

October 15, 2021

PROJECT: GDOT Buford Highway South Utility Relocation
CLIENT: Dekalb County, Department of Watershed Management
LOCATION: Buford Highway, Dekalb County, Georgia
AECOM PROJECT NO: 60442984 011
DOCUMENT LEVEL: 100% Design Documents
ESTIMATE NO: 16-053 25
BY: Bruce Pietkiewicz

OPINION OF PROBABLE CONSTRUCTION COST

1. Opinion of Probable Construction Cost is based on an AACE Level 2 Check Estimate and has been prepared at the request of the Atlanta, GA office to provide an Engineer's estimate of the project cost. Our Opinion of Probable Construction Cost is based on the following documents:
 - Atkins- Drawings dated August 12, 2020 (40 pages)
 - Department of Transportation, State of Georgia- Specifications dated July 17, 2013 (117 pages)
 - Bid Form- P.I. 0009400 Dekalb County- Dekalb County DWM- Water Utility dated August 11, 2020
2. Local Sales Tax is included at the rate of 8%.
3. Mobilization and Demobilization are included at the rate of 2%.
4. Safety Supplies and Equipment are included at the rate of 3%.
5. Small Tools and Equipment is included at the rate of 2% on craft labor.
6. Consumables are included at the rate of 2% on craft labor.
7. Wage Rates are based on 2021 prevailing wage rates for DeKalb County, Georgia. Total wage rate including hourly fringe and burden cost.
8. Third Party Inspections are included at the rate of 1.5%.
9. Construction General Conditions are included at the rate of 6%.
10. Our estimate is based on 2021 dollars.
11. Our estimate assumes that the project will be bid in February 2022 and that construction will start in April 2022 and last 5 months as stipulated by GDOT.
12. Escalation to June 2022 is included based on the assumption that it would be the mid-point of construction. The rate included is 2.73%.
13. Construction Risk Contingency is included at the rate of 3%.
14. Permits are included the rate of .75%.
15. All Risk Insurance is included at the rate of 2%.
16. Performance and Payment Bonds are included at the rate of 1%.
17. Typical Work Week – (1) eight-hour shift per day / (5) days per week.

18. Market Condition factor is included on labor at the rate of 2% based on the scarcity of construction labor in the Atlanta market.
19. Market Condition factor on materials is included at the rate of 7.5% based on the national shortage of materials, the increase of construction activity in the Atlanta area, and the problems associated with transporting the material to the project from across the country and within the Atlanta area.
20. General Contractor's Overhead and Profit is included at the rate of 15%.
21. The following qualifications apply to our estimate:
 - A Quantity Survey Analysis is attached to this report to present the quantities as listed on Drawing 06-0021 compared to AECOM's quantification exercise from the contract drawings.
 - A Budget Quote Analysis is attached to this report comparing our quotes from February 2020 to our current quotes from October 2021. There has been a significant increase in the cost of the pipe, valve and tapping sleeves.
 - For bid items that were not shown on the contract drawings but were listed on the Bid Form, our estimate priced the item quantities provided on the bid form.
 - **The following items were not shown on the Bid Form and are not included in our estimate:**
 - Adjust grade @ catch basin**
 - Reconstruct existing drainage inlet**
 - Convert existing catch basin to manhole**
 - Reconstruct existing catch basin**
 - Construct catch basin @ existing pipe**
 - Construct manhole @ existing pipe**
22. The following is a listing of the changes from our previously submitted OPCC dated February 21, 2020:
 - Water Line 16" decreased from 480 lf to 600 lf
 - Water Line 24" increased from 5,400 lf to 5,500 lf
 - Cut & Remove Water Main increased from 2 ea to 20 ea
 - Tapping Sleeve 24" x 16" increased from 1 ea to 2 ea
 - Gate Valve 6" increased from 2 ea to 36 ea
 - Gate Valve 8" increased from 1 ea to 2 ea
 - Gate Valve 10" decreased from 25 ea to 1 ea
 - Fire Hydrant increased from 32 ea to 34 ea
 - Remove Fire Hydrant increased from 32 ea to 34 ea
 - Cathodic Protection is now required and has been added to the estimate

23. The following items are not included in our estimate:
- Easement acquisitions
 - Agency design contingencies, project management fees or other client costs
 - Liquidated damages
 - Any other site hazardous materials, including but not limited to, PCB's, soil, water, treatment, disposal, and remediation
 - Any work associated with above normal flooding of the creek area
24. The following subcontractors and vendors have provided some budget numbers to help evaluate the cost for this project:
- American Pipe Company
 - US Pipe & Foundry Company, LLC
 - Ferguson Enterprises
 - Strack Inc.
 - Ruby Collins Inc.

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**P.I. 0009400 Dekalb County- Dekalb County DWM- Water Utility
GDOT Buford Hwy S. /SR13/US23- Water Lines (STA 136+00 thru 270+00)
Lvl 2 Engineer's Estimate 10-15-21**

Project name	GDOT Buford Highway South- New Water Lines
Document	100 % Design Development
Estimator	Bruce Pietkiewicz
Labor rate table	GA Dekalb Cnty 2021
Equipment rate table	Equip - ACM 21ld wrk
Job size	21500 lf
Duration	6 mo
Project Office	Water Utility Atlanta, GA
Principal Party	Greg Harrison
Estimating Office	Greenville, SC
Contact 1	Bruce Pietkiewicz
Contact 2	Marty Hammer
Estimate Class Lvl	2
Purpose of Estimat	Engineer's Estimate
FY Estimate	2022
Estimate Number	16-053 25
Notes	<i>The enclosed Opinion of Probable Cost is only an estimate of possible construction costs for budgeting purposes. This estimate is limited to the conditions existing at issuance and is not a guaranty of actual price or cost. Uncertain market conditions such as, but not limited to; local labor or contractor availability, wages, other work, material market fluctuations, price escalations, force majeure events and developing bidding conditions, etc. may affect the accuracy of this estimate. AECOM is not responsible for any variance from this Opinion of Probable Cost or actual prices and conditions obtained.</i>
Report format	Sorted by 'WBS Lvl 4/WBS Lvl 1/WBS Lvl 2/WBS Lvl 3' 'Detail' summary

WBS Lvl 4	Description	Takeoff Quantity	Total Cost/Unit	Total Amount	Grand Cost/Unit	Grand Total Amount	% Total
01	TRAFFIC CONTROL (150-1000)	1 ls	197,388.80	197,389	295,944.92	295,945	2.32%
02	WATER MAIN, 6 IN *** Requires Special Provision ***(670-1060)	1,500 lf	113.37	170,058	171.73	257,602	2.02%
03	WATER MAIN, 8 IN *** Requires Special Provision ***(670-1080)	1,200 lf	121.67	146,004	184.59	221,514	1.74%
04	WATER MAIN, 10 IN *** Requires Special Provision ***(670-1100)	600 lf	140.58	84,350	213.22	127,933	1.00%
05	WATER MAIN, 12 IN *** Requires Special Provision ***(670-1100)	12,100 lf	168.80	2,042,494	257.22	3,112,332	24.41%
06	WATER MAIN, 16 IN *** Requires Special Provision ***(670-1160)	600 lf	203.30	121,978	310.34	186,206	1.46%
07	WATER MAIN, 24 IN *** Requires Special Provision ***(670-1240)	5,500 lf	440.10	2,420,541	655.71	3,606,391	28.29%
08	CAP OR REMOVE EXISTING WATER MAIN *** Requires Special Provision ***(670-1500)	20 ea	884.71	17,694	1,366.07	27,321	0.21%
09	VALVE MARKER *** Requires Construction Detail ***(670-2002)	119 ea	44.73	5,322	68.45	8,146	0.06%
10	AIR RELEASE VALVE ASSEMBLY (670-2003)	3 ea	6,317.82	18,953	9,782.24	29,347	0.23%
11	BLOW-OFF ASSEMBLY, COMPLETE	4 ea	6,759.22	27,037	10,528.89	42,116	0.33%
12	SAFETY GRATE, TP 3 (668-8013)	1 ea	5,000.00	5,000	7,825.03	7,825	0.06%
13	TAPPING SLEEVE & VALVE ASSEMBLY, 8 IN X 6 IN *** Requires Special Provision ***(670-3086)	1 ea	12,000.00	12,000	16,920.11	16,920	0.13%
14	TAPPING SLEEVE & VALVE ASSEMBLY, 16 IN X 12 IN *** Requires Special Provision ***(670-3169)	1 ea	20,000.00	20,000	28,200.17	28,200	0.22%
15	TAPPING SLEEVE & VALVE ASSEMBLY, 12 IN X 8 IN *** Requires Special Provision ***(670-3127)	3 ea	10,000.00	30,000	14,100.09	42,300	0.33%
16	TAPPING SLEEVE & VALVE ASSY, 24 IN X 16 IN	2 ea	27,000.00	54,000	38,070.24	76,140	0.60%
17	TAPPING SLEEVE & VALVE ASSEMBLY *** Requires Special Provision ***(670-3015)	1 ea	100,000.00	100,000	141,000.85	141,001	1.11%
18	TAPPING SLEEVE & VALVE ASSEMBLY *** Requires Special Provision ***(670-3015)	1 ea	100,000.00	100,000	141,000.88	141,001	1.11%
19	GATE VALVE, 6 IN *** Requires Special Provision ***(670-2060)	36 ea	961.59	34,617	1,488.35	53,581	0.42%
20	GATE VALVE, 8 IN *** Requires Special Provision ***(670-2080)	2 ea	1,443.24	2,886	2,237.99	4,476	0.04%
21	GATE VALVE, 10 IN *** Requires Special Provision ***(670-2100)	1 ea	3,927.32	3,927	6,055.35	6,055	0.05%
22	GATE VALVE, 12 IN *** Requires Special Provision ***(670-2120)	26 ea	5,265.92	136,914	8,145.55	211,784	1.66%
23	GATE VALVE, 24 IN *** Requires Special Provision ***(670-2240)	10 ea	26,370.88	263,709	41,111.63	411,116	3.22%
24	FIRE HYDRANT *** Requires Special Provision (670-4000)	34 ea	3,872.28	131,658	6,034.72	205,180	1.61%
25	REMOVE EXISTING FIRE HYDRANT *** Requires Special Provision (670-9920)	34 ea	379.28	12,896	568.14	19,317	0.15%
26	WATER SERVICE LINE, 1 IN (670-5010)	1,500 lf	12.46	18,696	19.10	28,651	0.22%
27	WATER SERVICE LINE, 1 1/2 IN (670-5015)	1,500 lf	18.34	27,509	28.16	42,239	0.33%
28	WATER SERVICE LINE, 2 IN *** Requires Special Provision ***(670-5020)	1,500 lf	23.73	35,601	36.47	54,699	0.43%
29	WATER SERVICE LINE, 3/4 IN *** Requires Special Provision ***(670-5620)	1,500 lf	14.57	21,850	22.12	33,179	0.26%
30	RELOCATE EXIST WATER METER, INCL BOX *** Requires Special Provision ***(670-9730)	43 ea	916.73	39,419	1,407.60	60,527	0.47%
31	CUT & PLUG EXISTING WATER MAIN *** Requires Special Provision ***(670-1600)	26 ea	3,184.34	82,793	4,773.82	124,119	0.97%
32	ROCK EXCAVATION *** Requires Special Provision *** (670-9450)	3,018 cy	265.00	799,770	373.65	1,127,683	8.84%
33	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL REINFORCEMENT FIBER, BITUM MATL & H LIME(402-3127)	1,080 ton	18.00	19,440	25.38	27,411	0.21%
34	GR AGGR BASE CRS, INCL MATL(310-1101)	4,390 ton	18.00	79,020	25.38	111,419	0.87%
35	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2,INCL BITUM MATL & H LIME(402-3190)	1,466 ton	58.00	85,028	81.78	119,890	0.94%
36	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME(402-3121)	2,929 ton	54.00	158,166	76.14	223,015	1.75%
37	FLOWABLE FILL(600-0001)	219 cy	165.00	36,135	232.65	50,951	0.40%
38	CATHODIC PROTECTION INTEGRAL PILE JACKET *** Requires Special Provision *** (527-0500)	18,000 lf	18.72	336,960	26.40	475,117	3.73%
39	GRADING COMPLETE (210-0100)	1 ls	100,000.00	100,000	141,000.87	141,001	1.11%
40	BITUM TACK COAT (413-1000)	600 gl	97.68	58,611	148.40	89,043	0.70%
41	CLASS B CONCRETE (500-3200)	900 cy	600.00	540,000	846.01	761,405	5.97%

Estimate Totals

Description	Amount	Totals	Hours	Rate	Cost per Unit	ercent of Total
Labor	2,217,918		52,064 hrs		103.159 /lf	17.40%
Material	2,622,668				121.985 /lf	20.57%
Subcontract	3,506,383				163.088 /lf	27.50%
Equipment	251,456		7,666 hrs		11.696 /lf	1.97%
Other						
Subtotal	8,598,425	8,598,425			399.927 /lf	67.44%
Sales Tax	229,930			8.00 %	10.694 /lf	1.80%
Mobilization/Demobilization	171,969			2.00 %	7.999 /lf	1.35%
Safety Supplies and Equipment	66,538			3.00 %	3.095 /lf	0.52%
Small Tools and Equipment	44,358			2.00 %	2.063 /lf	0.35%
Consumables	44,358			2.00 %	2.063 /lf	0.35%
Subtotal	557,153	9,155,578			425.841 /lf	4.37%
3rd Party Inspections	137,334			1.50 %	6.388 /lf	1.08%
Inspections Subtotal	137,334	9,292,912			432.228 /lf	1.08%
General Conditions	557,575			6.00 %	25.934 /lf	4.37%
General Conditions Subtotal	557,575	9,850,487			458.162 /lf	4.37%
Project Cost Escalation to June 2022	268,918			2.73 %	12.508 /lf	2.11%
Escalation Subtotal	268,918	10,119,405			470.670 /lf	2.11%
Market Conditions- Labor	44,358			2.00 %	2.063 /lf	0.35%
Market Conditions- Materials	196,700			7.50 %	9.149 /lf	1.54%
Market Conditions Subtotal	241,058	10,360,463			481.882 /lf	1.89%
Contingency (%)	310,814			3.00 %	14.456 /lf	2.44%
Contingency Subtotal	310,814	10,671,277			496.338 /lf	2.44%
Permits	95,626			0.75 %	4.448 /lf	0.75%
All Risk Insurance	213,426			2.00 %	9.927 /lf	1.67%
Performance & Payment Bond	106,713			1.00 %	4.963 /lf	0.84%
Permits, Ins, & Bonds Subtotal	415,765	11,087,042			515.676 /lf	3.26%
G.C Overhead and Profit	1,663,056			15.00 %	77.351 /lf	13.04%
GC OH&P Subtotal	1,663,056	12,750,098			593.028 /lf	13.04%
Total		12,750,098			593.028 /lf	100.00%

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Duration	6 mo
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Principal Party	Greg Harrison
Estimating Office	Greenville, SC
Contact 1	Bruce Pietkiewicz
Contact 2	Marty Hammer
Estimate Class Lvl	2
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FY Estimate	2022
Estimate Number	16-053 25
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01				TRAFFIC CONTROL (150-1000)															
	1014			Traffic Controls															
		F01		Traffic Controls - Light Traffic															
			01.000	Traffic Controls - Light Traffic															
			0	Traffic Control - Flaggers (2 crews x 100 days/crew)	200 day	24.000 mh / day	4,800	38.21 /mh	183,389	-	-	-	-	70.00	14,000	-	-	197,389	295,945
02				WATER MAIN, 6 IN *** Requires Special Provision ** *(670-1060)															
	30			DI RJ Pipe															
		06		6 Inch															
			02	Excavation 4' to 8' Deep															
				Pipe Bagging Polyethylene 6" dia.	1,500 lf	80.000 lf / ch	75	177.51 /ch	3,328	0.25	368	-	-	1.11	1,666	-	-	5,362	8,051
				Trench Excav & Place Bedding 4- 8'	1,500 lf	350.000 lf / cd	240	2,345.33 /cd	10,051	-	-	-	-	2.83	4,238	-	-	14,289	21,391
				CY Trench Excavation (Volume Calculation Only) .84 cy/lf	1,260 cy														
				Utility Bed Stone 3/4" material only, .074 cy/lf	111 cy	cd / cy		1,090.02 /cd		32.47	3,604	-	-	-	-	-	-	3,604	5,640
				Utility Cover Stone 3/4" hand place, .322 cy/lf	482 cy	200.000 cy / cd	77	1,309.13 /cd	3,155	32.47	15,649	-	-	3.37	1,625	-	-	20,429	31,645
				Spoils to Waste - Hauling, .445 cy/lf	667 cy	64.000 cy / day	83	274.92 /day	2,865	-	-	-	-	3.75	2,501	-	-	5,366	8,025
				Backfill Trench-Backhoe/Truck - Spoils, .444 cy/lf	667 cy	400.000 cy / cd	93	2,345.33 /cd	3,911	-	-	-	-	2.47	1,649	-	-	5,560	8,323
				Trench Box 8' Deep	1,500 lf			-	-	-	-	-	-	1.50	2,250	-	-	2,250	3,353
				DI Pipe RJ - Class 350 (Zinc Coated) 6"	1,500 lf	34.000 lf / cd	1,412	1,333.54 /cd	58,832	26.16	39,237	-	-	-	-	-	-	98,069	149,655
	1012			Testing															
		06		6 Inch															
			HT	Hydrostatic Testing															
				Hydrostatic Testing - 2-12"	1,500 lf	0.012 ch / lf	36	90.28 /ch	1,625	0.08	123	-	-	-	-	-	-	1,748	2,630
	1018			Chlorination / Dechlorination															
		C / D		Chlorination / Dechlorination															
			C / D	Chlorination / Dechlorination															
				Chlorination / Dechlorination	1,500 lf			/lf		0.10	150	-	-	-	-	-	-	150	235
	1020			Video Inspection															
		VI		Video Inspection															
			VI 14	Video Inspection															
				Video Pipeline Inspection Subcontractor - 6 inch diameter	1,500 lf			-	-	-	-	8.82	13,230	-	-	-	-	13,230	18,654
03				WATER MAIN, 8 IN *** Requires Special Provision ** *(670-1080)															
	30			DI RJ Pipe															
		08		8 Inch															
			02	Excavation 4' to 8' Deep															
				Pipe Bagging Polyethylene 8" dia.	1,500 lf	80.000 lf / ch	75	177.51 /ch	3,328	0.26	389	-	-	1.11	1,666	-	-	5,384	8,084
				Trench Excav & Place Bedding 6- 8'	1,200 lf	350.000 lf / cd	192	2,345.33 /cd	8,041	-	-	-	-	2.83	3,390	-	-	11,431	17,113
				CY Trench Excavation (Volume Calculation Only) .79 cy/lf	948 cy														
				Utility Bed Stone 3/4" material only, .074 cy/lf	89 cy	cy / cd		/cd		32.47	2,890	-	-	-	-	-	-	2,890	4,522
				Utility Cover Stone 3/4" hand place, .271 cy/lf	325 cy	200.000 cy / cd	52	1,309.13 /cd	2,127	32.47	10,552	-	-	3.37	1,095	-	-	13,775	21,337
				Spoils to Waste - Hauling, .345 cy/lf	414 cy	64.000 cy / day	52	274.92 /day	1,778	-	-	-	-	3.75	1,553	-	-	3,331	4,981
				Backfill Trench-Backhoe/Truck - Spoils, .444 cy/lf	533 cy	400.000 cy / cd	75	2,345.33 /cd	3,125	-	-	-	-	2.47	1,318	-	-	4,443	6,651
				Trench Box 8' Deep	1,200 lf			-	-	-	-	-	-	1.50	1,800	-	-	1,800	2,682
				DI Pipe RJ - Class 350 (Zinc Coated) 8"	1,200 lf	32.000 lf / cd	1,200	1,333.54 /cd	50,008	34.03	40,841	-	-	-	-	-	-	90,848	138,928
	1012			Testing															
		08		8 Inch															
			HT	Hydrostatic Testing															
				Hydrostatic Testing - 1/2" - 12"	1,200 lf	0.012 ch / lf	29	90.28 /ch	1,300	0.08	98	-	-	-	-	-	-	1,398	2,104
	1018			Chlorination / Dechlorination															
		C / D		Chlorination / Dechlorination															
			C / D	Chlorination / Dechlorination															
				Chlorination / Dechlorination	1,200 lf			/lf		0.10	120	-	-	-	-	-	-	120	188
	1020			Video Inspection															

WBS Lvl 4	WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Cost w/o Addons & MU	Total Price w/ Addons & MU
		VI		Video Inspection															
			VI 10	Video Pipeline Inspection Subcontractor - 8 inch diameter															
				Video Pipeline Inspection Subcontractor - 8- inch diameter	1,200 lf			-	-	-	-	8.82	10,584	-	-	-	-	10,584	14,924
04				WATER MAIN, 10 IN *** Requires Special Provision ** *(670-1100)															
		30		DI RJ Pipe															
			10	10 Inch															
			02	Excavation 4' to 8' Deep															
				Pipe Bagging Polyethylene 10" dia.	600 lf	80.000 lf / ch	30	177.51 /ch	1,331	0.32	195	-	-	1.11	666	-	-	2,192	3,294
				Trench Excav & Place Bedding 6- 8'	600 lf	350.000 lf / cd	96	2,345.33 /cd	4,021	-	-	-	-	2.83	1,695	-	-	5,716	8,557
				CY Trench Excavation (Volume Calculation Only) .79 cy/lf	474 cy			-	-										
				Utility Bed Stone 3/4" material only, .074 cy/lf	44 cy	cy / cd		/cd		32.47	1,429	-	-	-	-	-	-	1,429	2,236
				Utility Cover Stone 3/4" hand place, .271 cy/lf	163 cy	200.000 cy / cd	26	1,309.13 /cd	1,067	32.47	5,292	-	-	3.37	549	-	-	6,909	10,701
				Spoils to Waste - Hauling, .345 cy/lf	207 cy	64.000 cy / day	26	274.92 /day	889	-	-	-	-	3.75	776	-	-	1,665	2,490
				Backfill Trench-Backhoe/Truck - Spoils, .444 cy/lf	266 cy	400.000 cy / cd	37	2,345.33 /cd	1,560	-	-	-	-	2.47	658	-	-	2,217	3,319
				Trench Box 8' Deep	600 lf			-	-	-	-	-	-	1.50	900	-	-	900	1,341
				DI Pipe RJ - 10" Class 350 Zinc Coated	600 lf	28.571 lf / cd	672	1,333.54 /cd	28,004	38.01	22,804	-	-	-	-	-	-	50,808	77,695
		1012		Testing															
			10	10 Inch															
			HT	Hydrostatic Testing															
				Hydrostatic Testing - 1/2" - 12"	600 lf	0.012 ch / lf	14	90.28 /ch	650	0.08	49	-	-	-	-	-	-	699	1,052
		1014		Traffic Controls															
			F01	Traffic Controls - Light Traffic															
			01.000	Traffic Controls - Light Traffic															
				Traffic Control - Flaggers	10 day	16.000 mh / day	160	38.21 /mh	6,113	-	-	-	-	35.00	350	-	-	6,463	9,691
		1018		Chlorination / Dechlorination															
			C / D	Chlorination / Dechlorination															
			C / D	Chlorination / Dechlorination															
				Chlorination / Dechlorination	600 lf			/lf		0.10	60	-	-	-	-	-	-	60	94
		1020		Video Inspection															
			VI	Video Inspection															
			VI 10	Video Pipeline Inspection Subcontractor - 8 inch diameter															
				Video Pipeline Inspection Subcontractor - 10- inch diameter	600 lf			-	-	-	-	8.82	5,292	-	-	-	-	5,292	7,462
05				WATER MAIN, 12 IN *** Requires Special Provision ** *(670-1100)															
		30		DI RJ Pipe															
			12	12 Inch															
			02	Excavation 4' to 8' Deep															
				Pipe Bagging Polyethylene 12" dia.	12,100 lf	80.000 lf / ch	605	177.51 /ch	26,848	0.39	4,711	-	-	1.11	13,439	-	-	44,999	67,670
				Trench Excav & Place Bedding 6- 8'	12,100 lf	350.000 lf / cd	1,936	2,345.33 /cd	81,081	-	-	-	-	2.83	34,184	-	-	115,266	172,557
				CY Trench Excavation (Volume Calculation Only) .815 cy/lf	9,862 cy			-	-										
				Utility Bed Stone 3/4" material only, .074 cy/lf	895 cy	cy / cd		/cd		32.47	29,058	-	-	-	-	-	-	29,058	45,477
				Utility Cover Stone 3/4" hand place, .296 cy/lf	3,582 cy	200.000 cy / cd	573	1,309.13 /cd	23,446	32.47	116,299	-	-	3.37	12,073	-	-	151,818	235,167
				Spoils to Waste - Hauling, .37 cy/lf	4,477 cy	64.000 cy / day	560	274.92 /day	19,232	-	-	-	-	3.75	16,789	-	-	36,020	53,863
				Backfill Trench-Backhoe/Truck - Spoils, .444 cy/lf	5,372 cy	400.000 cy / cd	752	2,345.33 /cd	31,498	-	-	-	-	2.47	13,280	-	-	44,777	67,034
				Trench Box 8' Deep	12,100 lf			-	-	-	-	-	-	1.50	18,150	-	-	18,150	27,044
				DI Pipe RJ - 12" Class 350 Zinc Coated	12,100 lf	25.000 lf / cd	15,488	1,333.54 /cd	645,431	48.68	589,007	-	-	-	-	-	-	1,234,439	1,889,954
				DI RJ Std Wgt Fittings 12	96 ea	6.035 mh / ea	579	41.67 /mh	24,144	1,640.00	157,440	-	-	-	-	-	-	181,584	282,611
		1012		Testing															
			12	12 Inch															
			HT	Hydrostatic Testing															
				Hydrostatic Testing - 1/2" - 12"	12,100 lf	0.012 ch / lf	290	90.28 /ch	13,109	0.08	992	-	-	-	-	-	-	14,101	21,216
		1018		Chlorination / Dechlorination															
			C / D	Chlorination / Dechlorination															

WBS Lvl 4	WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Cost w/o Addons & MU	Total Price w/ Addons & MU
			C / D	Chlorination / Dechlorination															
				Chlorination / Dechlorination	12,100 lf	/lf				0.10	1,210	-	-	-	-	-	-	1,210	1,894
	1020			Video Inspection															
		VI		Video Inspection															
			VI 12	Video Pipeline Inspection Subcontractor - 12- inch diameter															
				Video Pipeline Inspection Subcontractor - 12- inch diameter	12,100 lf			-	-	-	-	8.82	106,722	-	-	-	-	106,722	150,479
	1090			Drainage Structures															
		CB		Catch Basins															
			CB01	Catch Basin Modifications															
				Convert Catch Basin to Manhole	1 ea	4.000 ch / ea	8	90.28 /ch	361	125.00	125	-	-	-	-	-	-	486	737
				Adjust Grade @ Catch Basin	23 ea	4.000 ch / ea	184	90.28 /ch	8,306	-	-	-	-	200.00	4,600	-	-	12,906	19,313
				Reconstruct Existing Drainage Inlet	2 ea	4.000 ch / ea	16	90.28 /ch	722	125.00	250	-	-	-	-	-	-	972	1,475
			CB02	New Catch Basins															
				Catch Basin 4' Base	8 ea	3.000 mh / ea	24	41.84 /mh	1,004	95.00	760	-	-	50.77	406	-	-	2,170	3,301
				Catch Basin 4' Riser	32 vf	2.001 mh / vf	64	41.84 /mh	2,679	55.00	1,760	-	-	33.84	1,083	-	-	5,522	8,387
				Catch Basin 4' Flat Cover	8 ea	3.000 mh / ea	24	41.84 /mh	1,004	105.00	840	-	-	50.77	406	-	-	2,250	3,426
			CB03	Reconstruct Existing Catch Basins															
				Demo Catch Basins	26 ea	3.000 mh / ea	78	38.83 /mh	3,029	-	-	-	-	120.83	3,142	-	-	6,171	9,224
				Catch Basin 4' Base	26 ea	3.000 mh / ea	78	41.84 /mh	3,264	95.00	2,470	-	-	50.77	1,320	-	-	7,054	10,728
				Catch Basin 4' Riser	104 vf	2.001 mh / vf	208	41.84 /mh	8,707	55.00	5,720	-	-	33.84	3,520	-	-	17,947	27,258
				Catch Basin 4' Flat Cover	26 ea	3.000 mh / ea	78	41.84 /mh	3,264	105.00	2,730	-	-	50.77	1,320	-	-	7,314	11,135
		MH		Manholes															
			MH01	New Manholes															
				Manhole 4' Base	1 ea	3.000 mh / ea	3	41.84 /mh	126	179.70	180	-	-	50.77	51	-	-	356	545
				Manhole 4' Riser	4 vf	2.001 mh / vf	8	41.84 /mh	335	81.04	324	-	-	33.85	135	-	-	794	1,211
				Manhole 4' Flat Cover	1 ea	3.000 mh / ea	3	41.84 /mh	126	231.88	232	-	-	50.77	51	-	-	408	627
06				WATER MAIN, 16 IN *** Requires Special Provision ** *(670-1160)															
	30			DI RJ Pipe															
		16		16 Inch															
			02	Excavation 4' to 8' Deep															
				Pipe Bagging Polyethylene 16" dia.	600 lf	90.000 lf / ch	27	177.51 /ch	1,183	0.45	273	-	-	1.11	666	-	-	2,122	3,195
				Trench Excav & Place Bedding 6- 8'	600 lf	350.000 lf / cd	96	2,345.33 /cd	4,021	-	-	-	-	2.83	1,695	-	-	5,716	8,557
				CY Trench Excavation (Volume Calculation Only) .864 cy/lf	518 cy														
				Utility Bed Stone 3/4" material only, .074 cy/lf	45 cy	cd / cy		1,090.02 /cd		32.47	1,461	-	-	-	-	-	-	1,461	2,287
				Utility Cover Stone 3/4" hand place, .345 cy/lf	207 cy	200.000 cy / cd	33	1,309.13 /cd	1,355	32.47	6,721	-	-	3.37	698	-	-	8,773	13,590
				Spoils to Waste - Hauling, .419 cy/lf	251 cy	64.000 cy / day	31	274.92 /day	1,078	-	-	-	-	3.75	941	-	-	2,019	3,020
				Backfill Trench-Backhoe/Truck - Spoils, .444 cy/lf	266 cy	400.000 cy / cd	37	2,345.33 /cd	1,560	-	-	-	-	2.47	658	-	-	2,217	3,319
				Trench Box 8' Deep	600 lf			-	-	-	-	-	-	1.50	900	-	-	900	1,341
				DI Pipe RJ - 16" Class 350 Zinc Coated	600 lf	21.053 lf / cd	912	1,333.54 /cd	38,006	77.70	46,618	-	-	-	-	-	-	84,623	129,966
				DI RJ Std Wgt Fittings 16	2 ea	7.155 mh / ea	14	41.67 /mh	596	2,600.00	5,200	-	-	-	-	-	-	5,796	9,033
	1012			Testing															
		16		16 Inch															
			HT	Hydrostatic Testing															
				Hydrostatic Testing - 14-24"	600 lf	0.021 ch / lf	25	90.28 /ch	1,138	0.16	96	-	-	-	-	-	-	1,234	1,857
	1018			Chlorination / Dechlorination															
		C / D		Chlorination / Dechlorination															
			C / D	Chlorination / Dechlorination															
				Chlorination / Dechlorination	600 lf	/lf				0.10	60	-	-	-	-	-	-	60	94
	1020			Video Inspection															
		VI		Video Inspection															
			VI 16	Video Pipeline Inspection Subcontractor - 16- inch diameter															
				Video Pipeline Inspection Subcontractor - 16- inch diameter	600 lf			-	-	-	-	11.76	7,056	-	-	-	-	7,056	9,949
07				WATER MAIN, 24 IN *** Requires Special Provision ** *(670-1240)															

WBS Lvl 4	WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Cost w/o Addons & MU	Total Price w/ Addons & MU
	30			DI RJ Pipe															
		24		24 Inch															
			02	Excavation 4' to 8' Deep															
				Pipe Bagging Polyethylene 24" dia.	5,500 lf	60.000 lf / ch	367	177.51 /ch	16,272	0.78	4,283	-	-	1.48	8,145	-	-	28,700	43,247
				Trench Excav & Place Bedding 6- 8'	5,500 lf	350.000 lf / cd	880	2,345.33 /cd	36,855	-	-	-	-	2.83	15,538	-	-	52,393	78,435
				CY Trench Excavation (Volume Calculation Only) .963 cy/lf	5,297 cy			-	-					-	-	-	-		
				Utility Bed Stone 3/4" material only, .074 cy/lf	407 cy	cy / cd		/cd		32.47	13,214	-	-	-	-	-	-	13,214	20,680
				Utility Cover Stone 3/4" hand place, .444 cy/lf	2,442 cy	200.000 cy / cd	391	1,309.13 /cd	15,984	32.47	79,286	-	-	3.37	8,231	-	-	103,501	160,323
				Spoils to Waste - Hauling, .514 cy/lf	2,827 cy	64.000 cy / day	353	274.92 /day	12,144	-	-	-	-	3.75	10,601	-	-	22,745	34,012
				Backfill Trench-Backhoe/Truck - Spoils, .444 cy/lf	2,442 cy	400.000 cy / cd	342	2,345.33 /cd	14,318	-	-	-	-	2.47	6,037	-	-	20,355	30,472
				Trench Box 8' Deep	5,500 lf			-	-	-	-	-	-	1.50	8,250	-	-	8,250	12,293
				DI Pipe RJ - 16" Class 250 Zinc Coated	5,500 lf	17.391 lf / cd	10,120	1,555.42 /cd	491,903	131.24	721,822	-	-	-	-	-	-	1,213,725	1,867,516
				DI RJ Std Wgt Fittings 24	8 ea	9.518 mh / ea	76	48.61 /mh	3,701	6,140.00	49,120	-	-	-	-	-	-	52,821	82,425
	1012			Testing															
		24		24 Inch															
			HT	Hydrostatic Testing															
				Hydrostatic Testing - 14-24"	5,500 lf	0.021 ch / lf	231	90.28 /ch	10,427	0.16	880	-	-	-	-	-	-	11,307	17,018
	1018			Chlorination / Dechlorination															
		C / D		Chlorination / Dechlorination															
			C / D	Chlorination / Dechlorination															
				Chlorination / Dechlorination	5,500 lf			/lf		0.10	550	-	-	-	-	-	-	550	861
	1020			Video Inspection															
		VI		Video Inspection															
			VI 24	Video Pipeline Inspection Subcontractor - 24- inch diameter															
				Video Pipeline Inspection Subcontractor - 24- inch diameter	5,500 lf				-	-	-	11.76	64,680	-	-	-	-	64,680	91,199
	1021			Pneumatic Pressure Test, Includes Soaping Joints															
		PT		Pneumatic Pressure Test, Includes Soaping Joints															
			PT 24	Pneumatic Pressure Test Subcontractor - 24- inch diameter															
				Relining Pipe (Polyester) 24" diameter	5,500 lf				-	-	-	150.60	828,300	-	-	-	-	828,300	1,167,910
08				CAP OR REMOVE EXISTING WATER MAIN * * * Requires Special Provision * * *(670-1500)															
	1050			Cap Existing Water Main															
		CAP		Cap Existing Water Main															
			CAP10	Cap Existing 10" Water Main															
				DI RJ Std Wgt Cap 10	20 ea	6.000 mh / ea	120	47.45 /mh	5,694	600.00	12,000	-	-	-	-	-	-	17,694	27,321
09				VALVE MARKER * * * Requires Construction Detail * *(670-2002)															
	1051			Valve Marker															
		VM		Valve Marker															
			VM01	Valve Marker															
				Valve Marker	119 ea	0.500 mh / ea	60	47.45 /mh	2,823	21.00	2,499	-	-	-	-	-	-	5,322	8,146
10				AIR RELEASE VALVE ASSEMBLY (670-2003)															
	1052			Air Release Valve Assembly															
		ARVA		Air Release Valve Assembly															
			ARVA02	Air Release Valve Assembly 2"															
				Air Release Valve Assembly 2"	3 ea	16.000 mh / ea	48	47.45 /mh	2,278	4,000.00	12,000	-	-	-	-	-	-	14,278	22,197
		MH		Manholes															
			MH01	New Manholes															
				Manhole 4' Base	3 ea	3.000 mh / ea	9	41.84 /mh	377	179.70	539	-	-	50.77	152	-	-	1,068	1,635
				Manhole 4' Riser	12 vf	2.001 mh / vf	24	41.84 /mh	1,005	81.04	972	-	-	33.84	406	-	-	2,383	3,634
				Manhole 4' Flat Cover	3 ea	3.000 mh / ea	9	41.84 /mh	377	231.88	696	-	-	50.77	152	-	-	1,225	1,880
11				BLOW-OFF ASSEMBLY, COMPLETE															
	1053			Blow-Off Assembly															

WBS Lvl 4	WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Cost w/o Addons & MU	Total Price w/ Addons & MU
		BOA		Blow-Off Assembly															
			BOA1	Blow-Off Assembly															
				Blow-Off Assembly	4 ea	16.000 mh / ea	64	47.45 /mh	3,037	6,000.00	24,000	-	-	-	-	-	-	27,037	42,116
12				SAFETY GRATE, TP 3 (668-8013)															
	1054			Safety Grate															
		SG		Safety Grate															
			SG1	Safety Grate															
				Steel Plate 1" x 6" Wide (Detail 1/44-0036)- Allowance	1 ls			-	-	5,000.00	5,000	-	-	-	-	-	-	5,000	7,825
13				TAPPING SLEEVE & VALVE ASSEMBLY, 8 IN X 6 IN * * * Requires Special Provision * * *(670-3086)															
	1040			Tapping Sleeve & Valve Assembly															
		TS8		Tapping Sleeve & Valve Assembly 8"															
			TS8.6	Tapping Sleeve & Valve Assembly 8" x 6"															
				Tapping Sleeve & Valve Assembly 16" x 12"	1 ea			/ea				12,000.00	12,000					12,000	16,920
14				TAPPING SLEEVE & VALVE ASSEMBLY, 16 IN X 12 IN * * * Requires Special Provision * * *(670-3169)															
	1040			Tapping Sleeve & Valve Assembly															
		TS16		Tapping Sleeve & Valve Assembly 16"															
			TS16.12	Tapping Sleeve & Valve Assembly 16" x 12"															
				Tapping Sleeve & Valve Assembly 16" x 12"	1 ea			/ea				20,000.00	20,000					20,000	28,200
15				TAPPING SLEEVE & VALVE ASSEMBLY, 12 IN X 8 IN * * * Requires Special Provision * * *(670-3127)															
	1040			Tapping Sleeve & Valve Assembly															
		TS12		Tapping Sleeve & Valve Assembly 12"															
			TS12.8	Tapping Sleeve & Valve Assembly 12" x 8"															
				Tapping Sleeve & Valve Assembly 12" x 8"	2 ea			/ea				15,000.00	30,000					30,000	42,300
16				TAPPING SLEEVE & VALVE ASSY, 24 IN X 16 IN															
	1040			Tapping Sleeve & Valve Assembly															
		TS24		Tapping Sleeve & Valve Assembly 24"															
			TS24.16	Tapping Sleeve & Valve Assembly 24" x 16"															
				Tapping Sleeve & Valve Assembly 24" x 16"	2 ea			/ea				27,000.00	54,000					54,000	76,140
17				TAPPING SLEEVE & VALVE ASSEMBLY * * * Special Provision * * *(670-3015)															
	1040			Tapping Sleeve & Valve Assembly															
		TS30		Tapping Sleeve & Valve Assembly															
			TS30.24	Tapping Sleeve & Valve Assembly															
				Tapping Sleeve & Valve Assembly	1 ea			-	-	-	-	100,000.00	100,000	-	-	-	-	100,000	141,001
18				TAPPING SLEEVE & VALVE ASSEMBLY * * * Special Provision * * *(670-3015)															
	1040			Tapping Sleeve & Valve Assembly															
		TS30		Tapping Sleeve & Valve Assembly															
			TS30.24	Tapping Sleeve & Valve Assembly															
				Tapping Sleeve & Valve Assembly	1 ea			-	-	-	-	100,000.00	100,000	-	-	-	-	100,000	141,001
19				GATE VALVE, 6 IN * * * Requires Special Provision * * *(670-2060)															
	1026			Isolation Valves (Gate Valves)															
		GV		Isolation Valve (Gate Valve)															
			GV6	Isolation Valve (Gate Valve) 6"															
				Gate Valves 6" MJ w/ valve box	36 ea	5.640 mh / ea	203	45.14 /mh	9,165	707.00	25,452	-	-	-	-	-	-	34,617	53,581

WBS Lvl 4	WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Cost w/o Addons & MU	Total Price w/ Addons & MU
20				GATE VALVE, 8 IN * * * Requires Special Provision * * *(670-2080)															
	1026			Isolation Valves (Gate Valves)															
		GV		Isolation Valve (Gate Valve)															
			GV8	Isolation Valve (Gate Valve) 8"															
				Gate Valves 8" MJ w/ valve box	2 ea	7.050 mh / ea	14	45.14 /mh	636	1,125.00	2,250	-	-	-	-	-	-	2,886	4,476
21				GATE VALVE, 10 IN * * * Requires Special Provision * * *(670-2100)															
	1026			Isolation Valves (Gate Valves)															
		GV		Isolation Valve (Gate Valve)															
			GV10	Isolation Valve (Gate Valve) 10"															
				Gate Valves 10" MJ w/ valve box	1 ea	9.240 mh / ea	9	45.14 /mh	417	1,753.00	1,753	-	-	-	-	-	-	2,170	3,369
			MH	Manholes															
			MH01	New Manholes															
				Manhole 4' Base	1 ea	3.000 mh / ea	3	41.84 /mh	126	179.70	180	-	-	50.77	51	-	-	356	545
				Manhole 4' Riser	5 vf	2.001 mh / vf	10	41.84 /mh	419	81.04	405	-	-	33.84	169	-	-	993	1,514
				Manhole 4' Flat Cover	1 ea	3.000 mh / ea	3	41.84 /mh	126	231.88	232	-	-	50.77	51	-	-	408	627
22				GATE VALVE, 12 IN * * * Requires Special Provision * * *(670-2120)															
	1026			Isolation Valves (Gate Valves)															
		GV		Isolation Valve (Gate Valve)															
			GV12	Isolation Valve (Gate Valve) 12"															
				Gate Valves 12" MJ w/ valve box	26 ea	10.560 mh / ea	275	45.14 /mh	12,394	2,218.00	57,668	-	-	-	-	-	-	70,062	108,841
			MH	Manholes															
			MH01	New Manholes															
				Manhole 4' Riser	76 vf	2.001 mh / vf	152	41.84 /mh	6,363	81.04	6,159	-	-	33.84	2,572	-	-	15,094	23,016
				Manhole 4' Flat Cover	19 ea	3.000 mh / ea	57	41.84 /mh	2,385	231.88	4,406	-	-	50.77	965	-	-	7,755	11,910
				Manhole 8' Base	7 ea	7.000 mh / ea	49	41.84 /mh	2,050	864.20	6,049	-	-	50.77	355	-	-	8,455	13,072
				Manhole 8' Riser	28 vf	6.000 mh / vf	168	41.84 /mh	7,029	476.44	13,340	-	-	33.84	948	-	-	21,317	32,834
				Manhole 8' Flat Cover	7 ea	7.000 mh / ea	49	41.84 /mh	2,050	1,689.26	11,825	-	-	50.77	355	-	-	14,230	22,111
23				GATE VALVE, 24 IN * * * Requires Special Provision * * *(670-2240)															
	1026			Isolation Valves (Gate Valves)															
		GV		Isolation Valve (Gate Valve)															
			GV24	Isolation Valve (Gate Valve) 24"															
				Gate Valves 24" MJ w/ valve box	10 ea	20.820 mh / ea	208	45.14 /mh	9,398	20,670.00	206,700	-	-	-	-	-	-	216,098	337,585
			MH	Manholes															
			MH01	New Manholes															
				Manhole 4' Riser	12 vf	2.001 mh / vf	24	41.84 /mh	1,005	81.04	972	-	-	33.84	406	-	-	2,383	3,634
				Manhole 4' Flat Cover	3 ea	3.000 mh / ea	9	41.84 /mh	377	231.88	696	-	-	50.77	152	-	-	1,225	1,881
				Manhole 8' Base	7 ea	7.000 mh / ea	49	41.84 /mh	2,050	864.20	6,049	-	-	50.77	355	-	-	8,455	13,072
				Manhole 8' Riser	28 vf	6.000 mh / vf	168	41.84 /mh	7,029	476.44	13,340	-	-	33.84	948	-	-	21,317	32,834
				Manhole 8' Flat Cover	7 ea	7.000 mh / ea	49	41.84 /mh	2,050	1,689.26	11,825	-	-	50.77	355	-	-	14,230	22,111
24				FIRE HYDRANT * * * Requires Special Provision (670-4000)															
	1024			Fire Hydrant Assembly															
		FH		Fire Hydrant Assembly															
			FH	Fire Hydrant Assembly															
				Excavate Trench-& Backfill 4ft. depth - (3 cy/lf)	340 lf	0.060 ch / lf	61	121.59 /ch	2,481	0.00	0	-	-	5.78	1,967	-	-	4,447	6,651
				Fire Hydrants Assemblies	34 ea	1.600 ch / ea	163	142.35 /ch	7,744	3,493.00	118,762	-	-	20.72	704	-	-	127,211	198,529
25				REMOVE EXISTING FIRE HYDRANT * * * Requires Special Provision (670-9920)															
	1024			Fire Hydrant Assembly															
		FH		Fire Hydrant Assembly															
			FH	Fire Hydrant Assembly															
				Excavate Trench-& Backfill 4ft. depth - (3 cy/lf)	340 lf	0.060 ch / lf	61	121.59 /ch	2,481			-	-	5.78	1,967	-	-	4,447	6,651

WBS Lvl 4	WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Cost w/o Addons & MU	Total Price w/ Addons & MU
			FH	Fire Hydrant Assembly															
				Fire Hydrants Assemblies	34 ea	1.600 ch / ea	163	142.35 /ch	7,744					20.72	704			8,449	12,666
26				WATER SERVICE LINE, 1 IN (670-5010)															
	1060			Water Service Line															
		WSL2		Water Service Line															
			WSL1 .0	Water Service Line 1"															
				SS 304 Sch 40 Pipe 1"	1,500 lf	0.150 mh / lf	225	41.67 /mh	9,376	4.08	6,120	-	-	-	-	-	-	15,496	23,643
				SS Fittings & Accessories	1 ls	/ls				3,200.00	3,200							3,200	5,008
27				WATER SERVICE LINE, 1 1/2 IN (670-5015)															
	1060			Water Service Line															
		WSL3		Water Service Line															
			WSL1 .5	Water Service Line 1.5"															
				SS 304 Sch 40 Pipe 1-1/2"	1,500 lf	0.200 mh / lf	300	41.67 /mh	12,502	6.61	9,907	-	-	-	-	-	-	22,409	34,258
				SS Fittings & Accessories	1 ls	/ls				5,100.00	5,100							5,100	7,982
28				WATER SERVICE LINE, 2 IN *** Requires Special Provision *** (670-5020)															
	1060			Water Service Line															
		WSL4		Water Service Line															
			WSL2 .0	Water Service Line 2"															
				SS 304 Sch 40 Pipe 2"	1,500 lf	0.250 mh / lf	375	41.67 /mh	15,627	8.88	13,315	-	-	-	-	-	-	28,943	44,280
				SS Fittings & Accessories	1 ls	/ls				6,658.00	6,658							6,658	10,420
29				WATER SERVICE LINE, 3/4 IN *** Requires Special Provision *** (670-5620)															
	1060			Water Service Line															
		WSL4		Water Service Line															
			WSL0 .75	Water Service Line 3/4"															
				SS 304 Sch 40 Pipe 3/4"	1,500 lf	0.250 mh / lf	375	41.67 /mh	15,627	2.75	4,123	-	-	-	-	-	-	19,750	29,893
				SS Fittings & Accessories	1 ls	/ls				2,100.00	2,100							2,100	3,287
30				RELOCATE EXIST WATER METER, INCL BOX *** Requires Special Provision *** (670-9730)															
	1061			Relocate Water Meter & Box															
		RWM		Relocate Water Meter & Box															
			RWM 1	Relocate Water Meter & Box															
				Relocate Water Meter & Box	43 ea	10.000 mh / ea	430	41.67 /mh	17,919	500.00	21,500	-	-	-	-	-	-	39,419	60,527
31				CUT & PLUG EXISTING WATER MAIN *** Requires Special Provision *** (670-1600)															
	1062			Cut & Plug Water Main															
		CPWM		Cut & Plug Water Main															
			CPW M10	Cut & Plug Water Main 10"															
				Cut & Plug Water Main 10"	26 ea	15.000 ch / ea	1,950	194.17 /ch	75,724	-	-	-	-	271.87	7,069	-	-	82,793	124,119
32				ROCK EXCAVATION *** Requires Special Provision *** (670-9450)															
	ADD 01			Rock Trenching															
		ADD 01		Rock Trenching															
			ADD 01	Rock Trenching															
				Trench Rock Excavation	3,018 cy	/cy						250.00	754,500					754,500	1,063,852
				Spoils to Waste	3,018 cy	/cy						15.00	45,270					45,270	63,831

WBS Lvl 4	WBS Lvl 1	WBS Lvl 2	WBS Lvl 3	Description	Takeoff Quantity	Labor Productivity	Man Hours	Labor Price	Labor Amount	Material Cost/Unit	Material Amount	Subcontract Cost/Unit	Subcontract Amount	Const Equip Cost/Unit	Const Equip Amount	Process Equip Cost/Unit	Process Equip Amount	Total Cost w/o Addons & MU	Total Price w/ Addons & MU
33				RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL REINFORCEMENT FIBER, BITUM MATL & H LIME(402-3127)															
	1070			Recycled Asphalt Concrete Superpave															
		RAC		Recycled Asphalt Concrete Superpave															
			RAC2	GR Aggregate Base CRS															
				GR Aggregate Base CRS	1,080 ton			/ton				18.00	19,440					19,440	27,411
34				GR AGGR BASE CRS, INCL MATL(310-1101)															
	1070			Recycled Asphalt Concrete Superpave															
		RAC		Recycled Asphalt Concrete Superpave															
			RAC2	GR Aggregate Base CRS															
				GR Aggregate Base CRS	4,390 ton			/ton				18.00	79,020					79,020	111,419
35				RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2,INCL BITUM MATL & H LIME(402-3190)															
	1070			Recycled Asphalt Concrete Superpave															
		RAC		Recycled Asphalt Concrete Superpave															
			RAC3	Recycled Asphalt Concrete Superpave 19 mm (3/4")															
				Recycled Asphalt Concrete Superpave 19 mm (3/4")	1,466 ton			-	-	-	-	58.00	85,028	-	-			85,028	119,890
36				RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME(402-3121)															
	1070			Recycled Asphalt Concrete Superpave															
		RAC		Recycled Asphalt Concrete Superpave															
			RAC4	Recycled Asphalt Concrete Superpave 25 mm (1")															
				Recycled Asphalt Concrete Superpave 25 mm (1")	2,929 ton			-	-	-	-	54.00	158,166	-	-			158,166	223,015
37				FLOWABLE FILL(600-0001)															
	1080			Flowable Fill															
		FF		Flowable Fill															
			FF1	Flowable Fill @ Abandoned Water Main															
				Flowable Fill @ Abandoned Water Main	219 cy			-	-	-	-	165.00	36,135	-	-			36,135	50,951
38				CATHODIC PROTECTION INTEGRAL PILE JACKET * * * Requires Special Provision * * * (527-0500)															
	1006			Cathodic Protection															
		D01		Cathodic Pipe Protection															
			01.01	Cathodic Pipe Protection															
				Cathodic Protection System- Contractor OHP Allowance (12%)	1 ls			-	-	-	-	34,560.00	34,560	-	-			34,560	48,730
				Cathodic Protection System- Engineering Allowance (5%)	1 ls			-	-	-	-	14,400.00	14,400	-	-			14,400	20,304
				Cathodic Protection System- Sub	18,000 lf			-	-	-	-	16.00	288,000	-	-			288,000	406,083
39				GRADING COMPLETE (210-0100)															
	1001			Grading Complete															
		GD		Grading Complete															
			GD1	Grading Complete															
				Earthwork- Grading Subcontractor	1 ls			/ls				100,000.00	100,000					100,000	141,001
40				BITUM TACK COAT (413-1000)															
	1003			Bitum Tack Coat															
		BTC		Bitum Tack Coat															
			BTC1	Bitum Tack Coat															
				Sprayed On Bituminous- 1 coat (180 sf / gallon) 2 x 12' Lane x 4,4500' Road	108,000 sf	0.010 mh / sf	1,080	38.22 /mh	41,277	0.16	17,334	-	-	-	-			58,611	89,043
41				CLASS B CONCRETE (500-3200)															
	1081			Class B Concrete															
		CP		Class B Concrete															
			CP1	Class B Concrete															
				Class B Concrete	900 cy			-	-	-	-	600.00	540,000	-	-			540,000	761,405

Estimate Totals

Description	Amount	Totals	Hours	Rate	Cost per Unit	Percent of Total
Labor	2,217,918		52,064 hrs		103.159 /lf	17.40%
Material	2,622,668				121.985 /lf	20.57%
Subcontract	3,506,383				163.088 /lf	27.50%
Equipment	251,456		7,666 hrs		11.696 /lf	1.97%
Other						
Subtotal	8,598,425	8,598,425			399.927 /lf	67.44%
Sales Tax	229,930			8.00 %	10.694 /lf	1.80%
Mobilization/Demobilization	171,969			2.00 %	7.999 /lf	1.35%
Safety Supplies and Equipment	66,538			3.00 %	3.095 /lf	0.52%
Small Tools and Equipment	44,358			2.00 %	2.063 /lf	0.35%
Consumables	44,358			2.00 %	2.063 /lf	0.35%
Subtotal	557,153	9,155,578			425.841 /lf	4.37%
3rd Party Inspections	137,334			1.50 %	6.388 /lf	1.08%
Inspections Subtotal	137,334	9,292,912			432.228 /lf	1.08%
General Conditions	557,575			6.00 %	25.934 /lf	4.37%
General Conditions Subtotal	557,575	9,850,487			458.162 /lf	4.37%
Project Cost Escalation to June 2022	268,918			2.73 %	12.508 /lf	2.11%
Escalation Subtotal	268,918	10,119,405			470.670 /lf	2.11%
Market Conditions- Labor	44,358			2.00 %	2.063 /lf	0.35%
Market Conditions- Materials	196,700			7.50 %	9.149 /lf	1.54%
Market Conditions Subtotal	241,058	10,360,463			481.882 /lf	1.89%
Contingency (%)	310,814			3.00 %	14.456 /lf	2.44%
Contingency Subtotal	310,814	10,671,277			496.338 /lf	2.44%
Permits	95,626			0.75 %	4.448 /lf	0.75%
All Risk Insurance	213,426			2.00 %	9.927 /lf	1.67%
Performance & Payment Bond	106,713			1.00 %	4.963 /lf	0.84%
Permits, Ins, & Bonds Subtotal	415,765	11,087,042			515.676 /lf	3.26%
G.C Overhead and Profit	1,663,056			15.00 %	77.351 /lf	13.04%
GC OH&P Subtotal	1,663,056	12,750,098			593.028 /lf	13.04%
Total		12,750,098			593.028 /lf	100.00%

Dekalb County Utility Division: Buford Highway / SR 13 / US 23
Budget Quote Analysis 10/15/21

Item #	Description	Qty	UM	U.S.Pipe Co., LLC Mark Dabbs (404) 316-2078 Material Quote		American Pipe Jeff McCullough (678) 772-6551 Material Quote		Ferguson Ryan Leach (770) 248-9037 Material Quote		Strack, Inc. Jason Rainwater (770) 969-1591 Sub Quote		Ruby Collins TJ Ackerman (770) 432-2900 Sub Quote		2/19/20	10/15/21
				2/19/20	10/15/21	2/19/20	10/15/21	2/19/20	10/15/21	2/19/20	10/15/21	2/19/20	10/15/21		
1	150-1000 TRAFFIC CONTROL -(150-1000)	1	LS												
2	670-1060 WATER MAIN, 6 IN *** Requires Special Provision ***(670-1060)	1,500	LF	\$ 24.56	\$ 32.54	\$ 17.38	\$ 25.20			\$ 72.00		\$ 170.00	\$ 174.50		
3	670-1100 WATER MAIN, 8 IN *** Requires Special Provision ***(670-1080)	1,200	LF	\$ 31.25	\$ 41.32	\$ 22.88	\$ 31.78			\$ 74.00		\$ 190.00	\$ 195.50		
4	670-1100 WATER MAIN, 10 IN *** Requires Special Provision ***(670-1100)	600	LF	\$ 40.08	\$ 50.15	\$ 27.16	\$ 38.40			\$ 86.40		\$ 210.00	\$ 217.40		
5	670-1120 WATER MAIN, 12 IN *** Requires Special Provision ***(670-1120)	12,100	LF	\$ 51.80	\$ 64.63	\$ 35.06	\$ 49.18			\$ 90.00		\$ 225.00	\$ 234.50		
6	670-1160 WATER MAIN, 16 IN *** Requires Special Provision ***(670-1160)	600	LF	\$ 85.04	\$ 105.78	\$ 41.25	\$ 70.71			\$ 180.00		\$ 265.00	\$ 274.50		
7	670-1240 WATER MAIN, 24 IN *** Requires Special Provision ***(670-1240)	5,500	LF	\$ 145.66	\$ 180.78	\$ 77.83	\$ 182.62			\$ 252.00		\$ 350.00	\$ 365.50		
8	670-1500 CAP OR REMOVE EXISTING WATER MAIN *** Requires Special Provision ***(670-1500)	20	EA									\$ 3,000.00	\$ 3,000.00		
9	670-1523 CAP & REMOVE EXISTING WATER LINE, 16 IN *** Requires Special Provision ***(670-1523)	119	EA												
10	670-2003 AIR RELEASE VALVE ASSEMBLY(670-2003)	3	EA							\$ 8,000.00		\$ 6,200.00	\$ 7,275.00		
11	670-2005 BLOW-OFF ASSEMBLY, COMPLETE	4	UNITS							\$ 12,000.00		\$ 7,500.00	\$ 9,050.00		
12	668-8013 SAFETY GRATE, TP 3(668-8013)	1	SF									\$ 135.00	\$ 200.00		
13	670-3086 TAPPING SLEEVE & VALVE ASSEMBLY, 8 IN X 6 IN *** Requires Special Provision ***(670-3086)	1	EA				\$ 985.00	\$ 2,470.00				\$ 9,500.00	\$ 11,450.00		
14	670-3169 TAPPING SLEEVE & VALVE ASSEMBLY, 16 IN X 12 IN *** Requires Special Provision ***(670-3169)	1	EA				\$ 1,454.00	\$ 4,585.00				\$ 16,550.00	\$ 19,840.00		
15	670-3127 TAPPING SLEEVE & VALVE ASSEMBLY, 12 IN X 8 IN *** Requires Special Provision ***(670-3127)	3	EA				\$ 3,300.00					\$ 12,100.00	\$ 14,560.00		
16	670-3190 TAPPING SLEEVE & VALVE ASSY, 24 IN X 16 IN	2	EA				\$ 8,677.00					\$ 22,850.00	\$ 26,980.00		
17	670-3015 TAPPING SLEEVE & VALVE ASSEMBLY, - *** Requires Special Provision ***(670-3015)	1	EA									\$ 26,810.00	\$ 31,800.00		
18	670-3015 TAPPING SLEEVE & VALVE ASSEMBLY, - *** Requires Special Provision ***(670-3015)	1	EA												
19	670-2060 GATE VALVE, 6 IN *** Requires Special Provision ***(670-2060)	36	EA				\$ 707.00	\$ 894.00		\$ 1,500.00		\$ 1,500.00	\$ 1,650.00		
20	670-2080 GATE VALVE, 8 IN *** Requires Special Provision ***(670-2080)	2	EA				\$ 1,125.00	\$ 1,306.00		\$ 1,700.00		\$ 1,650.00	\$ 2,060.00		
21	670-2100 GATE VALVE, 10 IN(670-2100)	1	EA				\$ 1,753.00	\$ 1,930.00		\$ 2,000.00		\$ 2,050.00	\$ 2,610.00		
22	670-2120 GATE VALVE, 12 IN *** Requires Special Provision ***(670-2120)	26	EA				\$ 2,218.00	\$ 2,426.00		\$ 2,200.00		\$ 2,375.00	\$ 3,055.00		
23	670-2240 GATE VALVE, 24 IN *** Requires Special Provision ***(670-2240)	10	EA				\$ 20,670.00			\$ 30,000.00		\$ 40,910.00	\$ 45,195.00		
24	670-4000 FIRE HYDRANT *** Requires Special Provision ***(670-4000)	34	EA					\$ 3,493.00				\$ 10,140.00	\$ 12,650.00		
25	681-3600 LIGHTING STD, SPCL DESIGN(681-3600)	34	EA												
26	670-5010 WATER SERVICE LINE, 1 IN(670-5010)	1,500	LF									\$ 75.00	\$ 85.00		
27	670-5015 WATER SERVICE LINE, 1 1/2 IN(670-5015)	1,500	LF									\$ 115.00	\$ 130.00		
28	670-5020 WATER SERVICE LINE, 2 IN *** Requires Special Provision ***(670-5020)	1,500	LF									\$ 165.00	\$ 185.00		
29	670-5620 WATER SERVICE LINE, 3/4 IN *** Requires Special Provision ***(670-5620)	1,500	LF									\$ 75.00	\$ 75.00		
30	670-9730 RELOCATE EXIST WATER METER, INCL BOX *** Requires Special Provision ***(670-9730)	43	EA									\$ 6,980.00	\$ 7,340.00		
31	670-1600 CUT & PLUG EXISTING WATER MAIN *** Requires Special Provision ***(670-1600)	26	EA									\$ 3,015.00	\$ 3,050.00		
32	670-9450 ROCK EXCAVATION *** Requires Special Provision ***(670-9450)	3,018	CY									\$ 135.00	\$ 135.00		
33	402-4510 RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME(402-	1,080	TN									\$ 200.00	\$ 200.00		
34	310-1101 GR AGGR BASE CRS, INCL MATL(310-1101)	4,390	TN									\$ 85.00	\$ 95.00		
35	402-3190 RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2,INCL BITUM MATL & H LIME(402-3190)	1,466	TN									\$ 200.00	\$ 200.00		
36	402-3121 RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME(402-3121)	2,929	TN									\$ 200.00	\$ 200.00		
37	600-0001 FLOWABLE FILL(600-0001)	219	CY									\$ 250.00	\$ 200.00		
38	527-0500 CATHODIC PROTECTION INTEGRAL PILE JACKET *** Requires Special Provision ***(527-0500)	18,000	LF												
39	210-0100 GRADING COMPLETE -(210-0100)	1	LS												
40	413-1000 BITUM TACK COAT(413-1000)	600	GL												
41	500-3200 CLASS B CONCRETE(500-3200)	900	CY												

Notes:

4. ALL DIP WATER MAIN PIPE SHALL BE ZINC COATED AND POLYETHYLENE WRAPPED.

17. ALL NEW PIPE TO BE INSTALLED MUST HAVE MECHANICALLY RESTRAINED JOINTS, THRUST BLOCKS/ARE REQUIRED AT CONNECTION: EXISTING MAINS, OR WHERE UNBALANCED FORCES ARE PRESENT.

Pipe Sizes	
Pipe Diameter (inches)	Pressure Class (psi)
4 - 12	350
14 - 18	350
20	300
24	250
30 - 54	200
60 - 64	200



Cost Estimate Classification System

Reference AACE International Recommended Practices and Standards

Recommended Practice No. 17R-97

PURPOSE

As a recommended guideline, AECOM's Cost Estimate Classification System provides guidelines for applying the general principles of estimate classification to asset project cost estimates. Asset project cost estimates typically involve estimates for capital investment, and exclude operating and life-cycle evaluations. The Cost Estimate Classification System maps the phases and stages of asset cost estimating together with a generic maturity and quality matrix that can be applied across a wide variety of inquiries.

This guideline has been developed in a way that:

- 1 Provides common understanding of the concepts involved with classifying project costs estimates, regardless of the type of enterprise or industry the estimates relate to.
- 2 Fully defines and correlates the major characteristics used in classifying cost estimates.
- 3 Uses a degree of project definition as the primary characteristic to categorize estimate classes.
- 4 Reflects generally-accepted practices in the cost engineering profession.
- 5 Provide a classification method applicable across all business lines.
- 6 Identifying, cross-referencing, benchmarking, and empirically evaluating the multiple characteristics related to the class of estimate.

An intent of the guidelines is to improve communication among all of the parties involved with preparing, evaluating, and using project cost estimates. The various parties use project cost estimates often misinterpret the quality and value of the information available to prepare cost estimates, the various methods employed during the estimating process, the accuracy level expected from estimates, and the level of risk associated with estimates.

This classification guideline is intended to help those involved with project estimates to avoid misinterpretation of the various classes of cost estimates and to avoid their misapplication and misrepresentation. Improving communications about estimate classifications reduce business costs and project cycle times by avoiding inappropriate business and financial decisions, actions, delays, or disputes caused by misunderstandings of cost estimates and what they are expected to represent.

CLASSIFICATION METHODOLOGY

There are numerous characteristics that can be used to categorize cost estimate types. The most significant of these are degree of project definition, end usage of the estimate, estimating methodology, and the effort and time needed to prepare the estimate. The "primary" characteristic used in this guideline to define the classification category is the degree of project definition. The other characteristics are "secondary".

Categorizing cost estimates by degree of project definition will lend itself to AECOM's overall philosophy of project control. The discrete levels of project definition used for classifying estimates correspond to the typical phases and gates of evaluation, authorization, and execution often used by project stakeholders during a project life cycle.

Five (5) cost estimates classes have been established. While the level of project definition is a continuous spectrum, it was determined from benchmarking industry practices that three to five discrete categories are commonly used. Five categories are established in this guideline as it is easier to simplify by combining categories than it is to arbitrarily split a standard.

Five (5) cost estimates classes have been established. The estimate class designations are labeled Class 5,4,3,2, and 1. A class 5 estimate is based upon the lowest level of project definition, and a Class 1 estimate is closest to full project definition. This counting approach considers that estimating is a process whereby successive estimates are prepared until a final estimate closes the process.

Reference:

- AACE International Recommended Practice No. 17R-97 (American Association of Cost Estimators)
- ANSI Standard Z94.2-1989. Industrial Engineering Terminology: Cost Engineering.
- ASPE Standard Estimating Practice Fifth Edition (October 1998) of the American Society of Professional Estimators
- GOC (Government of Canada) CCA (Canadian Contractors Association)



Cost Estimate Classification System

Reference: AACE International Recommended Practices and Standards
 Recommended Practice No. 19R-97 Cost Estimate Classification System - EPC and Process Industries

Date: 6/4/2014

AECOM Classification Level	Estimate Classification Description	Primary Characteristics	Secondary Characteristics					Calculated	
		Level of Project Definition Expressed as a % of complete definition	End Usage Typical purpose of estimate	Design Information Outline Design Criteria Process Areas	Methodology Typical estimating method	Expected Accuracy Range Typical +/- range relative to best Index of 1 (a)	Preparation Effort Typical degree of effort relative to least cost Index of 1 (b)	Preparation Effort Typical degree of effort relative to estimate Index of 1 (b) as a %	Contingency Range
5	Order-of-Magnitude (ROM)	0% to 2%	Concept Screening	Outline Design Criteria: ✓ General Description ✓ Quality ✓ Size ✓ Geographic Location ✓ Layout ✓ Intended Use Process Areas: ✓ Product Capacity ✓ Services Requirements ✓ Utility Requirements ✓ Handling Requirements ✓ Raw Materials ✓ Storage Requirements ✓ Materials ✓ Process Layout ✓ Flow diagrams	Capacity Factored, Parametric Models Judgement, or Analogy	L: -20% to -50% H: +30% to +100%	1	0.005%	30 - 50%
4	Schematic / Conceptual Design	1% to 15%	Study or Feasibility	Outline Design Criteria: ✓ Soil Conditions ✓ Rough Sketches ✓ Construction type/size ✓ Foundation Requirements ✓ Rough utility quantities Process Areas: ✓ Outline Design Criteria ✓ General Arrangement Drawings ✓ Process Identification Drawings ✓ Electrical One Line Drawings ✓ Preliminary motor List / Sizes ✓ Preliminary Flow Sheets / Specifications	Equipment Factored, or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4	0.010% to 0.020%	30 - 50%
3	Design Development	10% to 40%	Budget, Authorization, or Control	Outline Design Criteria: ✓ General Site Description ✓ Preliminary Building Equip Plan ✓ Preliminary Plumbing Drawings ✓ Preliminary Structural Design ✓ Impounds & Fences ✓ Foundation Sketches ✓ Site Dimensions ✓ Impounds & Fences ✓ Preliminary Mechanical Drawings ✓ Elevations ✓ Soil Bearing Conditions ✓ Architectural Construction ✓ Roads ✓ General Arrangement ✓ Preliminary Electrical Drawings Process Areas: ✓ Piping Flow Sheet ✓ Equipment List ✓ Insulation Requirements ✓ Instrument List ✓ Utility Heat & Balance Flow ✓ Electric Substation Specifications	Semi-Detailed Unit Costs w/ Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10	0.015% to 0.050%	15 - 30%
2	Construction Documents	30% to 70%	Control or Bid / Tender	Outline Design Criteria: ✓ Outline Design ✓ Outline Specifications ✓ Preliminary Design Drawings ✓ Draft Specifications ✓ Partial Design Drawings ✓ Site Plans ✓ Building Equipment ✓ Elevations ✓ Detail Drawings ✓ Plumbing/Mech/Elec Drawings ✓ Soil Bearing Reports ✓ Topographical maps ✓ General Arrangements Process Areas: ✓ Equipment List ✓ Electrical Distribution Specs ✓ Utility Requirements ✓ Piping Layout and Schedules ✓ Insulation Drawings ✓ Electrical Drawings	Detailed Unit Cost w/ Forced Detailed Takeoff	L: -5% to -15% H: +5% to +20%	4 to 20	0.020% to 0.100%	10 - 20%
1	Bid	50% to 100%	Check Estimate or Bid/Tender	Outline Design Criteria: ✓ 100% design plans & specs	Detailed Unit Cost w/ Detailed Takeoff	L: -3% to -10% H: +3% to +15%	5 to 100	0.025% to 0.500%	5 - 10 %

Notes:

- [a] The state of process technology and availability of applicable references cost data affect the range of markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for a given scope.
- [b] If the range index value of "1" represents 0.005% of project costs, then an index value of 100 represents 0.5% Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.