 4	Poor	Could not keep up with project demands; poor safety practices; had an accident on project. Firm was selected to meet minority requirement and would not use this firm again.
Cement lining of pipeline	Company 5	Poor	This firm did not honor subcontract and did not want to do work. They were subsequently terminated for non-performance.
Cement lining of pipeline	Company 6	Excellent	On time delivery of cement lining; good quality of work; experienced supervision during installation. First rate, first class.
Hauling excess material	Company 7	Poor	Could not provide serviceable equipment to fulfill jobsite requirements. Minority hauler, cheap price. Service was poor. Gypsy drivers. Company ultimately went out of business.
Installation of erosion control devices & landscaping	Company 8	Good	Good quality of work; overall good performance.

Owner Rating	
Owner Expectations	To complete project on time and in good working condition.
Did We Meet Expectations	No.
Our Expectations	To complete project on time and within budget.
Did We Meet Expectations	No.
Owner Construction Experience	Limited-relied on consultant for most decisions regarding the contract.
Rating Scale: (X)	
Poor Average Good Excellent	
Rating of Owner	Poor - largely due to relationship with inspector and owners representative. The inspector was very strict and perhaps over-zealous. Baltimore county has proven to be a difficult owner to work with.

Extras:	
Actual billing for extras:	Minor change orders except for engineering of alternative cathartic protection system. This was billed and ultimately contested by the owner.

Dollars for other work?	None.
-------------------------	-------

Appendix III

Job Planning:

Was there consistent use of a Short Interval Planner?

Prepared by job team and consistently looked ahead of work but estimated production rates were not achieved. The project engineer was responsible for filling out this plan. The lack of a superintendent and the use of a working foreman who did not actively participate in the preparation of this schedule minimized its effectiveness.

Was there pre-job planning documentation before the job started?

No - the changes in estimator, project manager, superintendent, etc resulted in very little coordination prior to the start of this project.

If yes, please attach pre-job document:

N/A

Estimate

Positives:

- | | |
|---|---|
| 1 | Bid with the right tunnel subcontractor who performed well on this project. |
| 2 | Traditionally, a coated concrete pipe would have been used on this project, but XYZ Contractor used steel pipe. This eased the installation of the pipe and prevented problems that would have been created had concrete been utilized. These potential problems were in part driven by the subcontractor who was suppose to complete this work refusing to honor their subcontracts. |
| 3 | XYZ Contractor had some experience with Contractor 10 but their performance was average. The project manager on the projects is responsible for selecting subcontractors. |
| 4 | This project was very concrete intensive and we performed well on these items typically. |
| 5 | |

Items to change:

- | | |
|---|---|
| 1 | Production rate of 60' of pipe per day in bid was unrealistic, considering the strict specifications regarding pipe installation. On best days only achieved 40' or basically two pieces of pipe and excavation for third segment. The use of more experienced and capable supervision would have positively effected this project. |
| 2 | No allowance for bad weather in bid. |
| 3 | Support of excavation for deep pipe trenches was not accounted for in bid. |
| 4 | A minority set aside on project of 15%+ made it difficult to find qualified subcontractors and suppliers who were familiar with this type of work. |
| 5 | |

Appendix III

Operations	
Positives:	
1	Pipeline tested successfully for holding pressure with only minor corrections needed.
2	Project was bid expecting the use of excavator and relatively shallow cuts for pipe installation. Decided in the field to use a traditional trench box system which worked better due to the reach of the excavator and the shortness of the run - approximately 400 feet of pipe.
3	
4	
5	
Items to change:	
1	No capable Superintendent was assigned to the project and project was run without adequate field support.
2	Project was left dormant for 4 months following notice-to-proceed.
3	Request to change inspector should have been made.
4	The use of an alternative method of trenching from what was bid resulted in an additional number of units that required storage and hauling to get them to the storage site.
5	

General Comments	
1	Inspector was very strict and XYZ Contractor should consider asking for a more experience individual be supplied by County. Could possible consider interviewing the inspector in advance if possible.
2	Project was greatly damaged by the initial delay in starting work. Project was completed 4 months behind schedule.
3	Job cost projections did not accurately allow for productivity losses suffered late in the project.
4	Defective plans and specifications regarding cathartic protection resulted in a claim which has continued unresolved up until now.
5	Stone dust was not the best material to use. Some compaction problems due to owners and XYZ Contractor's unfamiliarity with product.

Prepared By:	Project Mgr. 1
Date Submitted:	4/11/2001

Estimate

Were equipment items sufficient? (i.e., type, quantity, & size duration)	Loaders frequently broke down, and delayed operations - these were owned items. Trucking (Company 11) was deficient due to poor equipment. Budget constraints prevented hiring/renting better equipment during this project. In hindsight, we should have rented equipment that was more reliable.
--	--

Was scope of work adequately covered?	The scope of work relating to the installation of the main waterline was not performed well due to complexity of estimating and a lack of understanding from the project team of how the job was estimated.
---------------------------------------	---

List why major activities were under/over estimate – (Direct and General Condition items)	The main waterline item went well over budget due to strict enforcement of compaction specifications by inspector and lack of field supervision from XYZ Contractor.
---	--

Which accounts/trades can be used for historical data?	Main waterline item; vault installation.
--	--

Appendix III

General Comments	
1	Original project manager left project due to health reason and replacement project manager was not as familiar with project as necessary. Pipe laying had already begin and approximately 50' was already laid.
2	
3	
4	
5	

	Prepared By:	Project Mgr. 1
	Date Submitted:	4/11/2001

Operations

How much re-work was performed?	Punchlist items were performed several times over (including silt fence on slope that repeatedly washed out). This was partially caused by the project not being considered "completed" by the owner in light of the unresolved cathartic protection claim. The result was that they continued to identify minor items they wanted corrected even though XYZ Contractor had long ago demobilized from the job site.
---------------------------------	---

Quality of craftsmen and operators?	XYZ Contractor's labor skill level was adequate overall but availability was very tight throughout the life of the project. Quality of some subcontractor's tradesmen, namely the reinforcing installation, was poor.
-------------------------------------	---

Availability of craftsmen and operators?	Fluctuated throughout the job. Project started late in small part due to lack of available crews and their use elsewhere.
--	---

Cooperation from Owner concerning:	
Extra Work Orders:	Very lacking. Owner would take a very adversarial attitude regarding any change orders to the contract.
Alternate methods:	Owner reacted very negatively to any changes proposed by the contractor. There was a strong reliance on the letter of the specifications as an end-all to all discussions of alternate methods of construction.
Acceptance of our work:	Acceptance of work was not performed in a timely manner. Inspector would delay his inspection of work until last minute, causing delays. Final completion of the project was not accepted until an alternate cathartic protection method was installed at XYZ Contractor's expense. The owner was also very strict on the requirement of backfill space which resulted in the trenching box staying in place longer than was expected. This situation limited production.
Owner's coordination of other work:	Not an issue. There was other work nearby and a tie in to the "Lisbon" line but there were minimal issues.
Owner furnished material delivery, quantity, & quality:	N/A
Approval of invoicing:	Inspector was very strict determining quantities and units completed which resulted in XYZ Contractor receiving underpayment for work performed. This was in part due to lack of skilled supervision on the job site by XYZ Contractor.
Timely payment:	
Punch list work: (as Extra Work Order of Contract)	Mainly landscaping maintenance issues, forced on by the delay of final project approval; cathartic protection alternate system submitted as EWO, still disputed.

Appendix III

Adherence to specs and standards: Owner adhered to specifications strictly, with little room for adjustments. However, standards regarding the competency of the inspection representative were not followed.

Did we submit requests for all EWO's? Yes - they were minimal and related to the cathartic protection system.

Did we charge costs for material, equipment, job overhead, & extended job overhead to Extra Work Orders? Yes - ultimately resulted in claim.

Did field management read, understand, and follow bid documents? Yes - although the thin design of the steel pipe and the use of the specialty stone dust should have been investigated further in the bid process.

Were drawing revisions charged as Extra Work Orders? No. The number and severity of change orders was small so XYZ Contractor held the cost.

General Comments	
1	Owner exhibited an adversarial relationship with contractor in most dealings regarding the project.
2	The Owner's field inspector was an employee of the designer presenting a potential conflict of interest and when problems arose concerning the design of the cathartic projection system, communication became difficult.
3	Towards the end of the project, and due to the delay in project completion, the Owner used liquidated damages as a threat to force XYZ Contractor to comply with their requests to perform maintenance duties and an alternate cathartic protection method on a substantially complete project.
4	
5	

Prepared By:	Project Mgr. 1
Date Submitted:	4/11/2001