

APPENDIX D
CAPITAL COST ESTIMATES

Capital Costs

Total Capital Cost by Option					
Option	Distribution Expansion	Existing Distribution Replacement	Mechanical Equipment	Electrical Equipment & Distribution Cost	Total Cost
Base Case	\$30,452,000	\$30,410,000	\$16,698,000	\$20,090,000	\$97,650,000
Option 1	\$22,774,000	\$20,660,000	\$16,304,000	\$20,090,000	\$79,828,000
Option 2	\$38,182,000	\$22,210,000	\$18,471,000	\$20,232,000	\$99,095,000
Option 3	\$5,231,000	\$30,520,000	\$16,607,000	\$18,256,000	\$70,614,000

Base Case

Base Case Capital Cost						
Phase	Year	Distribution Expansion	Existing Distribution Replacement	Mechanical Equipment	Electrical Equipment & Distribution	Total
		Total Cost	Total Cost	Total Cost	Total Cost	
PH1	2018	\$ 12,114,000	\$ 3,041,000	\$ 363,000	\$ 536,000	\$ 16,054,000
	2019	\$ 198,000	\$ 3,041,000	\$ 24,000	\$ 3,676,000	\$ 6,939,000
	2020	\$ -	\$ 3,041,000	\$ 5,134,000	\$ 1,555,000	\$ 9,730,000
	2021	\$ 195,000	\$ 3,041,000	\$ 18,000	\$ 515,000	\$ 3,769,000
	2022	\$ -	\$ 3,041,000	\$ 1,612,000	\$ 486,000	\$ 5,139,000
PH2	2023	\$ 10,112,000	\$ 3,041,000	\$ 4,142,000	\$ 3,007,000	\$ 20,302,000
	2024	\$ 2,446,000	\$ 3,041,000	\$ 30,000	\$ 1,528,000	\$ 7,045,000
	2025	\$ 122,000	\$ 3,041,000	\$ 16,000	\$ 515,000	\$ 3,694,000
	2026	\$ 1,324,000	\$ 3,041,000	\$ 14,000	\$ 349,000	\$ 4,728,000
	2027	\$ -	\$ 3,041,000	\$ 2,125,000	\$ 1,728,000	\$ 6,894,000
PH3	2028	\$ 176,000	\$ -	\$ 121,000	\$ 565,000	\$ 862,000
	2029	\$ 226,000	\$ -	\$ 30,000	\$ 565,000	\$ 821,000
	2030	\$ 120,000	\$ -	\$ 16,000	\$ 515,000	\$ 651,000
	2031	\$ 173,000	\$ -	\$ 14,000	\$ 515,000	\$ 702,000
	2032	\$ -	\$ -	\$ 1,783,000	\$ 536,000	\$ 2,319,000
	2033	\$ 2,727,000	\$ -	\$ 117,000	\$ 929,000	\$ 3,773,000
	2034	\$ 226,000	\$ -	\$ 1,109,000	\$ 1,285,000	\$ 2,620,000
	2035	\$ 120,000	\$ -	\$ 16,000	\$ 349,000	\$ 485,000
	2036	\$ 173,000	\$ -	\$ 14,000	\$ 349,000	\$ 536,000
2037	\$ -	\$ -	\$ -	\$ 587,000	\$ 587,000	
Total		\$ 30,452,000	\$ 30,410,000	\$ 16,698,000	\$ 20,090,000	\$ 97,650,000

Base Case: Electrical Equipment & Distribution Costs

2018 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 375,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,504	\$ 382,704
Design Contingency (10%)				10%	\$ 37,520	\$ 420,224
Construction Contingency (10%)				10%	\$ 37,520	\$ 457,744
Total with Contingencies						\$ 457,744
Design & CA				8%	\$ 36,620	\$ 494,364
Construction Management				5%	\$ 22,887	\$ 517,251
Commissioning / Start-up & TAB				4.0%	\$ 18,310	\$ 535,560
Total with Contingencies & Professional Services						\$ 535,560

2019 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	2500	1	2,500	ft.	\$ 368	\$ 920,000
15kV Medium Voltage Cable	2700	1	2,700	ft	\$ 50	\$ 135,000
Manholes	6	1	6	Ea.	\$ 15,000	\$ 90,000
15kV Southeast Campus Switchgear	1	1	1	Ea.	\$ 750,000	\$ 750,000
15kV Switchgear #2 Replacement	1	1	1	Ea.	\$ 485,000	\$ 485,000
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	2700	1	2,700	ft	\$ 20	\$ 54,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 2,575,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 51,504	\$ 2,626,704
Design Contingency (10%)				10%	\$ 257,520	\$ 2,884,224
Construction Contingency (10%)				10%	\$ 257,520	\$ 3,141,744
Total with Contingencies						\$ 3,141,744
Design & CA				8%	\$ 251,340	\$ 3,393,084
Construction Management				5%	\$ 157,087	\$ 3,550,171
Commissioning / Start-up & TAB				4.0%	\$ 125,670	\$ 3,675,840
Total with Contingencies & Professional Services						\$ 3,675,840

2020 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
4160V FТПP Sw itchg ear	2	1	2	Ea.	\$ 58,000	\$ 116,000
15kV-4160V, 1500kVA FТПP Transformer	2	1	2	Ea.	\$ 55,000	\$ 110,000
480V FТПP Sw itchboard	1	1	1	Ea.	\$ 35,000	\$ 30,000
15kV-480V, 1000kVA FТПP Transformer	1	1	1	Ea.	\$ 50,000	\$ 50,000
Manholes	2	1	2	Ea.	\$ 15,000	\$ 30,000
480V Low Voltage Cable/Raceway	2000	1	2,000	ft	\$ 80	\$ 160,000
15kV Medium Voltage Ductbank	1000	1	1,000	ft.	\$ 368	\$ 368,000
15kV Medium Voltage Cable	1700	1	1,700	ft	\$ 50	\$ 85,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
SCADA Fiber	1700	1	1,700	ft	\$ 20	\$ 34,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 1,089,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 21,784	\$ 1,110,984
Design Contingency (10%)				10%	\$ 108,920	\$ 1,219,904
Construction Contingency (10%)				10%	\$ 108,920	\$ 1,328,824
Total with Contingencies						\$ 1,328,824
Design & CA				8%	\$ 106,306	\$ 1,435,130
Construction Management				5%	\$ 66,441	\$ 1,501,571
Commissioning / Start-up & TAB				4.0%	\$ 53,153	\$ 1,554,724
Total with Contingencies & Professional Services						\$ 1,554,724

2021 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2022 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	500	1	500	Ea.	\$ 20	\$ 10,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 340,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 6,804	\$ 347,004
Design Contingency (10%)				10%	\$ 34,020	\$ 381,024
Construction Contingency (10%)				10%	\$ 34,020	\$ 415,044
Total with Contingencies						\$ 415,044
Design & CA				8%	\$ 33,204	\$ 448,248
Construction Management				5%	\$ 20,752	\$ 469,000
Commissioning / Start-up & TAB				4.0%	\$ 16,602	\$ 485,601
Total with Contingencies & Professional Services						\$ 485,601

2023 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	1500	1	1,500	ft.	\$ 368	\$ 552,000
15kV Medium Voltage Cable	2700	1	2,700	ft	\$ 50	\$ 135,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Medium Voltage 15kV CUP2 Main-Tie-Main Sw itchgear	1	1	1	Ea.	\$ 650,000	\$ 650,000
15kV-4160V, 1500kVA CUP2 Transformer	1	1	1	Ea.	\$ 50,000	\$ 50,000
4160V CUP2 Sw itchgear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV-480V, 1500KVA CUP2 Transformer	2	1	2	Ea.	\$ 55,000	\$ 110,000
480V CUP2 Main-Tie-Main Sw itchboard	1	1	1	Ea.	\$ 150,000	\$ 150,000
480V Low Voltage Cable/Raceway	3000	1	3,000	ft	\$ 80	\$ 240,000
Sub-Total						\$ 2,106,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 42,124	\$ 2,148,324
Design Contingency (10%)				10%	\$ 210,620	\$ 2,358,944
Construction Contingency (10%)				10%	\$ 210,620	\$ 2,569,564
Total with Contingencies						\$ 2,569,564
Design & CA				8%	\$ 205,565	\$ 2,775,129
Construction Management				5%	\$ 128,478	\$ 2,903,607
Commissioning / Start-up & TAB				4.0%	\$ 102,783	\$ 3,006,390
Total with Contingencies & Professional Services						\$ 3,006,390

2024 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1600	1	1,600	ft.	\$ 368	\$ 588,800
15kV Medium Voltage Cable	3200	1	3,200	ft	\$ 50	\$ 160,000
Manholes	3	1	3	Ea.	\$ 15,000	\$ 45,000
15kV Distribution Sw itch	2	1	2	Ea.	\$ 70,000	\$ 140,000
SCADA Fiber	3200	1	3,200	Ea.	\$ 20	\$ 64,000
SCADA Programming	2	1	2	Ea.	\$ 1,200	\$ 2,400
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 1,070,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 21,404	\$ 1,091,604
Design Contingency (10%)				10%	\$ 107,020	\$ 1,198,624
Construction Contingency (10%)				10%	\$ 107,020	\$ 1,305,644
Total with Contingencies						\$ 1,305,644
Design & CA				8%	\$ 104,452	\$ 1,410,096
Construction Management				5%	\$ 65,282	\$ 1,475,378
Commissioning / Start-up & TAB				4.0%	\$ 52,226	\$ 1,527,603
Total with Contingencies & Professional Services						\$ 1,527,603

2025 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2026 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2027 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1500	1	1,500	ft.	\$ 368	\$ 552,000
15kV Medium Voltage Cable	2500	1	2,500	ft	\$ 50	\$ 125,000
480V Low Voltage Cable/Raceway	2000	1	2,000	ft	\$ 80	\$ 160,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1800	1	1,800	Ea.	\$ 20	\$ 36,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV-4160V, 1500kVA FTPP Transformer	2	1	2	Ea.	\$ 50,000	\$ 100,000
4160V FTPP Switchgear	2	1	2	Ea.	\$ 58,000	\$ 116,000
Sub-Total						\$ 1,210,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 24,204	\$ 1,234,404
Design Contingency (10%)				10%	\$ 121,020	\$ 1,355,424
Construction Contingency (10%)				10%	\$ 121,020	\$ 1,476,444
Total with Contingencies						\$ 1,476,444
Design & CA				8%	\$ 118,116	\$ 1,594,560
Construction Management				5%	\$ 73,822	\$ 1,668,382
Commissioning / Start-up & TAB				4.0%	\$ 59,058	\$ 1,727,439
Total with Contingencies & Professional Services						\$ 1,727,439

2028 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 395,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,904	\$ 403,104
Design Contingency (10%)				10%	\$ 39,520	\$ 442,624
Construction Contingency (10%)				10%	\$ 39,520	\$ 482,144
Total with Contingencies						\$ 482,144
Design & CA				8%	\$ 38,572	\$ 520,716
Construction Management				5%	\$ 24,107	\$ 544,823
Commissioning / Start-up & TAB				4.0%	\$ 19,286	\$ 564,108
Total with Contingencies & Professional Services						\$ 564,108

2029 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 395,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,904	\$ 403,104
Design Contingency (10%)				10%	\$ 39,520	\$ 442,624
Construction Contingency (10%)				10%	\$ 39,520	\$ 482,144
Total with Contingencies						\$ 482,144
Design & CA				8%	\$ 38,572	\$ 520,716
Construction Management				5%	\$ 24,107	\$ 544,823
Commissioning / Start-up & TAB				4.0%	\$ 19,286	\$ 564,108
Total with Contingencies & Professional Services						\$ 564,108

2030 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2031 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2032 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 375,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,504	\$ 382,704
Design Contingency (10%)				10%	\$ 37,520	\$ 420,224
Construction Contingency (10%)				10%	\$ 37,520	\$ 457,744
Total with Contingencies						\$ 457,744
Design & CA				8%	\$ 36,620	\$ 494,364
Construction Management				5%	\$ 22,887	\$ 517,251
Commissioning / Start-up & TAB				4.0%	\$ 18,310	\$ 535,560
Total with Contingencies & Professional Services						\$ 535,560

2033 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	1000	1	1,000	ft.	\$ 368	\$ 368,000
15kV Medium Voltage Cable	2000	1	2,000	ft	\$ 50	\$ 100,000
SCADA Fiber	2000	1	2,000	ft	\$ 20	\$ 40,000
SCADA Programming	2	1	2	Ea.	\$ 1,200	\$ 2,400
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 650,400
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 13,008	\$ 663,408
Design Contingency (10%)				10%	\$ 65,040	\$ 728,448
Construction Contingency (10%)				10%	\$ 65,040	\$ 793,488
Total with Contingencies						\$ 793,488
Design & CA				8%	\$ 63,479	\$ 856,967
Construction Management				5%	\$ 39,674	\$ 896,641
Commissioning / Start-up & TAB				4.0%	\$ 31,740	\$ 928,381
Total with Contingencies & Professional Services						\$ 928,381

2034 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1100	1	1,100	ft.	\$ 368	\$ 404,800
15kV Medium Voltage Cable	2300	1	2,300	ft	\$ 50	\$ 115,000
480V Low Voltage Cable/Raceway	1000	1	1,000	ft	\$ 80	\$ 80,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV-4160V, 1500kVA FTTP Transformer	1	1	1	Ea.	\$ 50,000	\$ 50,000
4160V FTTP Switchgear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1800	1	1,800	ft	\$ 20	\$ 36,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 900,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 18,000	\$ 918,000
Design Contingency (10%)				10%	\$ 90,000	\$ 1,008,000
Construction Contingency (10%)				10%	\$ 90,000	\$ 1,098,000
Total with Contingencies						\$ 1,098,000
Design & CA				8%	\$ 87,840	\$ 1,185,840
Construction Management				5%	\$ 54,900	\$ 1,240,740
Commissioning / Start-up & TAB				4.0%	\$ 43,920	\$ 1,284,660
Total with Contingencies & Professional Services						\$ 1,284,660

2035 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2036 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2037 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	600	1	600	ft.	\$ 368	\$ 220,800
15kV Medium Voltage Cable	1200	1	1,200	ft	\$ 50	\$ 60,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1200	1	1,200	ft	\$ 20	\$ 24,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 411,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 8,220	\$ 419,220
Design Contingency (10%)				10%	\$ 41,100	\$ 460,320
Construction Contingency (10%)				10%	\$ 41,100	\$ 501,420
Total with Contingencies						\$ 501,420
Design & CA				8%	\$ 40,114	\$ 541,534
Construction Management				5%	\$ 25,071	\$ 566,605
Commissioning / Start-up & TAB				4.0%	\$ 20,057	\$ 586,661
Total with Contingencies & Professional Services						\$ 586,661

Base Case: Thermal Utility Costs

Building Side/Branch Connection Costs

Key	Building	Year Built	Total Steam System Cost	Total Condensate Return System Cost	Total Chilled Water System Cost	Total Bldg Dist. Cost	Total Bldg Dist. Cost w/ Contingency & Professional Services	Total Bldg Equip. Cost	Total Bldg Equip. Cost w/ Contingency & Professional Services	Total Project Cost:
501	Alvin I. Thomas Administration Building	1949	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 194,569	\$ -	\$ -	\$ 194,569
503	G.R. Woolfolk Social & Political Science Building	1932	\$ 74,685	\$ 23,774	\$ 35,647	\$ 134,106	\$ 191,423	\$ -	\$ -	\$ 191,423
504	Gilchrist Engineering Building	1952	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 194,569	\$ -	\$ -	\$ 194,569
506	Thomas E. Gray Center	1996	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
508	W.R. Banks Building	1945	\$ 81,767	\$ 23,774	\$ 60,049	\$ 165,591	\$ 236,364	\$ -	\$ -	\$ 236,364
517	A N Poindexter Veterinary Hospital	1925	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
523	Transportation Center	1985	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
529	Fry-Thomas Power Plant	1916	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
535	Jesse M Drew Memorial Complex	1955	\$ 71,663	\$ 23,774	\$ -	\$ 95,438	\$ 136,228	\$ -	\$ -	\$ 136,228
537	Hilliard Hall-Communication Building	1939	\$ 76,728	\$ 23,774	\$ 47,167	\$ 147,670	\$ 210,784	\$ -	\$ -	\$ 210,784
541	Anderson Hall	1933	\$ 74,685	\$ 23,774	\$ 35,647	\$ 134,106	\$ 191,423	\$ -	\$ -	\$ 191,423
544	Evans Hall	1928	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 194,569	\$ -	\$ -	\$ 194,569
658	May Building - Home Economics	1958	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 194,569	\$ -	\$ -	\$ 194,569
668	M.T. Harrington Science Building	1961	\$ 81,767	\$ 23,774	\$ 60,049	\$ 165,591	\$ 236,364	\$ -	\$ -	\$ 236,364
669	William "Billy" J. Nicks Building	1964	\$ 82,578	\$ 23,774	\$ 76,563	\$ 182,915	\$ 261,093	\$ -	\$ -	\$ 261,093
674	Physical Plant Administration Building	1966	\$ 71,663	\$ 23,774	\$ 27,537	\$ 122,975	\$ 175,535	\$ -	\$ -	\$ 175,535
687	Henrietta Farrell Hall	1973	\$ 76,728	\$ 23,774	\$ -	\$ 100,503	\$ 143,457	\$ -	\$ -	\$ 143,457
688	Owens-Franklin Health Clinic	1977	\$ 76,728	\$ 23,774	\$ 37,850	\$ 138,353	\$ 197,485	\$ -	\$ -	\$ 197,485
689	Hobart Thomas Taylor Sr. Hall	1976	\$ -	\$ -	\$ 123,092	\$ 123,092	\$ 175,701	\$ -	\$ -	\$ 175,701
682	Farm Shop	1973	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
702	Meat Goat Building #1	1977	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
704	C.L. Wilson Engineering Complex	1978	\$ 81,767	\$ 23,774	\$ 60,049	\$ 165,591	\$ 236,364	\$ -	\$ -	\$ 236,364
707	E Kika De La Garza Building	1983	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
708	Environmental Chambers Building	1983	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
709	Goat Auxiliary Building	1983	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
710	Goat Dairy Building	1983	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
712	Meat Goat Building #2	1983	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
713	Meat Goat Building #3	1983	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
714	Goat Reproduction Building	1983	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
715	Goat Nutrition Building	1983	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
716	Goat Yearling Building	1983	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
717	Goat Maternity	1983	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
724	Austin Greaux Chemical Engineering	1984	\$ 74,685	\$ 23,774	\$ 35,647	\$ 134,106	\$ 191,423	\$ -	\$ -	\$ 191,423
727	Central Receiving	1985	\$ 76,728	\$ 23,774	\$ 37,850	\$ 138,353	\$ 197,485	\$ -	\$ -	\$ 197,485
739	Utilities Plant Annex	1983	\$ 71,663	\$ 23,774	\$ 27,537	\$ 122,975	\$ 175,535	\$ -	\$ -	\$ 175,535
741	Johnson-Phillip Al Faiths Chapel	1986	\$ 71,663	\$ 23,774	\$ 27,537	\$ 122,975	\$ 175,535	\$ -	\$ -	\$ 175,535
742	Wilhelmina Delco Building	1986	\$ 81,767	\$ 23,774	\$ 60,049	\$ 165,591	\$ 236,364	\$ -	\$ -	\$ 236,364
743	Sam R. Collins Engineering Tech Building	1987	\$ 82,578	\$ 23,774	\$ 60,049	\$ 166,402	\$ 237,522	\$ -	\$ -	\$ 237,522
744	John B. Coleman Library	1988	\$ 91,167	\$ 23,774	\$ 76,563	\$ 191,504	\$ 273,353	\$ -	\$ -	\$ 273,353
745	Jesse H & Mary Gibbs Jones Building	1988	\$ 76,728	\$ 23,774	\$ 47,167	\$ 147,670	\$ 210,784	\$ -	\$ -	\$ 210,784
746	Calf and Hay Barn	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
747	Swine Farrowing Building	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
748	Swine Finishing Building	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
749	Laying House	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
750	Turkey House Building	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
751	Pullet Broiler Building	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
752	Office/Lab Processing Building	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
753	Feed Mill Building	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
754	Head House	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
755	Green House One	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
756	Green House Two	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
757	Swine Gestation Building	1988	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
758	Leroy G. Moore Jr. Gym	1988	\$ 76,728	\$ 23,774	\$ 47,167	\$ 147,670	\$ 210,784	\$ -	\$ -	\$ 210,784
761	Carden-Waller Cooperative Extension	1992	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 194,569	\$ -	\$ -	\$ 194,569
Housing	University Village (Phase I & II)	1996	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Housing	University Village North (Phase III)	1998	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Housing	University College (Phase IV)	2000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
790	Elmer E. O'Banion Science Building	2001	\$ 91,167	\$ 23,774	\$ 101,536	\$ 216,477	\$ 309,000	\$ -	\$ -	\$ 309,000
779	Willie A. Tempton Sr. Memorial Student Center Building	2003	\$ 91,167	\$ 23,774	\$ 76,563	\$ 191,504	\$ 273,353	\$ -	\$ -	\$ 273,353
783	Nathelyne Archie Kennedy Architecture Building	2005	\$ 82,578	\$ 23,774	\$ 76,563	\$ 182,915	\$ 261,093	\$ -	\$ -	\$ 261,093
789	Don K. Clark Juvenile Justice & Psychology Building	2006	\$ 81,767	\$ 23,774	\$ 60,049	\$ 165,591	\$ 236,364	\$ -	\$ -	\$ 236,364
793	New Electrical Engineering Building	2005	\$ 76,728	\$ 23,774	\$ 47,167	\$ 147,670	\$ 210,784	\$ -	\$ -	\$ 210,784
Housing	University View (Phase VII)	2013	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
848	Student Recreation Center	2014	\$ 82,578	\$ 23,774	\$ 76,563	\$ 182,915	\$ 261,093	\$ -	\$ -	\$ 261,093
849	Agriculture and Business Multipurpose Building	2016	\$ 82,578	\$ 23,774	\$ 76,563	\$ 182,915	\$ 261,093	\$ -	\$ -	\$ 261,093
850	Panther Plaza	2016	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
853	Baseball Stadium	2014	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
870	Panther Stadium	2016	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
872	Athletic Fieldhouse	2016	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Key	Building	Year Built	Total Steam System Cost	Total Condensate Return System Cost	Total Chilled Water System Cost	Total Bldg Dist. Cost	Total Bldg Dist. Cost w/ Contingency & Professional Services	Total Bldg Equip. Cost	Total Bldg Equip Cost w/ Contingency & Professional Services	Total Project Cost:
New	School of Architecture Fabrication Design Center	2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New	Welcome Center	2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New	University Square (Phase VIII)	2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F1	Police Station	2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 46,485	\$ 66,353	\$ 66,353
F2	Meat Processing Facility	2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 207,760	\$ 296,556	\$ 296,556
F3	KCE Facility (fab)	2019	\$ 76,728	\$ 23,774	\$ 37,850	\$ 138,353	\$ 197,485	\$ 16,420	\$ 23,438	\$ 220,923
F4	ROTC Building	2020	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 52,538	\$ 74,992	\$ 74,992
F5	Cultural Arts Center	2021	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 194,569	\$ 12,468	\$ 17,797	\$ 212,366
F6	Housing 2 (From 2011 Campus MP)	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F7/F8	Future Academic Building	2023	\$ 91,576	\$ 24,455	\$ 76,563	\$ 192,594	\$ 274,908	\$ 86,836	\$ 123,949	\$ 398,857
F9	Future Support Building	2024	\$ 43,226	\$ 16,676	\$ 23,496	\$ 83,398	\$ 119,042	\$ 11,368	\$ 16,226	\$ 135,268
F10	Future Office	2024	\$ 71,663	\$ 23,774	\$ 26,744	\$ 122,182	\$ 174,402	\$ 9,600	\$ 13,703	\$ 188,105
F11	Future Stud. Activities Building	2025	\$ 43,226	\$ 16,676	\$ 24,889	\$ 84,791	\$ 121,031	\$ 11,067	\$ 15,798	\$ 136,829
F12	Future Retail Office Building	2026	\$ 70,303	\$ 23,774	\$ 26,744	\$ 120,822	\$ 172,461	\$ 9,600	\$ 13,703	\$ 186,164
F13	Future Housing Building	2027	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F14/F15	Future Academic Building	2028	\$ 55,391	\$ 17,175	\$ 50,318	\$ 122,884	\$ 175,405	\$ 84,397	\$ 120,469	\$ 295,874
F16	Future Support Building	2029	\$ 43,226	\$ 16,676	\$ 23,496	\$ 83,398	\$ 119,042	\$ 11,157	\$ 15,926	\$ 134,968
F17	Future Office	2029	\$ 40,939	\$ 16,676	\$ 17,129	\$ 74,744	\$ 106,689	\$ 9,600	\$ 13,703	\$ 120,392
F18	Future Stud. Activities Building	2030	\$ 43,226	\$ 16,676	\$ 23,496	\$ 83,398	\$ 119,042	\$ 10,868	\$ 15,510	\$ 134,552
F19	Future Retail Office Building	2031	\$ 70,303	\$ 23,774	\$ 26,744	\$ 120,822	\$ 172,461	\$ 9,600	\$ 13,703	\$ 186,164
F20	Future Housing Building	2032	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F21/F22	Future Academic Building	2033	\$ 55,391	\$ 17,175	\$ 50,318	\$ 122,884	\$ 175,405	\$ 81,913	\$ 116,923	\$ 292,327
F23	Future Support Building	2034	\$ 43,226	\$ 16,676	\$ 23,496	\$ 83,398	\$ 119,042	\$ 10,947	\$ 15,626	\$ 134,668
F24	Future Office	2034	\$ 40,939	\$ 16,676	\$ 17,129	\$ 74,744	\$ 106,689	\$ 9,600	\$ 13,703	\$ 120,392
F25	Future Stud. Activities Building	2035	\$ 43,226	\$ 16,676	\$ 23,496	\$ 83,398	\$ 119,042	\$ 10,664	\$ 15,222	\$ 134,264
F26	Future Retail Office Building	2036	\$ 70,303	\$ 23,774	\$ 26,744	\$ 120,822	\$ 172,461	\$ 9,600	\$ 13,703	\$ 186,164
F27	Future Housing Building	2037	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Main Header Distribution Costs

Size (in)	Year Built	Service	Piping Location	Rounded Length of Trench (L.F.)	Piping	Fittings	Joint Kits	Valves	Trenching	Total Cost:	Total Cost w/ Contingency & Professional Services
10	2018	STM	A	800	\$202,761	\$48,655	\$18,710	\$7,146	\$186,115	\$463,387	\$661,438
4	2018	CR	A	800	\$56,926	\$13,192	\$8,562	\$2,814	-	\$81,494	\$116,325
24	2018	CHW	A	700	\$576,535	\$128,657	\$89,781	\$75,215	\$162,851	\$1,033,039	\$1,474,560
10	2018	STM	B	3700	\$937,770	\$210,840	\$86,999	\$35,729	\$860,782	\$2,132,120	\$3,043,388
4	2018	CR	B	3700	\$263,281	\$57,167	\$39,814	\$14,071	-	\$374,333	\$534,322
24	2018	CHW	B	3700	\$3,047,397	\$514,630	\$463,871	\$376,076	-	\$4,401,973	\$6,283,377
24	2023	CHW	C	200	\$164,724	\$64,329	\$24,939	\$75,215	\$46,529	\$375,736	\$536,326
10	2023	STM	D	3500	\$887,080	\$194,622	\$82,322	\$35,729	\$814,253	\$2,014,005	\$2,874,791
4	2023	CR	D	3500	\$249,050	\$52,769	\$37,673	\$14,071	-	\$353,563	\$504,676
24	2023	CHW	D	3500	\$2,882,673	\$450,301	\$438,931	\$376,076	-	\$4,147,981	\$5,920,828
10	2024	STM	E	800	\$202,761	\$48,655	\$18,710	\$7,146	\$186,115	\$463,387	\$661,438
4	2024	CR	E	800	\$56,926	\$13,192	\$8,562	\$2,814	-	\$81,494	\$116,325
24	2024	CHW	E	800	\$658,897	\$128,657	\$99,757	\$75,215	-	\$962,526	\$1,373,910
10	2026	STM	F	400	\$101,381	\$32,437	\$9,355	\$7,146	\$93,058	\$243,376	\$347,394
4	2026	CR	F	400	\$28,463	\$8,795	\$4,281	\$2,814	-	\$44,353	\$63,309
24	2026	CHW	F	400	\$329,448	\$64,329	\$49,879	\$75,215	-	\$518,871	\$740,636
6	2033	STM	G	1000	\$161,115	\$38,652	\$15,213	\$7,088	\$232,644	\$454,712	\$649,057
4	2033	CR	G	1000	\$71,157	\$17,590	\$10,703	\$5,629	-	\$105,078	\$149,988
24	2033	CHW	G	1000	\$823,621	\$128,657	\$124,696	\$150,430	-	\$1,227,405	\$1,751,998

Size (in)	Year Built	Service	Piping Location	Rounded Length of Trench (L.F.)	Piping	Fittings	Joint Kits	Valves	Trenching	Total Cost:	Total Cost w/ Contingency & Professional Services
24	N/A	CHW	N/A	200	\$164,724	\$64,329	\$24,939	\$75,215	\$46,529	\$375,736	\$536,326
20	N/A	CHW	N/A	2800	\$1,982,779	\$313,198	\$276,692	\$225,201	\$651,403	\$3,449,274	\$4,923,493
18	N/A	CHW	N/A	2900	\$1,886,139	\$276,811	\$250,769	\$187,372	\$674,667	\$3,275,758	\$4,675,817
12	N/A	CHW	N/A	2900	\$1,383,778	\$167,649	\$137,425	\$73,883	\$674,667	\$2,437,402	\$3,479,147
10	N/A	CHW	N/A	1900	\$757,614	\$95,786	\$76,680	\$42,874	\$442,023	\$1,414,978	\$2,019,739
8	N/A	CHW	N/A	400	\$128,129	\$19,952	\$13,125	\$10,957	\$93,058	\$265,220	\$378,576
12	N/A	STM	N/A	200	\$59,924	\$38,992	\$5,495	\$9,235	\$46,529	\$160,175	\$228,634
10	N/A	STM	N/A	4700	\$1,191,221	\$259,495	\$110,386	\$42,874	\$1,093,426	\$2,697,403	\$3,850,274
8	N/A	STM	N/A	1000	\$207,283	\$51,763	\$19,300	\$10,957	\$232,644	\$521,947	\$745,027
4	N/A	STM	N/A	3100	\$353,949	\$89,397	\$42,659	\$11,257	\$721,196	\$1,218,457	\$1,739,226
2	N/A	CR	N/A	9000	\$368,687	\$79,570	\$50,862	\$21,515	-	\$520,634	\$743,153

Base Case: Mechanical Equipment Costs

Heating Equipment

2020						
FTPP x Boiler #11 & #12 Demolition & 1 - 20000 MBH Firetube Boiler Installation						
FTPP						
Heating	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
20000 MBH Firetube Boiler (Equipment)	1	20,000	20,000	MBH	\$ 20	\$ 400,000
Boiler Demolition	2	25,000	50,000	MBH	\$ 2	\$ 100,000
Auxiliary Equipment	1	20,000	20,000	MBH	\$ 2	\$ 40,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Boiler Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Pump Controls	0	6	0	pt.	\$ 1,740	\$ -
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 644,372
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 12,887	\$ 657,260
Design Contingency (10%)				10%	\$ 64,437	\$ 721,697
Construction Contingency (10%)				10%	\$ 64,437	\$ 786,134
Total with Contingencies						\$ 786,134
Design & CA				8%	\$ 62,891	\$ 849,025
Construction Management				5%	\$ 39,307	\$ 888,332
Commissioning				2.0%	\$ 15,723	\$ 904,054
Start-up & TAB				2.0%	\$ 15,723	\$ 919,777
Total with Contingencies & Professional Services						\$ 919,777

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2022						
FTPP Boiler #10 Replacement						
FTPP						
Heating	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
20 MMBtu/hr Firetube Boiler (Equipment)	1	20,000	20,000	MBH	\$ 20	\$ 400,000
Boiler Demolition	1	20,000	20,000	MBH	\$ 2	\$ 40,000
Deaerator	1	110,000	110,000	MBH	\$ 1	\$ 100,000
Deaerator Demolition	1	110,000	110,000	MBH	\$ 2	\$ 220,000
Feedwater Pumps	3	15	45	hp	\$ 933	\$ 42,000
Pump Demolition	3	15	45	hp	\$ 28	\$ 1,253
RO	1	50	50	gpm	\$ 3,000	\$ 150,000
Auxiliary Equipment	1	20,000	20,000	MBH	\$ 2	\$ 40,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Boiler Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Pump Controls	3	6	18	pt.	\$ 1,740	\$ 31,312
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 1,128,937
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 22,579	\$ 1,151,515
Design Contingency (10%)				10%	\$ 112,894	\$ 1,264,409
Construction Contingency (10%)				10%	\$ 112,894	\$ 1,377,303
Total with Contingencies						\$ 1,377,303
Design & CA				8%	\$ 110,184	\$ 1,487,487
Construction Management				5%	\$ 68,865	\$ 1,556,352
Commissioning				2.0%	\$ 27,546	\$ 1,583,898
Start-up & TAB				2.0%	\$ 27,546	\$ 1,611,444
Total with Contingencies & Professional Services						\$ 1,611,444

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

Chilled Water Equipment

2020 FTPP 1100 Ton Chiller Replacement & 1100 Ton Chiller Addition						
FTPP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Building Expansion	1	1,650	1,650	sf	\$ 348	\$ 574,048
1100 Ton Chillers w ith VFDs (Equipment)	2	1,100	2,200	tons	\$ 403	\$ 885,940
Chw Plant Pumps w ith VFDs - 2,540 gpm, 115ft head	2	125	250	hp	\$ 468	\$ 116,933
Packaged S.S. Cooling Tow ers w ith VFDs	1	1,375	1,375	tons	\$ 395	\$ 543,125
Condenser Water Pumps w ith VFDs - 3,300 gpm, 75 ft head	2	75	150	hp	\$ 537	\$ 80,600
2 x 24" Bagstop Services / 2 x 30" Bagstop Services	4	1	4	pipe	\$ 75,000	\$ 300,000
Chiller Demolition	1	1,100	1,100	tons	\$ 13	\$ 14,300
Pump Demolition	1	200	200	hp	\$ 28	\$ 5,567
Auxiliary Equipment	1	2,200	2,200	tons	\$ 48	\$ 105,600
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	2	30	60	pt.	\$ 2,000	\$ 120,000
Pump Controls	2	6	12	pt.	\$ 1,740	\$ 20,874
Cooling Tow er Controls	2	8	16	pt.	\$ 1,740	\$ 27,833
Electrical Controls	2	30	60	pt.	\$ 1,740	\$ 104,372
Sub-Total						\$ 2,899,193
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 57,984	\$ 2,957,177
Design Contingency (10%)				10%	\$ 289,919	\$ 3,247,096
Construction Contingency (10%)				10%	\$ 289,919	\$ 3,537,015
Total with Contingencies						\$ 3,537,015
Design & CA				8%	\$ 282,961	\$ 3,819,976
Construction Management				5%	\$ 176,851	\$ 3,996,827
Commissioning				2.0%	\$ 70,740	\$ 4,067,567
Start-up & TAB				2.0%	\$ 70,740	\$ 4,138,308
Total with Contingencies & Professional Services						\$ 4,138,308

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2023 CUP-2 Construction & 1000 Ton Chiller Install						
CUP-2						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Building	1	4,500	4,500	sf	\$ 348	\$ 1,565,586
1000 Ton Chillers w ith VFDs (Equipment)	1	1,000	1,000	tons	\$ 403	\$ 402,700
Chw Plant Pumps w ith VFDs - 2,000 gpm, 120ft head	1	100	100	hp	\$ 515	\$ 51,500
Packaged S.S. Cooling Tow ers w ith VFDs	1	1,375	1,375	tons	\$ 395	\$ 543,125
Condenser Water Pumps w ith VFDs - 3,000 gpm, 120 ft head	1	150	150	hp	\$ 447	\$ 67,110
Auxiliary Equipment	1	1,000	1,000	tons	\$ 48	\$ 48,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tow er Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 2,814,561
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 56,291	\$ 2,870,852
Design Contingency (10%)				10%	\$ 281,456	\$ 3,152,308
Construction Contingency (10%)				10%	\$ 281,456	\$ 3,433,764
Total with Contingencies						\$ 3,433,764
Design & CA				8%	\$ 274,701	\$ 3,708,465
Construction Management				5%	\$ 171,688	\$ 3,880,154
Commissioning				2.0%	\$ 68,675	\$ 3,948,829
Start-up & TAB				2.0%	\$ 68,675	\$ 4,017,504
Total with Contingencies & Professional Services						\$ 4,017,504

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2027						
FTTP x 2 - 1100 Ton Chiller Replacement						
FTTP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1100 Ton Chillers with VFDs (Equipment)	2	1,100	2,200	tons	\$ 403	\$ 885,940
Chw Plant Pumps w ith VFDs - 2,540 gpm, 115ft head	2	125	250	hp	\$ 468	\$ 116,933
Condenser Water Pumps w ith VFDs - 3,300 gpm, 75 ft head	2	75	150	hp	\$ 447	\$ 67,110
Chiller Demolition	2	1,100	2,200	tons	\$ 13	\$ 28,600
Pump Demolition	1	400	400	hp	\$ 28	\$ 11,133
Auxiliary Equipment	1	2,200	2,200	tons	\$ 48	\$ 105,600
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	2	30	60	pt.	\$ 2,000	\$ 120,000
Pump Controls	2	6	12	pt.	\$ 1,740	\$ 20,874
Cooling Tower Controls	2	8	16	pt.	\$ 1,740	\$ 27,833
Electrical Controls	2	30	60	pt.	\$ 1,740	\$ 104,372
Sub-Total						\$ 1,488,396
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 29,768	\$ 1,518,164
Design Contingency (10%)				10%	\$ 148,840	\$ 1,667,004
Construction Contingency (10%)				10%	\$ 148,840	\$ 1,815,843
Total with Contingencies						\$ 1,815,843
Design & CA				8%	\$ 145,267	\$ 1,961,111
Construction Management				5%	\$ 90,792	\$ 2,051,903
Commissioning				2.0%	\$ 36,317	\$ 2,088,220
Start-up & TAB				2.0%	\$ 36,317	\$ 2,124,537
Total with Contingencies & Professional Services						\$ 2,124,537

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2032						
CUP-2 1000 Ton Chiller Install						
CUP-2						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1000 Ton Chillers w ith VFDs (Equipment)	1	1,000	1,000	tons	\$ 403	\$ 402,700
Chw Plant Pumps w ith VFDs - 2,000 gpm, 120ft head	1	100	100	hp	\$ 515	\$ 51,500
Packaged S.S. Cooling Towers w ith VFDs	1	1,375	1,375	tons	\$ 395	\$ 543,125
Condenser Water Pumps w ith VFDs - 3,000 gpm, 120 ft head	1	150	150	hp	\$ 447	\$ 67,110
Auxiliary Equipment	1	1,000	1,000	tons	\$ 48	\$ 48,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 1,248,975
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 24,979	\$ 1,273,954
Design Contingency (10%)				10%	\$ 124,897	\$ 1,398,852
Construction Contingency (10%)				10%	\$ 124,897	\$ 1,523,749
Total with Contingencies						\$ 1,523,749
Design & CA				8%	\$ 121,900	\$ 1,645,649
Construction Management				5%	\$ 76,187	\$ 1,721,837
Commissioning				2.0%	\$ 30,475	\$ 1,752,312
Start-up & TAB				2.0%	\$ 30,475	\$ 1,782,787
Total with Contingencies & Professional Services						\$ 1,782,787

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2034 FTPP 1100 Ton Chiller Replacement						
FTPP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1100 Ton Chillers with VFD's (Equipment)	1	1,100	1,100	tons	\$ 403	\$ 442,970
Chw Plant Pumps w with VFDs - 2,540 gpm, 125ft head	1	125	125	hp	\$ 468	\$ 58,467
Condenser Water Pumps with VFDs - 3,300 gpm, 75 ft head	1	100	100	hp	\$ 447	\$ 44,740
Chiller Demolition	1	1,100	1,100	tons	\$ 13	\$ 14,300
Pump Demolition	1	225	225	hp	\$ 28	\$ 6,263
Auxiliary Equipment	1	1,100	1,100	tons	\$ 48	\$ 52,800
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 756,079
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 15,122	\$ 771,201
Design Contingency (10%)				10%	\$ 75,608	\$ 846,808
Construction Contingency (10%)				10%	\$ 75,608	\$ 922,416
Total with Contingencies						\$ 922,416
Design & CA				8%	\$ 73,793	\$ 996,210
Construction Management				5%	\$ 46,121	\$ 1,042,330
Commissioning				2.0%	\$ 18,448	\$ 1,060,779
Start-up & TAB				2.0%	\$ 18,448	\$ 1,079,227
Total with Contingencies & Professional Services						\$ 1,079,227

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

Option 1

Option 1 Capital Cost						
Phase	Year	Distribution Expansion	Existing Distribution Replacement	Mechanical Equipment	Electrical Equipment & Distribution	Total
		Total Cost	Total Cost	Total Cost	Total Cost	
PH1	2018	\$ 8,987,000	\$ 2,066,000	\$ 360,000	\$ 536,000	\$ 11,949,000
	2019	\$ 121,000	\$ 2,066,000	\$ 257,000	\$ 3,676,000	\$ 6,120,000
	2020	\$ -	\$ 2,066,000	\$ 4,506,000	\$ 1,555,000	\$ 8,127,000
	2021	\$ 121,000	\$ 2,066,000	\$ 298,000	\$ 515,000	\$ 3,000,000
	2022	\$ -	\$ 2,066,000	\$ 514,000	\$ 486,000	\$ 3,066,000
PH2	2023	\$ 7,796,000	\$ 2,066,000	\$ 4,763,000	\$ 3,007,000	\$ 17,632,000
	2024	\$ 1,811,000	\$ 2,066,000	\$ 41,000	\$ 1,528,000	\$ 5,446,000
	2025	\$ 69,000	\$ 2,066,000	\$ 27,000	\$ 515,000	\$ 2,677,000
	2026	\$ 979,000	\$ 2,066,000	\$ 12,000	\$ 349,000	\$ 3,406,000
	2027	\$ -	\$ 2,066,000	\$ 2,125,000	\$ 1,728,000	\$ 5,919,000
PH3	2028	\$ 106,000	\$ -	\$ 194,000	\$ 565,000	\$ 865,000
	2029	\$ 125,000	\$ -	\$ 41,000	\$ 565,000	\$ 731,000
	2030	\$ 67,000	\$ -	\$ 26,000	\$ 515,000	\$ 608,000
	2031	\$ 105,000	\$ -	\$ 12,000	\$ 515,000	\$ 632,000
	2032	\$ -	\$ -	\$ 1,783,000	\$ 536,000	\$ 2,319,000
	2033	\$ 2,190,000	\$ -	\$ 188,000	\$ 929,000	\$ 3,307,000
	2034	\$ 125,000	\$ -	\$ 1,119,000	\$ 1,285,000	\$ 2,529,000
	2035	\$ 67,000	\$ -	\$ 26,000	\$ 349,000	\$ 442,000
	2036	\$ 105,000	\$ -	\$ 12,000	\$ 349,000	\$ 466,000
2037	\$ -	\$ -	\$ -	\$ 587,000	\$ 587,000	
Total		\$ 22,774,000	\$ 20,660,000	\$ 16,304,000	\$ 20,090,000	\$ 79,828,000

Option 1: Electrical Equipment & Distribution Cost

2018 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 375,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,504	\$ 382,704
Design Contingency (10%)				10%	\$ 37,520	\$ 420,224
Construction Contingency (10%)				10%	\$ 37,520	\$ 457,744
Total with Contingencies						\$ 457,744
Design & CA				8%	\$ 36,620	\$ 494,364
Construction Management				5%	\$ 22,887	\$ 517,251
Commissioning / Start-up & TAB				4.0%	\$ 18,310	\$ 535,560
Total with Contingencies & Professional Services						\$ 535,560

2019 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	2500	1	2,500	ft.	\$ 368	\$ 920,000
15kV Medium Voltage Cable	2700	1	2,700	ft	\$ 50	\$ 135,000
Manholes	6	1	6	Ea.	\$ 15,000	\$ 90,000
15kV Southeast Campus Switchgear	1	1	1	Ea.	\$ 750,000	\$ 750,000
15kV Switchgear #2 Replacement	1	1	1	Ea.	\$ 485,000	\$ 485,000
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	2700	1	2,700	ft	\$ 20	\$ 54,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 2,575,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 51,504	\$ 2,626,704
Design Contingency (10%)				10%	\$ 257,520	\$ 2,884,224
Construction Contingency (10%)				10%	\$ 257,520	\$ 3,141,744
Total with Contingencies						\$ 3,141,744
Design & CA				8%	\$ 251,340	\$ 3,393,084
Construction Management				5%	\$ 157,087	\$ 3,550,171
Commissioning / Start-up & TAB				4.0%	\$ 125,670	\$ 3,675,840
Total with Contingencies & Professional Services						\$ 3,675,840

2020 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
4160V FТПP Sw itchg ear	2	1	2	Ea.	\$ 58,000	\$ 116,000
15kV-4160V, 1500kVA FТПP Transformer	2	1	2	Ea.	\$ 55,000	\$ 110,000
480V FТПP Sw itchboard	1	1	1	Ea.	\$ 35,000	\$ 30,000
15kV-480V, 1000kVA FТПP Transformer	1	1	1	Ea.	\$ 50,000	\$ 50,000
Manholes	2	1	2	Ea.	\$ 15,000	\$ 30,000
480V Low Voltage Cable/Raceway	2000	1	2,000	ft	\$ 80	\$ 160,000
15kV Medium Voltage Ductbank	1000	1	1,000	ft.	\$ 368	\$ 368,000
15kV Medium Voltage Cable	1700	1	1,700	ft	\$ 50	\$ 85,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
SCADA Fiber	1700	1	1,700	ft	\$ 20	\$ 34,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 1,089,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 21,784	\$ 1,110,984
Design Contingency (10%)				10%	\$ 108,920	\$ 1,219,904
Construction Contingency (10%)				10%	\$ 108,920	\$ 1,328,824
Total with Contingencies						\$ 1,328,824
Design & CA				8%	\$ 106,306	\$ 1,435,130
Construction Management				5%	\$ 66,441	\$ 1,501,571
Commissioning / Start-up & TAB				4.0%	\$ 53,153	\$ 1,554,724
Total with Contingencies & Professional Services						\$ 1,554,724

2021 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2022 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	500	1	500	Ea.	\$ 20	\$ 10,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 340,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 6,804	\$ 347,004
Design Contingency (10%)				10%	\$ 34,020	\$ 381,024
Construction Contingency (10%)				10%	\$ 34,020	\$ 415,044
Total with Contingencies						\$ 415,044
Design & CA				8%	\$ 33,204	\$ 448,248
Construction Management				5%	\$ 20,752	\$ 469,000
Commissioning / Start-up & TAB				4.0%	\$ 16,602	\$ 485,601
Total with Contingencies & Professional Services						\$ 485,601

2023 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	1500	1	1,500	ft.	\$ 368	\$ 552,000
15kV Medium Voltage Cable	2700	1	2,700	ft	\$ 50	\$ 135,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Medium Voltage 15kV CUP2 Main-Tie-Main Sw itchgear	1	1	1	Ea.	\$ 650,000	\$ 650,000
15kV-4160V, 1500kVA CUP2 Transformer	1	1	1	Ea.	\$ 50,000	\$ 50,000
4160V CUP2 Sw itchgear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV-480V, 1500KVA CUP2 Transformer	2	1	2	Ea.	\$ 55,000	\$ 110,000
480V CUP2 Main-Tie-Main Sw itchboard	1	1	1	Ea.	\$ 150,000	\$ 150,000
480V Low Voltage Cable/Raceway	3000	1	3,000	ft	\$ 80	\$ 240,000
Sub-Total						\$ 2,106,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 42,124	\$ 2,148,324
Design Contingency (10%)				10%	\$ 210,620	\$ 2,358,944
Construction Contingency (10%)				10%	\$ 210,620	\$ 2,569,564
Total with Contingencies						\$ 2,569,564
Design & CA				8%	\$ 205,565	\$ 2,775,129
Construction Management				5%	\$ 128,478	\$ 2,903,607
Commissioning / Start-up & TAB				4.0%	\$ 102,783	\$ 3,006,390
Total with Contingencies & Professional Services						\$ 3,006,390

2024 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1600	1	1,600	ft.	\$ 368	\$ 588,800
15kV Medium Voltage Cable	3200	1	3,200	ft	\$ 50	\$ 160,000
Manholes	3	1	3	Ea.	\$ 15,000	\$ 45,000
15kV Distribution Sw itch	2	1	2	Ea.	\$ 70,000	\$ 140,000
SCADA Fiber	3200	1	3,200	Ea.	\$ 20	\$ 64,000
SCADA Programming	2	1	2	Ea.	\$ 1,200	\$ 2,400
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 1,070,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 21,404	\$ 1,091,604
Design Contingency (10%)				10%	\$ 107,020	\$ 1,198,624
Construction Contingency (10%)				10%	\$ 107,020	\$ 1,305,644
Total with Contingencies						\$ 1,305,644
Design & CA				8%	\$ 104,452	\$ 1,410,096
Construction Management				5%	\$ 65,282	\$ 1,475,378
Commissioning / Start-up & TAB				4.0%	\$ 52,226	\$ 1,527,603
Total with Contingencies & Professional Services						\$ 1,527,603

2025 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2026 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2027 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1500	1	1,500	ft.	\$ 368	\$ 552,000
15kV Medium Voltage Cable	2500	1	2,500	ft	\$ 50	\$ 125,000
480V Low Voltage Cable/Raceway	2000	1	2,000	ft	\$ 80	\$ 160,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1800	1	1,800	Ea.	\$ 20	\$ 36,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV-4160V, 1500kVA FTPP Transformer	2	1	2	Ea.	\$ 50,000	\$ 100,000
4160V FTPP Switchgear	2	1	2	Ea.	\$ 58,000	\$ 116,000
Sub-Total						\$ 1,210,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 24,204	\$ 1,234,404
Design Contingency (10%)				10%	\$ 121,020	\$ 1,355,424
Construction Contingency (10%)				10%	\$ 121,020	\$ 1,476,444
Total with Contingencies						\$ 1,476,444
Design & CA				8%	\$ 118,116	\$ 1,594,560
Construction Management				5%	\$ 73,822	\$ 1,668,382
Commissioning / Start-up & TAB				4.0%	\$ 59,058	\$ 1,727,439
Total with Contingencies & Professional Services						\$ 1,727,439

2028 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 395,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,904	\$ 403,104
Design Contingency (10%)				10%	\$ 39,520	\$ 442,624
Construction Contingency (10%)				10%	\$ 39,520	\$ 482,144
Total with Contingencies						\$ 482,144
Design & CA				8%	\$ 38,572	\$ 520,716
Construction Management				5%	\$ 24,107	\$ 544,823
Commissioning / Start-up & TAB				4.0%	\$ 19,286	\$ 564,108
Total with Contingencies & Professional Services						\$ 564,108

2029 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 395,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,904	\$ 403,104
Design Contingency (10%)				10%	\$ 39,520	\$ 442,624
Construction Contingency (10%)				10%	\$ 39,520	\$ 482,144
Total with Contingencies						\$ 482,144
Design & CA				8%	\$ 38,572	\$ 520,716
Construction Management				5%	\$ 24,107	\$ 544,823
Commissioning / Start-up & TAB				4.0%	\$ 19,286	\$ 564,108
Total with Contingencies & Professional Services						\$ 564,108

2030 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2031 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2032 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 375,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,504	\$ 382,704
Design Contingency (10%)				10%	\$ 37,520	\$ 420,224
Construction Contingency (10%)				10%	\$ 37,520	\$ 457,744
Total with Contingencies						\$ 457,744
Design & CA				8%	\$ 36,620	\$ 494,364
Construction Management				5%	\$ 22,887	\$ 517,251
Commissioning / Start-up & TAB				4.0%	\$ 18,310	\$ 535,560
Total with Contingencies & Professional Services						\$ 535,560

2033 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	1000	1	1,000	ft.	\$ 368	\$ 368,000
15kV Medium Voltage Cable	2000	1	2,000	ft	\$ 50	\$ 100,000
SCADA Fiber	2000	1	2,000	ft	\$ 20	\$ 40,000
SCADA Programming	2	1	2	Ea.	\$ 1,200	\$ 2,400
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 650,400
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 13,008	\$ 663,408
Design Contingency (10%)				10%	\$ 65,040	\$ 728,448
Construction Contingency (10%)				10%	\$ 65,040	\$ 793,488
Total with Contingencies						\$ 793,488
Design & CA				8%	\$ 63,479	\$ 856,967
Construction Management				5%	\$ 39,674	\$ 896,641
Commissioning / Start-up & TAB				4.0%	\$ 31,740	\$ 928,381
Total with Contingencies & Professional Services						\$ 928,381

2034 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1100	1	1,100	ft.	\$ 368	\$ 404,800
15kV Medium Voltage Cable	2300	1	2,300	ft	\$ 50	\$ 115,000
480V Low Voltage Cable/Raceway	1000	1	1,000	ft	\$ 80	\$ 80,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV-4160V, 1500kVA FTTP Transformer	1	1	1	Ea.	\$ 50,000	\$ 50,000
4160V FTTP Switchgear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1800	1	1,800	ft	\$ 20	\$ 36,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 900,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 18,000	\$ 918,000
Design Contingency (10%)				10%	\$ 90,000	\$ 1,008,000
Construction Contingency (10%)				10%	\$ 90,000	\$ 1,098,000
Total with Contingencies						\$ 1,098,000
Design & CA				8%	\$ 87,840	\$ 1,185,840
Construction Management				5%	\$ 54,900	\$ 1,240,740
Commissioning / Start-up & TAB				4.0%	\$ 43,920	\$ 1,284,660
Total with Contingencies & Professional Services						\$ 1,284,660

2035 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2036 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2037 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	600	1	600	ft.	\$ 368	\$ 220,800
15kV Medium Voltage Cable	1200	1	1,200	ft	\$ 50	\$ 60,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1200	1	1,200	ft	\$ 20	\$ 24,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 411,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 8,220	\$ 419,220
Design Contingency (10%)				10%	\$ 41,100	\$ 460,320
Construction Contingency (10%)				10%	\$ 41,100	\$ 501,420
Total with Contingencies						\$ 501,420
Design & CA				8%	\$ 40,114	\$ 541,534
Construction Management				5%	\$ 25,071	\$ 566,605
Commissioning / Start-up & TAB				4.0%	\$ 20,057	\$ 586,661
Total with Contingencies & Professional Services						\$ 586,661

Option 1: Thermal Utility Costs Building Side Equipment/Branch Connection Costs

Key	Building	Year Converted to Local Heating	Total Chilled Water System Cost	Total Bldg Dist. Cost	Total Bldg Dist. Cost w/ Contingency & Professional Services	Total Bldg Equip. Cost	Total Bldg Equip Cost w/ Contingency & Professional Services	Total Project Cost:
501	Alvin I. Thomas Administration Building	2019	\$ 84,379	\$ 84,379	\$ 120,443	\$ 17,508	\$ 24,991	\$ 145,434
503	G.R. Woolfolk Social & Political Science Building	2019	\$ 82,175	\$ 82,175	\$ 117,297	\$ 14,634	\$ 20,889	\$ 138,186
504	Gilchrist Engineering Building	2019	\$ 84,379	\$ 84,379	\$ 120,443	\$ 19,358	\$ 27,632	\$ 148,074
506	Thomas E Gray Center	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
508	W.R. Banks Building	2019	\$ 106,578	\$ 106,578	\$ 152,130	\$ 47,775	\$ 68,194	\$ 220,324
517	A N Poindexter Veterinary Hospital	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
523	Transportation Center	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
529	Fry-Thomas Power Plant	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
535	Jesse M Drew Memorial Complex	2019	\$ 82,175	\$ 82,175	\$ 117,297	\$ 10,753	\$ 15,349	\$ 132,646
537	Hilliard Hall-Communication Building	2019	\$ 93,696	\$ 93,696	\$ 133,742	\$ 32,979	\$ 47,074	\$ 180,815
541	Anderson Hall	2020	\$ 82,175	\$ 82,175	\$ 117,297	\$ 14,753	\$ 21,058	\$ 138,355
544	Evans Hall	2020	\$ 84,379	\$ 84,379	\$ 120,443	\$ 20,106	\$ 28,700	\$ 149,143
658	May Building - Home Economics	2020	\$ 84,379	\$ 84,379	\$ 120,443	\$ 17,100	\$ 24,409	\$ 144,852
668	M.T. Harrington Science Building	2020	\$ 106,578	\$ 106,578	\$ 152,130	\$ 49,529	\$ 70,698	\$ 222,827
669	William "Billy" J. Nicks Building	2020	\$ 123,092	\$ 123,092	\$ 175,701	\$ 67,614	\$ 96,513	\$ 272,214
674	Physical Plant Administration Building	2020	\$ 74,066	\$ 74,066	\$ 105,722	\$ 11,116	\$ 15,866	\$ 121,588
687	Henrietta Farrell Hall	2020	\$ 84,379	\$ 84,379	\$ 120,443	\$ 25,342	\$ 36,173	\$ 156,616
688	Owens-Franklin Health Clinic	2021	\$ 84,379	\$ 84,379	\$ 120,443	\$ 31,451	\$ 44,893	\$ 165,336
689	Hobart Thomas Taylor Sr. Hall	N/A	\$ 123,092	\$ 123,092	\$ 175,701	\$ -	\$ -	\$ 175,701
682	Farm Shop	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
702	Meat Goat Building #1	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
704	C.L. Wilson Engineering Complex	2021	\$ 106,578	\$ 106,578	\$ 152,130	\$ 52,511	\$ 74,954	\$ 227,084
707	E Kika De La Garza Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
708	Environmental Chambers Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
709	Goat Auxiliary Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
710	Goat Dairy Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
712	Meat Goat Building #2	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
713	Meat Goat Building #3	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
714	Goat Reproduction Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
715	Goat Nutrition Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
716	Goat Yearling Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
717	Goat Maternity	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
724	Austin Greaux Chemical Engineering	2021	\$ 82,175	\$ 82,175	\$ 117,297	\$ 12,081	\$ 17,245	\$ 134,542
727	Central Receiving	2021	\$ 84,379	\$ 84,379	\$ 120,443	\$ 25,156	\$ 35,907	\$ 156,350
739	Utilities Plant Annex	2021	\$ 74,066	\$ 74,066	\$ 105,722	\$ 10,004	\$ 14,280	\$ 120,002
741	Johnson-Phillip All Faiths Chapel	2021	\$ 74,066	\$ 74,066	\$ 105,722	\$ 7,330	\$ 10,463	\$ 116,185
742	Wilhelmina Delco Building	2021	\$ 106,578	\$ 106,578	\$ 152,130	\$ 48,713	\$ 69,533	\$ 221,663
743	Sam R. Collins Engineering Tech Building	2022	\$ 106,578	\$ 106,578	\$ 152,130	\$ 59,194	\$ 84,494	\$ 236,623
744	John B. Coleman Library	2022	\$ 123,092	\$ 123,092	\$ 175,701	\$ 100,041	\$ 142,799	\$ 318,500
745	Jesse H & Mary Gibbs Jones Building	2022	\$ 93,696	\$ 93,696	\$ 133,742	\$ 30,449	\$ 43,462	\$ 177,204
746	Calf and Hay Barn	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
747	Swine Farrowing Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
748	Swine Finishing Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
749	Laying House	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
750	Turkey House Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
751	Pullet Broiler Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
752	Office/Lab Processing Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
753	Feed Mill Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
754	Head House	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
755	Green House One	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
756	Green House Two	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
757	Swine Gestation Building	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
758	Leroy G. Moore Jr. Gym	2022	\$ 93,696	\$ 93,696	\$ 133,742	\$ 38,742	\$ 55,301	\$ 189,042
761	Carden-Waller Cooperative Extension	2022	\$ 84,379	\$ 84,379	\$ 120,443	\$ 19,207	\$ 27,416	\$ 147,859
Housing	University Village (Phase I & II)	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Housing	University Village North (Phase III)	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Housing	University College (Phase IV)	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
790	Elmer E. O'Banion Science Building	2022	\$ 148,065	\$ 148,065	\$ 211,348	\$ 111,807	\$ 159,593	\$ 370,940
779	Willie A. Tempton Sr. Memorial Student Center Building	2023	\$ 123,092	\$ 123,092	\$ 175,701	\$ 84,601	\$ 120,759	\$ 296,460
783	Nathelyne Archie Kennedy Architecture Building	2023	\$ 123,092	\$ 123,092	\$ 175,701	\$ 69,395	\$ 99,054	\$ 274,755
789	Don K. Clark Juvenile Justice & Psychology Building	2023	\$ 106,578	\$ 106,578	\$ 152,130	\$ 49,588	\$ 70,782	\$ 222,911
793	New Electrical Engineering Building	2023	\$ 93,696	\$ 93,696	\$ 133,742	\$ 41,162	\$ 58,754	\$ 192,496
Housing	University View (Phase VII)	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
848	Student Recreation Center	2023	\$ 123,092	\$ 123,092	\$ 175,701	\$ 64,702	\$ 92,355	\$ 268,056
849	Agriculture and Business Multipurpose Building	2023	\$ 123,092	\$ 123,092	\$ 175,701	\$ 73,419	\$ 104,798	\$ 280,499
850	Panther Plaza	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
853	Baseball Stadium	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
870	Panther Stadium	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
872	Athletic Fieldhouse	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Key	Building	Year Converted to Local Heating	Total Chilled Water System Cost	Total Bldg Dist. Cost	Total Bldg Dist. Cost w/ Contingency & Professional Services	Total Bldg Equip. Cost	Total Bldg Equip Cost w/ Contingency & Professional Services	Total Project Cost:
New	School of Architecture Fabrication Design Center	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New	Welcome Center	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Housing	University Square (Phase VIII)	N/A	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F1	Police Station	2018	\$ -	\$ -	\$ -	\$ 45,510	\$ 64,961	\$ 64,961
F2	Meat Processing Facility	2018	\$ -	\$ -	\$ -	\$ 206,682	\$ 295,018	\$ 295,018
F3	ICCE Facility (lab)	2019	\$ 84,379	\$ 84,379	\$ 120,443	\$ 36,551	\$ 52,172	\$ 172,615
F4	ROTC Building	2020	\$ -	\$ -	\$ -	\$ 51,563	\$ 73,601	\$ 73,601
F5	Cultural Arts Center	2021	\$ 84,379	\$ 84,379	\$ 120,443	\$ 21,140	\$ 30,176	\$ 150,619
Housing	Housing 2 (From 2011 Campus MP)	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F7/F8	Future Academic Building	2023	\$ 123,092	\$ 123,092	\$ 175,701	\$ 139,338	\$ 198,891	\$ 374,592
F9	Future Support Building	2024	\$ 46,760	\$ 46,760	\$ 66,746	\$ 19,973	\$ 28,510	\$ 95,255
F10	Future Office	2024	\$ 73,273	\$ 73,273	\$ 104,590	\$ 8,625	\$ 12,311	\$ 116,901
F11	Future Stud. Activities Building	2025	\$ 48,154	\$ 48,154	\$ 68,735	\$ 18,516	\$ 26,430	\$ 95,165
F12	Future Retail Office Building	2026	\$ 73,273	\$ 73,273	\$ 104,590	\$ 7,987	\$ 11,401	\$ 115,990
Housing	Future Housing Building	2027	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F14/F15	Future Academic Building	2028	\$ 73,582	\$ 73,582	\$ 105,031	\$ 135,391	\$ 193,257	\$ 298,288
F16	Future Support Building	2029	\$ 46,760	\$ 46,760	\$ 66,746	\$ 19,489	\$ 27,819	\$ 94,564
F17	Future Office	2029	\$ 40,393	\$ 40,393	\$ 57,657	\$ 8,546	\$ 12,198	\$ 69,856
F18	Future Stud. Activities Building	2030	\$ 46,760	\$ 46,760	\$ 66,746	\$ 18,074	\$ 25,799	\$ 92,544
F19	Future Retail Office Building	2031	\$ 73,273	\$ 73,273	\$ 104,590	\$ 7,926	\$ 11,314	\$ 115,903
Housing	Future Housing Building	2032	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F21/F22	Future Academic Building	2033	\$ 73,582	\$ 73,582	\$ 105,031	\$ 131,415	\$ 187,581	\$ 292,612
F23	Future Support Building	2034	\$ 46,760	\$ 46,760	\$ 66,746	\$ 19,005	\$ 27,128	\$ 93,873
F24	Future Office	2034	\$ 40,393	\$ 40,393	\$ 57,657	\$ 8,466	\$ 12,085	\$ 69,742
F25	Future Stud. Activities Building	2035	\$ 46,760	\$ 46,760	\$ 66,746	\$ 17,631	\$ 25,167	\$ 91,913
F26	Future Retail Office Building	2036	\$ 73,273	\$ 73,273	\$ 104,590	\$ 7,865	\$ 11,226	\$ 115,816
Housing	Future Housing Building	2037	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Main Header Distribution Costs

Size (in)	Year Built	Service	Piping Location	Rounded Length of Trench (L.F.)	Piping	Fittings	Joint Kits	Valves	Trenching	Total Cost:	Total Cost w/ Contingency & Professional Services
24	2018	CHW	A	700	\$576,535	\$128,657	\$89,781	\$75,215	\$162,851	\$1,033,039	\$1,474,560
24	2018	CHW	B	3700	\$3,047,397	\$514,630	\$463,871	\$376,076	\$860,782	\$5,262,756	\$7,512,057
24	2023	CHW	C	200	\$164,724	\$64,329	\$24,939	\$75,215	\$46,529	\$375,736	\$536,326
24	2023	CHW	D	3500	\$2,882,673	\$450,301	\$438,931	\$376,076	\$814,253	\$4,962,235	\$7,083,094
24	2024	CHW	E	800	\$658,897	\$128,657	\$99,757	\$75,215	\$186,115	\$1,148,641	\$1,639,571
24	2026	CHW	F	400	\$329,448	\$64,329	\$49,879	\$75,215	\$93,058	\$611,928	\$873,466
24	2033	CHW	G	1000	\$823,621	\$128,657	\$124,696	\$150,430	\$232,644	\$1,460,049	\$2,084,074

Size (in)	Year Built	Service	Piping Location	Rounded Length of Trench (L.F.)	Piping	Fittings	Joint Kits	Valves	Trenching	Total Cost:	Total Cost w/ Contingency & Professional Services
24	N/A	CHW	N/A	200	\$164,724	\$64,329	\$24,939	\$75,215	\$46,529	\$375,736	\$536,326
20	N/A	CHW	N/A	2800	\$1,982,779	\$313,198	\$276,692	\$225,201	\$651,403	\$3,449,274	\$4,923,493
18	N/A	CHW	N/A	2900	\$1,886,139	\$276,811	\$250,769	\$187,372	\$674,667	\$3,275,758	\$4,675,817
12	N/A	CHW	N/A	2900	\$1,383,778	\$167,649	\$137,425	\$73,883	\$674,667	\$2,437,402	\$3,479,147
10	N/A	CHW	N/A	1900	\$757,614	\$95,786	\$76,680	\$42,874	\$442,023	\$1,414,978	\$2,019,739
8	N/A	CHW	N/A	400	\$128,129	\$19,952	\$13,125	\$10,957	\$93,058	\$265,220	\$378,576

Option 1: Mechanical Equipment Costs

Heating Equipment

All heating equipment is local and included in the Building Side Equipment/Branch Connection Costs table above.

Chilled Water Equipment

2020						
FTPP 1100 Ton Chiller Replacement & 1100 Ton Chiller Addition						
FTPP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Building Expansion	1	1,650	1,650	sf	\$ 348	\$ 574,048
1100 Ton Chillers w ith VFDs (Equipment)	2	1,100	2,200	tons	\$ 403	\$ 885,940
Chw Plant Pumps w ith VFDs - 2,540 gpm, 115ft head	2	125	250	hp	\$ 468	\$ 116,933
Packaged S.S. Cooling Towers w ith VFDs	1	1,375	1,375	tons	\$ 395	\$ 543,125
Condenser Water Pumps w ith VFDs - 3,300 gpm, 75 ft head	2	75	150	hp	\$ 537	\$ 80,600
2 x 24" Bagstop Services / 2 x 30" Bagstop Services	4	1	4	pipe	\$ 75,000	\$ 300,000
Chiller Demolition	1	1,100	1,100	tons	\$ 13	\$ 14,300
Pump Demolition	1	200	200	hp	\$ 28	\$ 5,567
Auxiliary Equipment	1	2,200	2,200	tons	\$ 48	\$ 105,600
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	2	30	60	pt.	\$ 2,000	\$ 120,000
Pump Controls	2	6	12	pt.	\$ 1,740	\$ 20,874
Cooling Tower Controls	2	8	16	pt.	\$ 1,740	\$ 27,833
Electrical Controls	2	30	60	pt.	\$ 1,740	\$ 104,372
Sub-Total						\$ 2,899,193
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 57,984	\$ 2,957,177
Design Contingency (10%)				10%	\$ 289,919	\$ 3,247,096
Construction Contingency (10%)				10%	\$ 289,919	\$ 3,537,015
Total with Contingencies						\$ 3,537,015
Design & CA				8%	\$ 282,961	\$ 3,819,976
Construction Management				5%	\$ 176,851	\$ 3,996,827
Commissioning				2.0%	\$ 70,740	\$ 4,067,567
Start-up & TAB				2.0%	\$ 70,740	\$ 4,138,308
Total with Contingencies & Professional Services						\$ 4,138,308

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2023						
CUP-2 Construction & 1000 Ton Chiller Install						
CUP-2						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Building	1	4,500	4,500	sf	\$ 348	\$ 1,565,586
1000 Ton Chillers w ith VFDs (Equipment)	1	1,000	1,000	tons	\$ 403	\$ 402,700
Chw Plant Pumps w ith VFDs - 2,000 gpm, 120ft head	1	100	100	hp	\$ 515	\$ 51,500
Packaged S.S. Cooling Towers w ith VFDs	1	1,375	1,375	tons	\$ 395	\$ 543,125
Condenser Water Pumps w ith VFDs - 3,000 gpm, 120 ft head	1	150	150	hp	\$ 447	\$ 67,110
Auxiliary Equipment	1	1,000	1,000	tons	\$ 48	\$ 48,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 2,814,561
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 56,291	\$ 2,870,852
Design Contingency (10%)				10%	\$ 281,456	\$ 3,152,308
Construction Contingency (10%)				10%	\$ 281,456	\$ 3,433,764
Total with Contingencies						\$ 3,433,764
Design & CA				8%	\$ 274,701	\$ 3,708,465
Construction Management				5%	\$ 171,688	\$ 3,880,154
Commissioning				2.0%	\$ 68,675	\$ 3,948,829
Start-up & TAB				2.0%	\$ 68,675	\$ 4,017,504
Total with Contingencies & Professional Services						\$ 4,017,504

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2027						
FTTP x 2 - 1100 Ton Chiller Replacement						
FTTP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1100 Ton Chillers with VFDs (Equipment)	2	1,100	2,200	tons	\$ 403	\$ 885,940
Chw Plant Pumps w ith VFDs - 2,540 gpm, 115ft head	2	125	250	hp	\$ 468	\$ 116,933
Condenser Water Pumps w ith VFDs - 3,300 gpm, 75 ft head	2	75	150	hp	\$ 447	\$ 67,110
Chiller Demolition	2	1,100	2,200	tons	\$ 13	\$ 28,600
Pump Demolition	1	400	400	hp	\$ 28	\$ 11,133
Auxiliary Equipment	1	2,200	2,200	tons	\$ 48	\$ 105,600
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	2	30	60	pt.	\$ 2,000	\$ 120,000
Pump Controls	2	6	12	pt.	\$ 1,740	\$ 20,874
Cooling Tower Controls	2	8	16	pt.	\$ 1,740	\$ 27,833
Electrical Controls	2	30	60	pt.	\$ 1,740	\$ 104,372
Sub-Total						\$ 1,488,396
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 29,768	\$ 1,518,164
Design Contingency (10%)				10%	\$ 148,840	\$ 1,667,004
Construction Contingency (10%)				10%	\$ 148,840	\$ 1,815,843
Total with Contingencies						\$ 1,815,843
Design & CA				8%	\$ 145,267	\$ 1,961,111
Construction Management				5%	\$ 90,792	\$ 2,051,903
Commissioning				2.0%	\$ 36,317	\$ 2,088,220
Start-up & TAB				2.0%	\$ 36,317	\$ 2,124,537
Total with Contingencies & Professional Services						\$ 2,124,537

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2032						
CUP-2 1000 Ton Chiller Install						
CUP-2						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1000 Ton Chillers w ith VFDs (Equipment)	1	1,000	1,000	tons	\$ 403	\$ 402,700
Chw Plant Pumps w ith VFDs - 2,000 gpm, 120ft head	1	100	100	hp	\$ 515	\$ 51,500
Packaged S.S. Cooling Towers w ith VFDs	1	1,375	1,375	tons	\$ 395	\$ 543,125
Condenser Water Pumps w ith VFDs - 3,000 gpm, 120 ft head	1	150	150	hp	\$ 447	\$ 67,110
Auxiliary Equipment	1	1,000	1,000	tons	\$ 48	\$ 48,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 1,248,975
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 24,979	\$ 1,273,954
Design Contingency (10%)				10%	\$ 124,897	\$ 1,398,852
Construction Contingency (10%)				10%	\$ 124,897	\$ 1,523,749
Total with Contingencies						\$ 1,523,749
Design & CA				8%	\$ 121,900	\$ 1,645,649
Construction Management				5%	\$ 76,187	\$ 1,721,837
Commissioning				2.0%	\$ 30,475	\$ 1,752,312
Start-up & TAB				2.0%	\$ 30,475	\$ 1,782,787
Total with Contingencies & Professional Services						\$ 1,782,787

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2034 FTPP 1100 Ton Chiller Replacement						
FTPP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1100 Ton Chillers with VFD's (Equipment)	1	1,100	1,100	tons	\$ 403	\$ 442,970
Chw Plant Pumps w with VFDs - 2,540 gpm, 125ft head	1	125	125	hp	\$ 468	\$ 58,467
Condenser Water Pumps with VFDs - 3,300 gpm, 75 ft head	1	100	100	hp	\$ 447	\$ 44,740
Chiller Demolition	1	1,100	1,100	tons	\$ 13	\$ 14,300
Pump Demolition	1	225	225	hp	\$ 28	\$ 6,263
Auxiliary Equipment	1	1,100	1,100	tons	\$ 48	\$ 52,800
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 756,079
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 15,122	\$ 771,201
Design Contingency (10%)				10%	\$ 75,608	\$ 846,808
Construction Contingency (10%)				10%	\$ 75,608	\$ 922,416
Total with Contingencies						\$ 922,416
Design & CA				8%	\$ 73,793	\$ 996,210
Construction Management				5%	\$ 46,121	\$ 1,042,330
Commissioning				2.0%	\$ 18,448	\$ 1,060,779
Start-up & TAB				2.0%	\$ 18,448	\$ 1,079,227
Total with Contingencies & Professional Services						\$ 1,079,227

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

Option 2

Option 2 Capital Cost						
Phase	Year	Distribution Expansion	Existing Distribution Replacement	Mechanical Equipment	Electrical Equipment & Distribution	Total
		Total Cost	Total Cost	Total Cost	Total Cost	
PH1	2018	\$ -	\$ 2,221,000	\$ -	\$ 536,000	\$ 2,757,000
	2019	\$ 2,374,000	\$ 2,221,000	\$ 768,000	\$ 3,676,000	\$ 9,039,000
	2020	\$ -	\$ 2,221,000	\$ 4,282,000	\$ 1,569,000	\$ 8,072,000
	2021	\$ 161,000	\$ 2,221,000	\$ 12,000	\$ 515,000	\$ 2,909,000
	2022	\$ -	\$ 2,221,000	\$ -	\$ 486,000	\$ 2,707,000
PH2	2023	\$ 19,438,000	\$ 2,221,000	\$ 7,352,000	\$ 3,135,000	\$ 32,146,000
	2024	\$ 5,850,000	\$ 2,221,000	\$ 402,000	\$ 1,528,000	\$ 10,001,000
	2025	\$ 5,930,000	\$ 2,221,000	\$ 82,000	\$ 515,000	\$ 8,748,000
	2026	\$ 140,000	\$ 2,221,000	\$ 9,000	\$ 349,000	\$ 2,719,000
	2027	\$ -	\$ 2,221,000	\$ 2,125,000	\$ 1,728,000	\$ 6,074,000
PH3	2028	\$ 163,000	\$ -	\$ 444,000	\$ 565,000	\$ 1,172,000
	2029	\$ 176,000	\$ -	\$ 18,000	\$ 565,000	\$ 759,000
	2030	\$ 94,000	\$ -	\$ 10,000	\$ 515,000	\$ 619,000
	2031	\$ 140,000	\$ -	\$ 9,000	\$ 515,000	\$ 664,000
	2032	\$ -	\$ -	\$ 1,783,000	\$ 536,000	\$ 2,319,000
	2033	\$ 3,306,000	\$ -	\$ 59,000	\$ 929,000	\$ 4,294,000
	2034	\$ 176,000	\$ -	\$ 1,097,000	\$ 1,285,000	\$ 2,558,000
	2035	\$ 94,000	\$ -	\$ 10,000	\$ 349,000	\$ 453,000
	2036	\$ 140,000	\$ -	\$ 9,000	\$ 349,000	\$ 498,000
	2037	\$ -	\$ -	\$ -	\$ 587,000	\$ 587,000
Total		\$ 38,182,000	\$ 22,210,000	\$ 18,471,000	\$ 20,232,000	\$ 99,095,000

Option 2: Electrical Equipment & Distribution Costs

2018 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 375,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,504	\$ 382,704
Design Contingency (10%)				10%	\$ 37,520	\$ 420,224
Construction Contingency (10%)				10%	\$ 37,520	\$ 457,744
Total with Contingencies						\$ 457,744
Design & CA				8%	\$ 36,620	\$ 494,364
Construction Management				5%	\$ 22,887	\$ 517,251
Commissioning / Start-up & TAB				4.0%	\$ 18,310	\$ 535,560
Total with Contingencies & Professional Services						\$ 535,560

2019 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	2500	1	2,500	ft.	\$ 368	\$ 920,000
15kV Medium Voltage Cable	2700	1	2,700	ft	\$ 50	\$ 135,000
Manholes	6	1	6	Ea.	\$ 15,000	\$ 90,000
15kV Southeast Campus Switchgear	1	1	1	Ea.	\$ 750,000	\$ 750,000
15kV Switchgear #2 Replacement	1	1	1	Ea.	\$ 485,000	\$ 485,000
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	2700	1	2,700	ft	\$ 20	\$ 54,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 2,575,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 51,504	\$ 2,626,704
Design Contingency (10%)				10%	\$ 257,520	\$ 2,884,224
Construction Contingency (10%)				10%	\$ 257,520	\$ 3,141,744
Total with Contingencies						\$ 3,141,744
Design & CA				8%	\$ 251,340	\$ 3,393,084
Construction Management				5%	\$ 157,087	\$ 3,550,171
Commissioning / Start-up & TAB				4.0%	\$ 125,670	\$ 3,675,840
Total with Contingencies & Professional Services						\$ 3,675,840

2020 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
4160V FТПP Sw itchg ear	2	1	2	Ea.	\$ 58,000	\$ 116,000
15kV-4160V, 1500kVA FТПP Transformer	2	1	2	Ea.	\$ 55,000	\$ 110,000
480V FТПP Sw itchboard	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV-480V, 1500kVA FТПP Transformer	1	1	1	Ea.	\$ 55,000	\$ 55,000
Manholes	2	1	2	Ea.	\$ 15,000	\$ 30,000
480V Low Voltage Cable/Raceway	2000	1	2,000	ft	\$ 80	\$ 160,000
15kV Medium Voltage Ductbank	1000	1	1,000	ft.	\$ 368	\$ 368,000
15kV Medium Voltage Cable	1700	1	1,700	ft	\$ 50	\$ 85,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
SCADA Fiber	1700	1	1,700	ft	\$ 20	\$ 34,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 1,099,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 21,984	\$ 1,121,184
Design Contingency (10%)				10%	\$ 109,920	\$ 1,231,104
Construction Contingency (10%)				10%	\$ 109,920	\$ 1,341,024
Total with Contingencies						\$ 1,341,024
Design & CA				8%	\$ 107,282	\$ 1,448,306
Construction Management				5%	\$ 67,051	\$ 1,515,357
Commissioning / Start-up & TAB				4.0%	\$ 53,641	\$ 1,568,998
Total with Contingencies & Professional Services						\$ 1,568,998

2021 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2022 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	500	1	500	Ea.	\$ 20	\$ 10,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 340,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 6,804	\$ 347,004
Design Contingency (10%)				10%	\$ 34,020	\$ 381,024
Construction Contingency (10%)				10%	\$ 34,020	\$ 415,044
Total with Contingencies						\$ 415,044
Design & CA				8%	\$ 33,204	\$ 448,248
Construction Management				5%	\$ 20,752	\$ 469,000
Commissioning / Start-up & TAB				4.0%	\$ 16,602	\$ 485,601
Total with Contingencies & Professional Services						\$ 485,601

2023 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	1500	1	1,500	ft.	\$ 368	\$ 552,000
15kV Medium Voltage Cable	2700	1	2,700	ft	\$ 50	\$ 135,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Medium Voltage 15kV CUP2 Main-Tie-Main Switchgear	1	1	1	Ea.	\$ 650,000	\$ 650,000
15kV-4160V, 1500kVA CUP2 Transformer	1	1	1	Ea.	\$ 50,000	\$ 50,000
4160V CUP2 Switchgear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV-480V, 2000kVA CUP2 Transformer	2	1	2	Ea.	\$ 80,000	\$ 160,000
480V CUP2 Main-Tie-Main Switchboard	1	1	1	Ea.	\$ 190,000	\$ 190,000
480V Low Voltage Cable/Raceway	3000	1	3,000	ft	\$ 80	\$ 240,000
Sub-Total						\$ 2,196,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 43,924	\$ 2,240,124
Design Contingency (10%)				10%	\$ 219,620	\$ 2,459,744
Construction Contingency (10%)				10%	\$ 219,620	\$ 2,679,364
Total with Contingencies						\$ 2,679,364
Design & CA				8%	\$ 214,349	\$ 2,893,713
Construction Management				5%	\$ 133,968	\$ 3,027,681
Commissioning / Start-up & TAB				4.0%	\$ 107,175	\$ 3,134,856
Total with Contingencies & Professional Services						\$ 3,134,856

2024 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1600	1	1,600	ft.	\$ 368	\$ 588,800
15kV Medium Voltage Cable	3200	1	3,200	ft	\$ 50	\$ 160,000
Manholes	3	1	3	Ea.	\$ 15,000	\$ 45,000
15kV Distribution Sw itch	2	1	2	Ea.	\$ 70,000	\$ 140,000
SCADA Fiber	3200	1	3,200	Ea.	\$ 20	\$ 64,000
SCADA Programming	2	1	2	Ea.	\$ 1,200	\$ 2,400
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 1,070,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 21,404	\$ 1,091,604
Design Contingency (10%)				10%	\$ 107,020	\$ 1,198,624
Construction Contingency (10%)				10%	\$ 107,020	\$ 1,305,644
Total with Contingencies						\$ 1,305,644
Design & CA				8%	\$ 104,452	\$ 1,410,096
Construction Management				5%	\$ 65,282	\$ 1,475,378
Commissioning / Start-up & TAB				4.0%	\$ 52,226	\$ 1,527,603
Total with Contingencies & Professional Services						\$ 1,527,603

2025 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2026 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2027 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1500	1	1,500	ft.	\$ 368	\$ 552,000
15kV Medium Voltage Cable	2500	1	2,500	ft	\$ 50	\$ 125,000
480V Low Voltage Cable/Raceway	2000	1	2,000	ft	\$ 80	\$ 160,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1800	1	1,800	Ea.	\$ 20	\$ 36,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV-4160V, 1500kVA FTPP Transformer	2	1	2	Ea.	\$ 50,000	\$ 100,000
4160V FTPP Switchgear	2	1	2	Ea.	\$ 58,000	\$ 116,000
Sub-Total						\$ 1,210,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 24,204	\$ 1,234,404
Design Contingency (10%)				10%	\$ 121,020	\$ 1,355,424
Construction Contingency (10%)				10%	\$ 121,020	\$ 1,476,444
Total with Contingencies						\$ 1,476,444
Design & CA				8%	\$ 118,116	\$ 1,594,560
Construction Management				5%	\$ 73,822	\$ 1,668,382
Commissioning / Start-up & TAB				4.0%	\$ 59,058	\$ 1,727,439
Total with Contingencies & Professional Services						\$ 1,727,439

2028 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 395,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,904	\$ 403,104
Design Contingency (10%)				10%	\$ 39,520	\$ 442,624
Construction Contingency (10%)				10%	\$ 39,520	\$ 482,144
Total with Contingencies						\$ 482,144
Design & CA				8%	\$ 38,572	\$ 520,716
Construction Management				5%	\$ 24,107	\$ 544,823
Commissioning / Start-up & TAB				4.0%	\$ 19,286	\$ 564,108
Total with Contingencies & Professional Services						\$ 564,108

2029 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 395,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,904	\$ 403,104
Design Contingency (10%)				10%	\$ 39,520	\$ 442,624
Construction Contingency (10%)				10%	\$ 39,520	\$ 482,144
Total with Contingencies						\$ 482,144
Design & CA				8%	\$ 38,572	\$ 520,716
Construction Management				5%	\$ 24,107	\$ 544,823
Commissioning / Start-up & TAB				4.0%	\$ 19,286	\$ 564,108
Total with Contingencies & Professional Services						\$ 564,108

2030 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2031 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2032 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 375,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,504	\$ 382,704
Design Contingency (10%)				10%	\$ 37,520	\$ 420,224
Construction Contingency (10%)				10%	\$ 37,520	\$ 457,744
Total with Contingencies						\$ 457,744
Design & CA				8%	\$ 36,620	\$ 494,364
Construction Management				5%	\$ 22,887	\$ 517,251
Commissioning / Start-up & TAB				4.0%	\$ 18,310	\$ 535,560
Total with Contingencies & Professional Services						\$ 535,560

2033 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	1000	1	1,000	ft.	\$ 368	\$ 368,000
15kV Medium Voltage Cable	2000	1	2,000	ft	\$ 50	\$ 100,000
SCADA Fiber	2000	1	2,000	ft	\$ 20	\$ 40,000
SCADA Programming	2	1	2	Ea.	\$ 1,200	\$ 2,400
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 650,400
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 13,008	\$ 663,408
Design Contingency (10%)				10%	\$ 65,040	\$ 728,448
Construction Contingency (10%)				10%	\$ 65,040	\$ 793,488
Total with Contingencies						\$ 793,488
Design & CA				8%	\$ 63,479	\$ 856,967
Construction Management				5%	\$ 39,674	\$ 896,641
Commissioning / Start-up & TAB				4.0%	\$ 31,740	\$ 928,381
Total with Contingencies & Professional Services						\$ 928,381

2034 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1100	1	1,100	ft.	\$ 368	\$ 404,800
15kV Medium Voltage Cable	2300	1	2,300	ft	\$ 50	\$ 115,000
480V Low Voltage Cable/Raceway	1000	1	1,000	ft	\$ 80	\$ 80,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV-4160V, 1500kVA FTTP Transformer	1	1	1	Ea.	\$ 50,000	\$ 50,000
4160V FTTP Switchgear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1800	1	1,800	ft	\$ 20	\$ 36,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 900,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 18,000	\$ 918,000
Design Contingency (10%)				10%	\$ 90,000	\$ 1,008,000
Construction Contingency (10%)				10%	\$ 90,000	\$ 1,098,000
Total with Contingencies						\$ 1,098,000
Design & CA				8%	\$ 87,840	\$ 1,185,840
Construction Management				5%	\$ 54,900	\$ 1,240,740
Commissioning / Start-up & TAB				4.0%	\$ 43,920	\$ 1,284,660
Total with Contingencies & Professional Services						\$ 1,284,660

2035 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2036 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2037 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	600	1	600	ft.	\$ 368	\$ 220,800
15kV Medium Voltage Cable	1200	1	1,200	ft	\$ 50	\$ 60,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1200	1	1,200	ft	\$ 20	\$ 24,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 411,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 8,220	\$ 419,220
Design Contingency (10%)				10%	\$ 41,100	\$ 460,320
Construction Contingency (10%)				10%	\$ 41,100	\$ 501,420
Total with Contingencies						\$ 501,420
Design & CA				8%	\$ 40,114	\$ 541,534
Construction Management				5%	\$ 25,071	\$ 566,605
Commissioning / Start-up & TAB				4.0%	\$ 20,057	\$ 586,661
Total with Contingencies & Professional Services						\$ 586,661

Option 2: Thermal Utility Costs

Building Side/Branch Connection Costs

Key	Building	Year Built (or HHW Conversion)	Total HHW System Cost	Total Chilled Water System Cost	Total Bldg Dist. Cost	Total Bldg Dist. Cost w/ Contingency & Professional Services	Total Bldg Equip. Cost	Total Bldg Equip. Cost w/ Contingency & Professional Services	Total Project Cost:
501	Alvin I. Thomas Administration Building	2023	\$ 77,810	\$ 37,850	\$ 115,660	\$ 165,093	\$ -	\$ -	\$ 165,093
503	G.R. Woolfolk Social & Political Science Building	2019	\$ 74,370	\$ 35,647	\$ 110,017	\$ 157,038	\$ -	\$ -	\$ 157,038
504	Gilchrist Engineering Building	2019	\$ 77,810	\$ 37,850	\$ 115,660	\$ 165,093	\$ -	\$ -	\$ 165,093
506	Thomas E Gray Center		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
508	W.R. Banks Building	2024	\$ 79,371	\$ 60,049	\$ 139,420	\$ 199,008	\$ -	\$ -	\$ 199,008
517	AN Poindexter Veterinary Hospital		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
523	Transportation Center		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
529	Fry-Thomas Power Plant		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
535	Jesse M Drew Memorial Complex	2023	\$ 74,370	\$ 35,647	\$ 110,017	\$ 157,038	\$ -	\$ -	\$ 157,038
537	Hilliard Hall-Communication Building	2019	\$ 77,810	\$ 47,167	\$ 124,977	\$ 178,392	\$ -	\$ -	\$ 178,392
541	Anderson Hall	2023	\$ 74,370	\$ 35,647	\$ 110,017	\$ 157,038	\$ -	\$ -	\$ 157,038
544	Evans Hall	2023	\$ 77,810	\$ 37,850	\$ 115,660	\$ 165,093	\$ -	\$ -	\$ 165,093
658	May Building - Home Economics	2020	\$ 77,810	\$ 37,850	\$ 115,660	\$ 165,093	\$ -	\$ -	\$ 165,093
668	M.T. Harrington Science Building	2023	\$ 79,371	\$ 60,049	\$ 139,420	\$ 199,008	\$ -	\$ -	\$ 199,008
669	William "Billy" J. Nicks Building	2023	\$ 89,232	\$ 76,563	\$ 165,795	\$ 236,656	\$ -	\$ -	\$ 236,656
674	Physical Plant Administration Building	2020	\$ 74,370	\$ 27,537	\$ 101,907	\$ 145,462	\$ -	\$ -	\$ 145,462
687	Henrietta Farrell Hall	2020	\$ 77,810	\$ 37,850	\$ 115,660	\$ 165,093	\$ -	\$ -	\$ 165,093
688	Owens-Franklin Health Clinic	2023	\$ 77,810	\$ 37,850	\$ 115,660	\$ 165,093	\$ -	\$ -	\$ 165,093
689	Hobart Thomas Taylor Sr. Hall		\$ -	\$ 123,092	\$ 123,092	\$ 175,701	\$ -	\$ -	\$ 175,701
682	Farm Shop		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
702	Meat Goat Building #1		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
704	C.L. Wilson Engineering Complex	2019	\$ 79,371	\$ 60,049	\$ 139,420	\$ 199,008	\$ -	\$ -	\$ 199,008
707	E. Kika De La Garza Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
708	Environmental Chambers Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
709	Goat Auxiliary Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
710	Goat Dairy Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
712	Meat Goat Building #2		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
713	Meat Goat Building #3		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
714	Goat Reproduction Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
715	Goat Nutrition Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
716	Goat Yearling Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
717	Goat Maternity		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
724	Austin Greaux Chemical Engineering	2019	\$ 74,370	\$ 35,647	\$ 110,017	\$ 157,038	\$ -	\$ -	\$ 157,038
727	Central Receiving	2020	\$ 77,810	\$ 37,850	\$ 115,660	\$ 165,093	\$ -	\$ -	\$ 165,093
739	Utilities Plant Annex	2025	\$ 74,370	\$ 27,537	\$ 101,907	\$ 145,462	\$ -	\$ -	\$ 145,462
741	Johnson-Phillip All Faiths Chapel	2025	\$ 74,370	\$ 27,537	\$ 101,907	\$ 145,462	\$ -	\$ -	\$ 145,462
742	Wilhelmina Delco Building	2023	\$ 79,371	\$ 60,049	\$ 139,420	\$ 199,008	\$ -	\$ -	\$ 199,008
743	Sam R. Collins Engineering Tech Building	2020	\$ 89,232	\$ 60,049	\$ 149,282	\$ 213,085	\$ -	\$ -	\$ 213,085
744	John B. Coleman Library	2025	\$ 91,835	\$ 76,563	\$ 168,398	\$ 240,372	\$ -	\$ -	\$ 240,372
745	Jesse H & Mary Gibbs Jones Building	2025	\$ 77,810	\$ 47,167	\$ 124,977	\$ 178,392	\$ -	\$ -	\$ 178,392
746	Calf and Hay Barn		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
747	Swine Farrowing Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
748	Swine Finishing Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
749	Laying House		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
750	Turkey House Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
751	Pullet Broiler Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
752	Office/Lab Processing Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
753	Feed Mill Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
754	Head House		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
755	Green House One		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
756	Green House Two		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
757	Swine Gestation Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
758	Leroy G. Moore Jr. Gym	2023	\$ 79,371	\$ 47,167	\$ 126,538	\$ 180,620	\$ -	\$ -	\$ 180,620
761	Carden-Waller Cooperative Extension	2024	\$ 77,810	\$ 37,850	\$ 115,660	\$ 165,093	\$ -	\$ -	\$ 165,093
Housing	University Village (Phase I & II)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Housing	University Village North (Phase III)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Housing	University College (Phase IV)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
790	Elmer E. O'Banion Science Building	2024	\$ 91,835	\$ 101,536	\$ 193,371	\$ 276,018	\$ -	\$ -	\$ 276,018
779	Willie A. Tempton Sr. Memorial Student Center Building	2024	\$ 91,835	\$ 76,563	\$ 168,398	\$ 240,372	\$ -	\$ -	\$ 240,372
783	Nathelyne Archie Kennedy Architecture Building	2024	\$ 89,232	\$ 76,563	\$ 165,795	\$ 236,656	\$ -	\$ -	\$ 236,656
789	Don K. Clark Juvenile Justice & Psychology Building	2020	\$ 79,371	\$ 60,049	\$ 139,420	\$ 199,008	\$ -	\$ -	\$ 199,008
793	New Electrical Engineering Building	2025	\$ 79,371	\$ 47,167	\$ 126,538	\$ 180,620	\$ -	\$ -	\$ 180,620
Housing	University View (Phase VII)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
848	Student Recreation Center	2023	\$ 89,232	\$ 76,563	\$ 165,795	\$ 236,656	\$ -	\$ -	\$ 236,656
849	Agriculture and Business Multipurpose Building	2020	\$ 89,232	\$ 76,563	\$ 165,795	\$ 236,656	\$ -	\$ -	\$ 236,656
850	Panther Plaza		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
853	Baseball Stadium		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
870	Panther Stadium		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
872	Athletic Fieldhouse		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Key	Building	Year Built (or HHW Conversion)	Total HHW System Cost	Total Chilled Water System Cost	Total Bldg Dist. Cost	Total Bldg Dist. Cost w/ Contingency & Professional Services	Total Bldg Equip. Cost	Total Bldg Equip. Cost w/ Contingency & Professional Services	Total Project Cost:
New	School of Architecture Fabrication Design Center		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New	Welcome Center		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New	University Square (Phase VII)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F1	Police Station		\$ -	\$ -	\$ -	\$ -	\$ 45,510	\$ 64,961	\$ 64,961
F2	Meat Processing Facility		\$ -	\$ -	\$ -	\$ -	\$ 206,682	\$ 295,018	\$ 295,018
F3	ICCE Facility (lab)		\$ -	\$ 84,379	\$ 84,379	\$ 120,443	\$ 36,551	\$ 52,172	\$ 172,615
F4	ROTC Building		\$ -	\$ -	\$ -	\$ -	\$ 51,563	\$ 73,601	\$ 73,601
F5	Cultural Arts Center	2021	\$ 74,370	\$ 37,850	\$ 112,220	\$ 160,183	\$ 7,761	\$ 11,078	\$ 171,261
Housing	Housing 2 (From 2011 Campus MP)		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F7/F8	Future Academic Building	2023	\$ 102,491	\$ 76,563	\$ 179,054	\$ 255,581	\$ 43,269	\$ 61,763	\$ 317,344
F9	Future Support Building	2024	\$ 42,250	\$ 23,496	\$ 65,746	\$ 93,845	\$ 6,687	\$ 9,544	\$ 103,390
F10	Future Office	2024	\$ 71,064	\$ 26,744	\$ 97,808	\$ 139,611	\$ 5,850	\$ 8,350	\$ 147,962
F11	Future Stud. Activities Building	2025	\$ 42,250	\$ 24,889	\$ 67,139	\$ 95,834	\$ 6,834	\$ 9,754	\$ 105,589
F12	Future Retail Office Building	2026	\$ 71,064	\$ 26,744	\$ 97,808	\$ 139,611	\$ 5,850	\$ 8,350	\$ 147,962
Housing	Future Housing Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F14/F15	Future Academic Building	2028	\$ 63,283	\$ 50,318	\$ 113,600	\$ 162,153	\$ 42,083	\$ 60,070	\$ 222,223
F16	Future Support Building	2029	\$ 42,250	\$ 23,496	\$ 65,746	\$ 93,845	\$ 6,582	\$ 9,395	\$ 103,240
F17	Future Office	2029	\$ 39,961	\$ 17,129	\$ 57,090	\$ 81,490	\$ 5,850	\$ 8,350	\$ 89,840
F18	Future Stud. Activities Building	2030	\$ 42,250	\$ 23,496	\$ 65,746	\$ 93,845	\$ 6,725	\$ 9,599	\$ 103,445
F19	Future Retail Office Building	2031	\$ 71,064	\$ 26,744	\$ 97,808	\$ 139,611	\$ 5,850	\$ 8,350	\$ 147,962
Housing	Future Housing Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F21/F22	Future Academic Building	2033	\$ 63,283	\$ 50,318	\$ 113,600	\$ 162,153	\$ 40,837	\$ 58,290	\$ 220,444
F23	Future Support Building	2034	\$ 42,250	\$ 23,496	\$ 65,746	\$ 93,845	\$ 6,478	\$ 9,246	\$ 103,091
F24	Future Office	2034	\$ 39,961	\$ 17,129	\$ 57,090	\$ 81,490	\$ 5,850	\$ 8,350	\$ 89,840
F25	Future Stud. Activities Building	2035	\$ 42,250	\$ 23,496	\$ 65,746	\$ 93,845	\$ 6,617	\$ 9,444	\$ 103,290
F26	Future Retail Office Building	2036	\$ 71,064	\$ 26,744	\$ 97,808	\$ 139,611	\$ 5,850	\$ 8,350	\$ 147,962
Housing	Future Housing Building		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Main Header Distribution Costs

Size (in)	Year Built	Service	Piping Location	Rounded Length of Trench (L.F.)	Piping	Fittings	Joint Kits	Valves	Trenching	Total Cost:	Total Cost w/ Contingency & Professional Services
14	2019	HHW	A	1700	\$909,343	\$187,034	\$103,204	\$67,715	\$395,494	\$1,662,790	\$2,373,466
14	2023	HHW	B	6700	\$3,583,880	\$629,113	\$403,214	\$203,146	\$1,558,713	\$6,378,066	\$9,104,052
24	2023	CHW	B	5800	\$4,777,001	\$771,945	\$723,239	\$601,721	\$186,115	\$7,060,021	\$10,077,474
14	2024	HHW	C	1800	\$962,833	\$187,034	\$108,004	\$67,715	\$418,759	\$1,744,345	\$2,489,878
24	2024	CHW	C	1800	\$1,482,518	\$257,315	\$224,454	\$225,645	-	\$2,189,931	\$3,125,908
14	2025	HHW	D	2100	\$1,123,306	\$221,040	\$127,204	\$67,715	\$488,552	\$2,027,817	\$2,894,506
24	2025	CHW	D	1600	\$1,317,793	\$257,315	\$199,514	\$150,430	\$133,770	\$2,058,823	\$2,938,764
14	2033	HHW	E	1000	\$534,907	\$102,018	\$60,002	\$45,144	\$232,644	\$974,715	\$1,391,309
24	2033	CHW	E	1000	\$823,621	\$128,657	\$124,696	\$150,430	-	\$1,227,405	\$1,751,998

Size (in)	Year Built	Service	Piping Location	Rounded Length of Trench (L.F.)	Piping	Fittings	Joint Kits	Valves	Trenching	Total Cost:	Total Cost w/ Contingency & Professional Services
24	N/A	CHW	N/A	200	\$164,724	\$64,329	\$24,939	\$75,215	\$46,529	\$375,736	\$536,326
20	N/A	CHW	N/A	2800	\$1,982,779	\$313,198	\$276,692	\$225,201	\$651,403	\$3,449,274	\$4,923,493
18	N/A	CHW	N/A	2900	\$1,886,139	\$276,811	\$250,769	\$187,372	\$674,667	\$3,275,758	\$4,675,817
12	N/A	CHW	N/A	2900	\$1,383,778	\$167,649	\$137,425	\$73,883	\$674,667	\$2,437,402	\$3,479,147
10	N/A	CHW	N/A	1900	\$757,614	\$95,786	\$76,680	\$42,874	\$442,023	\$1,414,978	\$2,019,739
8	N/A	CHW	N/A	400	\$128,129	\$19,952	\$13,125	\$10,957	\$93,058	\$265,220	\$378,576

Option 2: Mechanical Equipment Costs

Heating Equipment

2020 FTPP Boiler #12 Demolition (Offline 2018)						
FTPP						
Heating	Qty.	Capacity	Total	Unit	Unit	Total
Boiler Demolition	1	25,000	25,000	MBH	\$ 2	\$ 50,000
Sub-Total						\$ 50,000
Soft Costs & Contingencies				Cost	Sub-Total	Total
General Conditions				2.0%	\$ 1,000	\$ 51,000
Design Contingency (10%)				10%	\$ 5,000	\$ 56,000
Construction Contingency (10%)				10%	\$ 5,000	\$ 61,000
Total with Contingencies						\$ 61,000
Design & CA				8%	\$ 4,880	\$ 65,880
Construction Management				5%	\$ 3,050	\$ 68,930
Commissioning				2.0%	\$ 1,220	\$ 70,150
Start-up & TAB				2.0%	\$ 1,220	\$ 71,370
Total with Contingencies & Professional Services						\$ 71,370

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2020 FTPP Boiler #11 Demolition						
FTPP						
Heating	Qty.	Capacity	Total	Unit	Unit	Total
Boiler Demolition	1	25,000	25,000	MBH	\$ 2	\$ 50,000
Sub-Total						\$ 50,000
Soft Costs & Contingencies				Cost	Sub-Total	Total
General Conditions				2.0%	\$ 1,000	\$ 51,000
Design Contingency (10%)				10%	\$ 5,000	\$ 56,000
Construction Contingency (10%)				10%	\$ 5,000	\$ 61,000
Total with Contingencies						\$ 61,000
Design & CA				8%	\$ 4,880	\$ 65,880
Construction Management				5%	\$ 3,050	\$ 68,930
Commissioning				2.0%	\$ 1,220	\$ 70,150
Start-up & TAB				2.0%	\$ 1,220	\$ 71,370
Total with Contingencies & Professional Services						\$ 71,370

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2019 FTPP 2 x 8000 MBH HW Boiler Install						
FTPP						
Heating	Qty.	Capacity	Total	Unit	Unit	Total
8 MMBtu/hr HW Boiler (Equipment)	2	8,000	16,000	MBH	\$ 16	\$ 254,400
HW Plant Pumps with VFDs - 548 gpm, 116 ft head	2	25	50	hp	\$ 438	\$ 21,900
Auxiliary Equipment	1	16,000	16,000	MBH	\$ 2	\$ 32,000
Controls	Qty.	Capacity	Total	Unit	Unit	Total
Boiler Controls	2	30	60	pt.	\$ 1,740	\$ 104,372
Pump Controls	2	6	12	pt.	\$ 1,740	\$ 20,874
Electrical Controls	2	30	60	pt.	\$ 1,740	\$ 104,372
Electrical	Qty.	Capacity	Total	Unit	Unit	Total
Sub-Total						\$ 537,919
Soft Costs & Contingencies				Cost	Sub-Total	Total
General Conditions				2.0%	\$ 10,758	\$ 548,678
Design Contingency (10%)				10%	\$ 53,792	\$ 602,470
Construction Contingency (10%)				10%	\$ 53,792	\$ 656,262
Total with Contingencies						\$ 656,262
Design & CA				8%	\$ 52,501	\$ 708,762
Construction Management				5%	\$ 32,813	\$ 741,576
Commissioning				2.0%	\$ 13,125	\$ 754,701
Start-up & TAB				2.0%	\$ 13,125	\$ 767,826
Total with Contingencies & Professional Services						\$ 767,826

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2023 CUP-2 Construction & 2 x 8000 MBH HW Boiler Install						
CUP-2						
Heating	Qty.	Capacity	Total	Unit	Unit	Total
Building	1	5,000	5,000	sf	\$ 348	\$1,739,540
8 MMBtu/hr HW Boiler (Equipment)	2	8,000	16,000	MBH	\$ 16	\$ 254,400
HW Plant Pumps with VFDs - 548 gpm, 116 ft head	2	25	50	hp	\$ 438	\$ 21,900
Expansion Tank	1	400	400	gal	\$ 38	\$ 15,160
Auxiliary Equipment	1	16,000	16,000	MBH	\$ 2	\$ 32,000
Controls	Qty.	Capacity	Total	Unit	Unit	Total
Boiler Controls	2	30	60	pt.	\$ 1,740	\$ 104,372
Pump Controls	2	6	12	pt.	\$ 1,740	\$ 20,874
Electrical Controls	2	30	60	pt.	\$ 1,740	\$ 104,372
Sub-Total						\$ 2,292,619
Soft Costs & Contingencies				Cost	Sub-Total	Total
General Conditions				2.0%	\$ 45,852	\$ 2,338,472
Design Contingency (10%)				10%	\$ 229,262	\$ 2,567,734
Construction Contingency (10%)				10%	\$ 229,262	\$ 2,796,996
Total with Contingencies						\$ 2,796,996
Design & CA				8%	\$ 223,760	\$ 3,020,755
Construction Management				5%	\$ 139,850	\$ 3,160,605
Commissioning				2.0%	\$ 55,940	\$ 3,216,545
Start-up & TAB				2.0%	\$ 55,940	\$ 3,272,485
Total with Contingencies & Professional Services						\$ 3,272,485

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2024 CUP-2 8000 MBH HW Boiler Install						
CUP-2						
Heating	Qty.	Capacity	Total	Unit	Unit	Total
8 MMBtu/hr HW Boiler (Equipment)	1	8,000	8,000	MBH	\$ 16	\$ 127,200
HW Plant Pumps with VFDs - 548 gpm, 116 ft head	1	25	25	hp	\$ 438	\$ 10,950
Auxiliary Equipment	1	8,000	8,000	MBH	\$ 2	\$ 16,000
Controls	Qty.	Capacity	Total	Unit	Unit	Total
Boiler Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Electrical	Qty.	Capacity	Total	Unit	Unit	Total
Sub-Total						\$ 268,960
Soft Costs & Contingencies				Cost	Sub-Total	Total
General Conditions				2.0%	\$ 5,379	\$ 274,339
Design Contingency (10%)				10%	\$ 26,896	\$ 301,235
Construction Contingency (10%)				10%	\$ 26,896	\$ 328,131
Total with Contingencies						\$ 328,131
Design & CA				8%	\$ 26,250	\$ 354,381
Construction Management				5%	\$ 16,407	\$ 370,788
Commissioning				2.0%	\$ 6,563	\$ 377,350
Start-up & TAB				2.0%	\$ 6,563	\$ 383,913
Total with Contingencies & Professional Services						\$ 383,913

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2025 FTPP Boiler #18 Demolition						
FTPP						
Heating	Qty.	Capacity	Total	Unit	Unit	Total
Boiler Demolition	1	25,000	25,000	MBH	\$ 2	\$ 50,000
Sub-Total						\$ 50,000
Soft Costs & Contingencies				Cost	Sub-Total	Total
General Conditions				2.0%	\$ 1,000	\$ 51,000
Design Contingency (10%)				10%	\$ 5,000	\$ 56,000
Construction Contingency (10%)				10%	\$ 5,000	\$ 61,000
Total with Contingencies						\$ 61,000
Design & CA				8%	\$ 4,880	\$ 65,880
Construction Management				5%	\$ 3,050	\$ 68,930
Commissioning				2.0%	\$ 1,220	\$ 70,150
Start-up & TAB				2.0%	\$ 1,220	\$ 71,370
Total with Contingencies & Professional Services						\$ 71,370

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2028 CUP-2 8000 MBH HW Boiler Install CUP-2						
Heating						
8 MMBtu/hr HW Boiler (Equipment)	1	8,000	8,000	MBH	\$ 16	\$ 127,200
HW Plant Pumps with VFDs - 548 gpm, 116 ft head	1	25	25	hp	\$ 438	\$ 10,950
Auxiliary Equipment	1	8,000	8,000	MBH	\$ 2	\$ 16,000
Controls						
Boiler Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Electrical						
Sub-Total						\$ 268,960
Soft Costs & Contingencies						
General Conditions				Cost	Sub-Total	Total
Design Contingency (10%)				2.0%	\$ 5,379	\$ 274,339
Construction Contingency (10%)				10%	\$ 26,896	\$ 301,235
				10%	\$ 26,896	\$ 328,131
Total with Contingencies						\$ 328,131
Design & CA				8%	\$ 26,250	\$ 354,381
Construction Management				5%	\$ 16,407	\$ 370,788
Commissioning				2.0%	\$ 6,563	\$ 377,350
Start-up & TAB				2.0%	\$ 6,563	\$ 383,913
Total with Contingencies & Professional Services						\$ 383,913
* Costs are estimates of probable construction cost and are estimated in 2017 dollars.						

Chilled Water Equipment

2020						
FTPP 1100 Ton Chiller Replacement & 1100 Ton Chiller Addition						
FTPP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Building Expansion	1	1,650	1,650	sf	\$ 348	\$ 574,048
1100 Ton Chillers w ith VFDs (Equipment)	2	1,100	2,200	tons	\$ 403	\$ 885,940
Chw Plant Pumps w ith VFDs - 2,540 gpm, 115ft head	2	125	250	hp	\$ 468	\$ 116,933
Packaged S.S. Cooling Tow ers w ith VFDs	1	1,375	1,375	tons	\$ 395	\$ 543,125
Condenser Water Pumps w ith VFDs - 3,300 gpm, 75 ft head	2	75	150	hp	\$ 537	\$ 80,600
2 x 24" Bagstop Services / 2 x 30" Bagstop Services	4	1	4	pipe	\$ 75,000	\$ 300,000
Chiller Demolition	1	1,100	1,100	tons	\$ 13	\$ 14,300
Pump Demolition	1	200	200	hp	\$ 28	\$ 5,567
Auxiliary Equipment	1	2,200	2,200	tons	\$ 48	\$ 105,600
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	2	30	60	pt.	\$ 2,000	\$ 120,000
Pump Controls	2	6	12	pt.	\$ 1,740	\$ 20,874
Cooling Tow er Controls	2	8	16	pt.	\$ 1,740	\$ 27,833
Electrical Controls	2	30	60	pt.	\$ 1,740	\$ 104,372
Sub-Total						\$ 2,899,193
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 57,984	\$ 2,957,177
Design Contingency (10%)				10%	\$ 289,919	\$ 3,247,096
Construction Contingency (10%)				10%	\$ 289,919	\$ 3,537,015
Total with Contingencies						\$ 3,537,015
Design & CA				8%	\$ 282,961	\$ 3,819,976
Construction Management				5%	\$ 176,851	\$ 3,996,827
Commissioning				2.0%	\$ 70,740	\$ 4,067,567
Start-up & TAB				2.0%	\$ 70,740	\$ 4,138,308
Total with Contingencies & Professional Services						\$ 4,138,308

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2023						
CUP-2 Construction & 1000 Ton Chiller Install						
CUP-2						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Building	1	4,500	4,500	sf	\$ 348	\$ 1,565,586
1000 Ton Chillers w ith VFDs (Equipment)	1	1,000	1,000	tons	\$ 403	\$ 402,700
Chw Plant Pumps w ith VFDs - 2,000 gpm, 120ft head	1	100	100	hp	\$ 515	\$ 51,500
Packaged S.S. Cooling Tow ers w ith VFDs	1	1,375	1,375	tons	\$ 395	\$ 543,125
Condenser Water Pumps w ith VFDs - 3,000 gpm, 120 ft head	1	150	150	hp	\$ 447	\$ 67,110
Auxiliary Equipment	1	1,000	1,000	tons	\$ 48	\$ 48,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tow er Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 2,814,561
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 56,291	\$ 2,870,852
Design Contingency (10%)				10%	\$ 281,456	\$ 3,152,308
Construction Contingency (10%)				10%	\$ 281,456	\$ 3,433,764
Total with Contingencies						\$ 3,433,764
Design & CA				8%	\$ 274,701	\$ 3,708,465
Construction Management				5%	\$ 171,688	\$ 3,880,154
Commissioning				2.0%	\$ 68,675	\$ 3,948,829
Start-up & TAB				2.0%	\$ 68,675	\$ 4,017,504
Total with Contingencies & Professional Services						\$ 4,017,504

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2032 CUP-2 1000 Ton Chiller Install						
CUP-2						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1000 Ton Chillers w ith VFD's (Equipment)	1	1,000	1,000	tons	\$ 403	\$ 402,700
Chw Plant Pumps w ith VFD's - 2,000 gpm, 120ft head	1	100	100	hp	\$ 515	\$ 51,500
Field Erected S.S. Cooling Towers w ith VFD's 1375 tons	1	1,375	1,375	tons	\$ 276	\$ 379,500
Condenser Water Pumps w ith VFD's - 3,000 gpm, 120 ft head	1	150	150	hp	\$ 447	\$ 67,110
Auxiliary Equipment	1	12,000	12,000	MBH	\$ 4	\$ 48,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 1,085,350
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 21,707	\$ 1,107,057
Design Contingency (10%)				10%	\$ 108,535	\$ 1,215,592
Construction Contingency (10%)				10%	\$ 108,535	\$ 1,324,127
Total with Contingencies						\$ 1,324,127
Design & CA				8%	\$ 105,930	\$ 1,430,057
Construction Management				5%	\$ 66,206	\$ 1,496,263
Commissioning				2.0%	\$ 26,483	\$ 1,522,746
Start-up & TAB				2.0%	\$ 26,483	\$ 1,549,228
Total with Contingencies & Professional Services						\$ 1,549,228

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2034 FTPP 1100 Ton Chiller Replacement						
FTPP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1100 Ton Chillers w ith VFD's (Equipment)	1	1,100	1,100	tons	\$ 403	\$ 442,970
Chw Plant Pumps w ith VFD's - 2,540 gpm, 125ft head	1	125	125	hp	\$ 468	\$ 58,467
Condenser Water Pumps w ith VFD's - 3,300 gpm, 75 ft head	1	100	100	hp	\$ 447	\$ 44,740
Chiller Demolition	1	1,100	1,100	tons	\$ 13	\$ 14,300
Pump Demolition	1	225	225	hp	\$ 28	\$ 6,263
Auxiliary Equipment	1	13,200	13,200	MBH	\$ 4	\$ 52,800
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 756,079
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 15,122	\$ 771,201
Design Contingency (10%)				10%	\$ 75,608	\$ 846,808
Construction Contingency (10%)				10%	\$ 75,608	\$ 922,416
Total with Contingencies						\$ 922,416
Design & CA				8%	\$ 73,793	\$ 996,210
Construction Management				5%	\$ 46,121	\$ 1,042,330
Commissioning				2.0%	\$ 18,448	\$ 1,060,779
Start-up & TAB				2.0%	\$ 18,448	\$ 1,079,227
Total with Contingencies & Professional Services						\$ 1,079,227

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

Option 3

Option 3 Capital Cost						
Phase	Year	Distribution Expansion	Existing Distribution Replacement	Mechanical Equipment	Electrical Equipment & Distribution	Total
		Total Cost	Total Cost	Total Cost	Total Cost	
PH1	2018	\$ -	\$ 3,052,000	\$ 1,824,000	\$ 1,122,000	\$ 5,998,000
	2019	\$ -	\$ 3,052,000	\$ -	\$ 3,676,000	\$ 6,728,000
	2020	\$ -	\$ 3,052,000	\$ 6,741,000	\$ 1,173,000	\$ 10,966,000
	2021	\$ 195,000	\$ 3,052,000	\$ -	\$ 515,000	\$ 3,762,000
	2022	\$ -	\$ 3,052,000	\$ 4,394,000	\$ 769,000	\$ 8,215,000
PH2	2023	\$ 377,000	\$ 3,052,000	\$ -	\$ 927,000	\$ 4,356,000
	2024	\$ -	\$ 3,052,000	\$ -	\$ 1,528,000	\$ 4,580,000
	2025	\$ 270,000	\$ 3,052,000	\$ 1,824,000	\$ 797,000	\$ 5,943,000
	2026	\$ -	\$ 3,052,000	\$ -	\$ 349,000	\$ 3,401,000
	2027	\$ -	\$ 3,052,000	\$ -	\$ 1,191,000	\$ 4,243,000
PH3	2028	\$ 2,145,000	\$ -	\$ 1,824,000	\$ 847,000	\$ 4,816,000
	2029	\$ -	\$ -	\$ -	\$ 565,000	\$ 565,000
	2030	\$ -	\$ -	\$ -	\$ 515,000	\$ 515,000
	2031	\$ -	\$ -	\$ -	\$ 515,000	\$ 515,000
	2032	\$ -	\$ -	\$ -	\$ 536,000	\$ 536,000
	2033	\$ 2,244,000	\$ -	\$ -	\$ 929,000	\$ 3,173,000
	2034	\$ -	\$ -	\$ -	\$ 1,017,000	\$ 1,017,000
	2035	\$ -	\$ -	\$ -	\$ 349,000	\$ 349,000
	2036	\$ -	\$ -	\$ -	\$ 349,000	\$ 349,000
	2037	\$ -	\$ -	\$ -	\$ 587,000	\$ 587,000
Total		\$ 5,231,000	\$ 30,520,000	\$ 16,607,000	\$ 18,256,000	\$ 70,614,000

Option 3: Electrical Equipment & Distribution Cost

2018 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	700	1	700	ft.	\$ 368	\$ 257,600
15kV Medium Voltage Cable	1200	1	1,200	ft	\$ 50	\$ 60,000
Manholes	2	1	2	Ea.	\$ 15,000	\$ 30,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
4160V FТП Switchgear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV-4160V, 2000kVA FТП Transformer	1	1	1	Ea.	\$ 60,000	\$ 60,000
480V FТП Switchboard	1	1	1	Ea.	\$ 45,000	\$ 45,000
15kV-480V, 2000kVA FТП Transformer	1	1	1	Ea.	\$ 65,000	\$ 65,000
480V Low Voltage Cable/Raceway	1000	1	1,000	ft	\$ 80	\$ 80,000
SCADA Fiber	1200	1	1,200	ft	\$ 20	\$ 24,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 785,800
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 15,716	\$ 801,516
Design Contingency (10%)				10%	\$ 78,580	\$ 880,096
Construction Contingency (10%)				10%	\$ 78,580	\$ 958,676
Total with Contingencies						\$ 958,676
Design & CA				8%	\$ 76,694	\$ 1,035,370
Construction Management				5%	\$ 47,934	\$ 1,083,304
Commissioning / Start-up & TAB				4.0%	\$ 38,347	\$ 1,121,651
Total with Contingencies & Professional Services						\$ 1,121,651

2019 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	2500	1	2,500	ft.	\$ 368	\$ 920,000
15kV Medium Voltage Cable	2700	1	2,700	ft	\$ 50	\$ 135,000
Manholes	6	1	6	Ea.	\$ 15,000	\$ 90,000
15kV Southeast Campus Switchgear	1	1	1	Ea.	\$ 750,000	\$ 750,000
15kV Switchgear #2 Replacement	1	1	1	Ea.	\$ 485,000	\$ 485,000
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	2700	1	2,700	ft	\$ 20	\$ 54,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 2,575,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 51,504	\$ 2,626,704
Design Contingency (10%)				10%	\$ 257,520	\$ 2,884,224
Construction Contingency (10%)				10%	\$ 257,520	\$ 3,141,744
Total with Contingencies						\$ 3,141,744
Design & CA				8%	\$ 251,340	\$ 3,393,084
Construction Management				5%	\$ 157,087	\$ 3,550,171
Commissioning / Start-up & TAB				4.0%	\$ 125,670	\$ 3,675,840
Total with Contingencies & Professional Services						\$ 3,675,840

2020 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1000	1	1,000	ft.	\$ 368	\$ 368,000
15kV Medium Voltage Cable	1700	1	1,700	ft	\$ 50	\$ 85,000
Manholes	2	1	2	Ea.	\$ 15,000	\$ 30,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
4160V FTTP Sw itchg ear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV-4160V, 2000kVA FTTP Transformer	1	1	1	Ea.	\$ 60,000	\$ 60,000
480V Low Voltage Cable/Raceway	1000	1	1,000	ft	\$ 80	\$ 80,000
SCADA Fiber	1700	1	1,700	ft	\$ 20	\$ 34,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 821,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 16,424	\$ 837,624
Design Contingency (10%)				10%	\$ 82,120	\$ 919,744
Construction Contingency (10%)				10%	\$ 82,120	\$ 1,001,864
Total with Contingencies						\$ 1,001,864
Design & CA				8%	\$ 80,149	\$ 1,082,013
Construction Management				5%	\$ 50,093	\$ 1,132,106
Commissioning / Start-up & TAB				4.0%	\$ 40,075	\$ 1,172,181
Total with Contingencies & Professional Services						\$ 1,172,181

2021 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2022 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft.	\$ 50	\$ 25,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
4160V FTTP Switchgear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV-4160V, 2000kVA FTTP Transformer	1	1	1	Ea.	\$ 60,000	\$ 60,000
480V Low Voltage Cable/Raceway	1000	1	1,000	ft.	\$ 80	\$ 80,000
SCADA Fiber	500	1	500	Ea.	\$ 20	\$ 10,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 538,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 10,764	\$ 548,964
Design Contingency (10%)				10%	\$ 53,820	\$ 602,784
Construction Contingency (10%)				10%	\$ 53,820	\$ 656,604
Total with Contingencies						\$ 656,604
Design & CA				8%	\$ 52,528	\$ 709,132
Construction Management				5%	\$ 32,830	\$ 741,963
Commissioning / Start-up & TAB				4.0%	\$ 26,264	\$ 768,227
Total with Contingencies & Professional Services						\$ 768,227

2023 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	1000	1	1,000	ft.	\$ 368	\$ 368,000
15kV Medium Voltage Cable	2000	1	2,000	ft.	\$ 50	\$ 100,000
SCADA Fiber	2000	1	2,000	ft.	\$ 20	\$ 40,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 649,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 12,984	\$ 662,184
Design Contingency (10%)				10%	\$ 64,920	\$ 727,104
Construction Contingency (10%)				10%	\$ 64,920	\$ 792,024
Total with Contingencies						\$ 792,024
Design & CA				8%	\$ 63,362	\$ 855,386
Construction Management				5%	\$ 39,601	\$ 894,987
Commissioning / Start-up & TAB				4.0%	\$ 31,681	\$ 926,668
Total with Contingencies & Professional Services						\$ 926,668

2024 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1600	1	1,600	ft.	\$ 368	\$ 588,800
15kV Medium Voltage Cable	3200	1	3,200	ft	\$ 50	\$ 160,000
Manholes	3	1	3	Ea.	\$ 15,000	\$ 45,000
15kV Distribution Sw itch	2	1	2	Ea.	\$ 70,000	\$ 140,000
SCADA Fiber	3200	1	3,200	Ea.	\$ 20	\$ 64,000
SCADA Programming	2	1	2	Ea.	\$ 1,200	\$ 2,400
15kV-480V Building Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 1,070,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 21,404	\$ 1,091,604
Design Contingency (10%)				10%	\$ 107,020	\$ 1,198,624
Construction Contingency (10%)				10%	\$ 107,020	\$ 1,305,644
Total with Contingencies						\$ 1,305,644
Design & CA				8%	\$ 104,452	\$ 1,410,096
Construction Management				5%	\$ 65,282	\$ 1,475,378
Commissioning / Start-up & TAB				4.0%	\$ 52,226	\$ 1,527,603
Total with Contingencies & Professional Services						\$ 1,527,603

2025 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
4160V FTTP Sw itchgear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV-4160V, 2000kVA FTTP Transformer	1	1	1	Ea.	\$ 60,000	\$ 60,000
480V Low Voltage Cable/Raceway	1000	1	1,000	ft	\$ 80	\$ 80,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 558,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 11,164	\$ 569,364
Design Contingency (10%)				10%	\$ 55,820	\$ 625,184
Construction Contingency (10%)				10%	\$ 55,820	\$ 681,004
Total with Contingencies						\$ 681,004
Design & CA				8%	\$ 54,480	\$ 735,484
Construction Management				5%	\$ 34,050	\$ 769,535
Commissioning / Start-up & TAB				4.0%	\$ 27,240	\$ 796,775
Total with Contingencies & Professional Services						\$ 796,775

2026 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Building Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2027 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	1500	1	1,500	ft.	\$ 368	\$ 552,000
15kV Medium Voltage Cable	2500	1	2,500	ft	\$ 50	\$ 125,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1800	1	1,800	Ea.	\$ 20	\$ 36,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 834,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 16,684	\$ 850,884
Design Contingency (10%)				10%	\$ 83,420	\$ 934,304
Construction Contingency (10%)				10%	\$ 83,420	\$ 1,017,724
Total with Contingencies						\$ 1,017,724
Design & CA				8%	\$ 81,418	\$ 1,099,142
Construction Management				5%	\$ 50,886	\$ 1,150,028
Commissioning / Start-up & TAB				4.0%	\$ 40,709	\$ 1,190,737
Total with Contingencies & Professional Services						\$ 1,190,737

2028 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
4160V FTTP Sw itchgear	1	1	1	Ea.	\$ 58,000	\$ 58,000
15kV-4160V, 2000kVA FTTP Transformer	1	1	1	Ea.	\$ 60,000	\$ 60,000
480V Low Voltage Cable/Raceway	1000	1	1,000	ft	\$ 80	\$ 80,000
SCADA Fiber	1000	1	1,000	ft	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 593,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 11,864	\$ 605,064
Design Contingency (10%)				10%	\$ 59,320	\$ 664,384
Construction Contingency (10%)				10%	\$ 59,320	\$ 723,704
Total with Contingencies						\$ 723,704
Design & CA				8%	\$ 57,896	\$ 781,600
Construction Management				5%	\$ 36,185	\$ 817,786
Commissioning / Start-up & TAB				4.0%	\$ 28,948	\$ 846,734
Total with Contingencies & Professional Services						\$ 846,734

2029 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 395,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,904	\$ 403,104
Design Contingency (10%)				10%	\$ 39,520	\$ 442,624
Construction Contingency (10%)				10%	\$ 39,520	\$ 482,144
Total with Contingencies						\$ 482,144
Design & CA				8%	\$ 38,572	\$ 520,716
Construction Management				5%	\$ 24,107	\$ 544,823
Commissioning / Start-up & TAB				4.0%	\$ 19,286	\$ 564,108
Total with Contingencies & Professional Services						\$ 564,108

2030 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2031 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 360,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,204	\$ 367,404
Design Contingency (10%)				10%	\$ 36,020	\$ 403,424
Construction Contingency (10%)				10%	\$ 36,020	\$ 439,444
Total with Contingencies						\$ 439,444
Design & CA				8%	\$ 35,156	\$ 474,600
Construction Management				5%	\$ 21,972	\$ 496,572
Commissioning / Start-up & TAB				4.0%	\$ 17,578	\$ 514,149
Total with Contingencies & Professional Services						\$ 514,149

2032 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	1000	1	1,000	ft	\$ 50	\$ 50,000
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1000	1	1,000	Ea.	\$ 20	\$ 20,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 375,200
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 7,504	\$ 382,704
Design Contingency (10%)				10%	\$ 37,520	\$ 420,224
Construction Contingency (10%)				10%	\$ 37,520	\$ 457,744
Total with Contingencies						\$ 457,744
Design & CA				8%	\$ 36,620	\$ 494,364
Construction Management				5%	\$ 22,887	\$ 517,251
Commissioning / Start-up & TAB				4.0%	\$ 18,310	\$ 535,560
Total with Contingencies & Professional Services						\$ 535,560

2033 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000
15kV Medium Voltage Ductbank	1000	1	1,000	ft.	\$ 368	\$ 368,000
15kV Medium Voltage Cable	2000	1	2,000	ft	\$ 50	\$ 100,000
SCADA Fiber	2000	1	2,000	ft	\$ 20	\$ 40,000
SCADA Programming	2	1	2	Ea.	\$ 1,200	\$ 2,400
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000
Sub-Total						\$ 650,400
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 13,008	\$ 663,408
Design Contingency (10%)				10%	\$ 65,040	\$ 728,448
Construction Contingency (10%)				10%	\$ 65,040	\$ 793,488
Total with Contingencies						\$ 793,488
Design & CA				8%	\$ 63,479	\$ 856,967
Construction Management				5%	\$ 39,674	\$ 896,641
Commissioning / Start-up & TAB				4.0%	\$ 31,740	\$ 928,381
Total with Contingencies & Professional Services						\$ 928,381

2034 Electrical Distribution							
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate	
15kV Medium Voltage Ductbank	1100	1	1,100	ft.	\$ 368	\$ 404,800	
15kV Medium Voltage Cable	2300	1	2,300	ft	\$ 50	\$ 115,000	
Manholes	1	1	1	Ea.	\$ 15,000	\$ 15,000	
15kV-480V Transformer	2	1	2	Ea.	\$ 35,000	\$ 70,000	
15kV Distribution Switch	1	1	1	Ea.	\$ 70,000	\$ 70,000	
SCADA Fiber	1800	1	1,800	ft	\$ 20	\$ 36,000	
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200	
Sub-Total						\$ 712,000	
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate	
General Conditions				2.0%	\$ 14,240	\$ 726,240	
Design Contingency (10%)				10%	\$ 71,200	\$ 797,440	
Construction Contingency (10%)				10%	\$ 71,200	\$ 868,640	
Total with Contingencies						\$ 868,640	
Design & CA				8%	\$ 69,491	\$ 938,131	
Construction Management				5%	\$ 43,432	\$ 981,563	
Commissioning / Start-up & TAB				4.0%	\$ 34,746	\$ 1,016,309	
Total with Contingencies & Professional Services						\$ 1,016,309	

2035 Electrical Distribution							
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate	
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000	
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000	
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000	
Sub-Total						\$ 244,000	
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate	
General Conditions				2.0%	\$ 4,880	\$ 248,880	
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280	
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680	
Total with Contingencies						\$ 297,680	
Design & CA				8%	\$ 23,814	\$ 321,494	
Construction Management				5%	\$ 14,884	\$ 336,378	
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286	
Total with Contingencies & Professional Services						\$ 348,286	

2036 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	500	1	500	ft.	\$ 368	\$ 184,000
15kV Medium Voltage Cable	500	1	500	ft	\$ 50	\$ 25,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
Sub-Total						\$ 244,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 4,880	\$ 248,880
Design Contingency (10%)				10%	\$ 24,400	\$ 273,280
Construction Contingency (10%)				10%	\$ 24,400	\$ 297,680
Total with Contingencies						\$ 297,680
Design & CA				8%	\$ 23,814	\$ 321,494
Construction Management				5%	\$ 14,884	\$ 336,378
Commissioning / Start-up & TAB				4.0%	\$ 11,907	\$ 348,286
Total with Contingencies & Professional Services						\$ 348,286

2037 Electrical Distribution						
Electrical	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
15kV Medium Voltage Ductbank	600	1	600	ft.	\$ 368	\$ 220,800
15kV Medium Voltage Cable	1200	1	1,200	ft	\$ 50	\$ 60,000
15kV-480V Transformer	1	1	1	Ea.	\$ 35,000	\$ 35,000
15kV Distribution Sw itch	1	1	1	Ea.	\$ 70,000	\$ 70,000
SCADA Fiber	1200	1	1,200	ft	\$ 20	\$ 24,000
SCADA Programming	1	1	1	Ea.	\$ 1,200	\$ 1,200
Sub-Total						\$ 411,000
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 8,220	\$ 419,220
Design Contingency (10%)				10%	\$ 41,100	\$ 460,320
Construction Contingency (10%)				10%	\$ 41,100	\$ 501,420
Total with Contingencies						\$ 501,420
Design & CA				8%	\$ 40,114	\$ 541,534
Construction Management				5%	\$ 25,071	\$ 566,605
Commissioning / Start-up & TAB				4.0%	\$ 20,057	\$ 586,661
Total with Contingencies & Professional Services						\$ 586,661

Option 3: Thermal Utility Costs Building Side Equipment/Branch Connection Costs

Key	Building	Year Built	Total Steam System Cost	Total Condensate Return System Cost	Total Chilled Water System Cost	Total Bldg Dist. Cost	Total Bldg Dist. Cost w/ Contingency & Professional Services	Total Bldg. Equip. Cost	Total Bldg Equip. Cost w/ Contingency & Professional Services	Total Project Cost:
501	Alvin I. Thomas Administration Building	2019	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 166,298	\$ -	\$ -	\$ 166,298
503	G.R. Woolfolk Social & Political Science B	2019	\$ 74,685	\$ 23,774	\$ 35,647	\$ 134,106	\$ 163,610	\$ -	\$ -	\$ 163,610
504	Gilchrist Engineering Building	2019	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 166,298	\$ -	\$ -	\$ 166,298
506	Thomas E Gray Center	2019	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
508	W.R. Banks Building	2019	\$ 81,767	\$ 23,774	\$ 60,049	\$ 165,591	\$ 202,021	\$ -	\$ -	\$ 202,021
517	A N Poindexter Veterinary Hospital	2019	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
523	Transportation Center	2019	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
529	Fry-Thomas Power Plant	2019	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
535	Jesse M Drew Memorial Complex	2019	\$ 71,663	\$ 23,774	\$ 35,647	\$ 131,084	\$ 159,923	\$ -	\$ -	\$ 159,923
537	Hilliard Hall-Communication Building	2019	\$ 76,728	\$ 23,774	\$ 47,167	\$ 147,670	\$ 180,157	\$ -	\$ -	\$ 180,157
541	Anderson Hall	2020	\$ 74,685	\$ 23,774	\$ 35,647	\$ 134,106	\$ 163,610	\$ -	\$ -	\$ 163,610
544	Evans Hall	2020	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 166,298	\$ -	\$ -	\$ 166,298
658	May Building - Home Economics	2020	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 166,298	\$ -	\$ -	\$ 166,298
668	M.T. Harrington Science Building	2020	\$ 81,767	\$ 23,774	\$ 60,049	\$ 165,591	\$ 202,021	\$ -	\$ -	\$ 202,021
669	William "Billy" J. Nicks Building	2020	\$ 82,578	\$ 23,774	\$ 76,563	\$ 182,915	\$ 223,156	\$ -	\$ -	\$ 223,156
674	Physical Plant Administration Building	2020	\$ 71,663	\$ 23,774	\$ 27,537	\$ 122,975	\$ 150,030	\$ -	\$ -	\$ 150,030
687	Henrietta Farrell Hall	2020	\$ 76,728	\$ 23,774	\$ 37,850	\$ 138,353	\$ 168,791	\$ -	\$ -	\$ 168,791
688	Owens-Franklin Health Clinic	2021	\$ 76,728	\$ 23,774	\$ 37,850	\$ 138,353	\$ 168,791	\$ -	\$ -	\$ 168,791
689	Hobart Thomas Taylor Sr. Hall	2021	\$ -	\$ -	\$ 123,092	\$ 123,092	\$ 150,172	\$ -	\$ -	\$ 150,172
682	Farm Shop	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
702	Meat Goat Building #1	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
704	C.L. Wilson Engineering Complex	2021	\$ 81,767	\$ 23,774	\$ 60,049	\$ 165,591	\$ 202,021	\$ -	\$ -	\$ 202,021
707	E Kika De La Garza Building	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
708	Environmental Chambers Building	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
709	Goat Auxiliary Building	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
710	Goat Dairy Building	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
712	Meat Goat Building #2	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
713	Meat Goat Building #3	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
714	Goat Reproduction Building	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
715	Goat Nutrition Building	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
716	Goat Yearling Building	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
717	Goat Maternity	2021	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
724	Austin Greaux Chemical Engineering	2021	\$ 74,685	\$ 23,774	\$ 35,647	\$ 134,106	\$ 163,610	\$ -	\$ -	\$ 163,610
727	Central Receiving	2021	\$ 76,728	\$ 23,774	\$ 37,850	\$ 138,353	\$ 168,791	\$ -	\$ -	\$ 168,791
739	Utilities Plant Annex	2021	\$ 71,663	\$ 23,774	\$ 27,537	\$ 122,975	\$ 150,030	\$ -	\$ -	\$ 150,030
741	Johnson-Phillip All Faiths Chapel	2021	\$ 71,663	\$ 23,774	\$ 27,537	\$ 122,975	\$ 150,030	\$ -	\$ -	\$ 150,030
742	Wilhelmina Delco Building	2021	\$ 81,767	\$ 23,774	\$ 60,049	\$ 165,591	\$ 202,021	\$ -	\$ -	\$ 202,021
743	Sam R. Collins Engineering Tech Building	2022	\$ 82,578	\$ 23,774	\$ 60,049	\$ 166,402	\$ 203,010	\$ -	\$ -	\$ 203,010
744	John B. Coleman Library	2022	\$ 91,167	\$ 23,774	\$ 76,563	\$ 191,504	\$ 233,635	\$ -	\$ -	\$ 233,635
745	Jesse H & Mary Gibbs Jones Building	2022	\$ 76,728	\$ 23,774	\$ 47,167	\$ 147,670	\$ 180,157	\$ -	\$ -	\$ 180,157
746	Calf and Hay Barn	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
747	Swine Farrowing Building	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
748	Swine Finishing Building	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
749	Laying House	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
750	Turkey House Building	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
751	Pullet Broiler Building	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
752	Office/Lab Processing Building	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
753	Feed Mill Building	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
754	Head House	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
755	Green House One	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
756	Green House Two	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
757	Swine Gestation Building	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
758	Leroy G. Moore Jr. Gym	2022	\$ 76,728	\$ 23,774	\$ 47,167	\$ 147,670	\$ 180,157	\$ -	\$ -	\$ 180,157
761	Carden-Waller Cooperative Extension	2022	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 166,298	\$ -	\$ -	\$ 166,298
Housing	University Village (Phase I & II)	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Housing	University Village North (Phase III)	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Housing	University College (Phase IV)	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
790	Elmer E. O'Banion Science Building	2022	\$ 91,167	\$ 23,774	\$ 101,536	\$ 216,477	\$ 264,102	\$ -	\$ -	\$ 264,102
779	Willie A. Tempton Sr. Memorial Student C	2023	\$ 91,167	\$ 23,774	\$ 76,563	\$ 191,504	\$ 233,635	\$ -	\$ -	\$ 233,635
783	Nathelyne Archie Kennedy Architecture B	2023	\$ 82,578	\$ 23,774	\$ 76,563	\$ 182,915	\$ 223,156	\$ -	\$ -	\$ 223,156
789	Don K. Clark Juvenile Justice & Psycholo	2023	\$ 81,767	\$ 23,774	\$ 60,049	\$ 165,591	\$ 202,021	\$ -	\$ -	\$ 202,021
793	New Electrical Engineering Building	2023	\$ 76,728	\$ 23,774	\$ 47,167	\$ 147,670	\$ 180,157	\$ -	\$ -	\$ 180,157
Housing	University View (Phase VII)	2023	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
848	Student Recreation Center	2023	\$ 82,578	\$ 23,774	\$ 76,563	\$ 182,915	\$ 223,156	\$ -	\$ -	\$ 223,156
849	Agriculture and Business Multipurpose Bu	2023	\$ 82,578	\$ 23,774	\$ 76,563	\$ 182,915	\$ 223,156	\$ -	\$ -	\$ 223,156
850	Panther Plaza	2023	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
853	Baseball Stadium	2023	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
870	Panther Stadium	2023	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
872	Athletic Fieldhouse	2023	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Key	Building	Year Built	Total Steam System Cost	Total Condensate Return System Cost	Total Chilled Water System Cost	Total Bldg Dist. Cost	Total Bldg Dist. Cost w/ Contingency & Professional Services	Total Bldg. Equip. Cost	Total Bldg Equip. Cost w/ Contingency & Professional Services	Total Project Cost:
New	School of Architecture Fabrication Design	2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New	Welcome Center	2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Housing	University Square (Phase VIII)	2017	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F1	Police Station	2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 45,510	\$ 64,961	\$ 64,961
F2	Meat Processing Facility	2018	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 206,682	\$ 295,018	\$ 295,018
F3	ICCE Facility (lab)	2019	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 128,992	\$ 184,124	\$ 184,124
F4	ROTC Building	2020	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 51,563	\$ 73,601	\$ 73,601
F5	Cultural Arts Center	2021	\$ 74,685	\$ 23,774	\$ 37,850	\$ 136,310	\$ 166,298	\$ 11,493	\$ 16,405	\$ 182,703
Housing	Housing 2 (From 2011 Campus MP)	2022	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F7/F8	Future Academic Building	2023	\$ 127,899	\$ 31,931	\$ 103,836	\$ 263,665	\$ 321,672	\$ 83,767	\$ 119,568	\$ 441,240
F9	Future Support Building	2024	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 84,238	\$ 120,241	\$ 120,241
F10	Future Office	2024	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 22,047	\$ 31,470	\$ 31,470
F11	Future Stud. Activities Building	2025	\$ 106,403	\$ 31,063	\$ 51,557	\$ 189,024	\$ 230,609	\$ 10,092	\$ 14,406	\$ 245,015
F12	Future Retail Office Building	2026	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 20,203	\$ 28,837	\$ 28,837
Housing	Future Housing Building	2027	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F14/F15	Future Academic Building	2028	\$ 750,543	\$ 173,900	\$ 578,068	\$ 1,502,511	\$ 1,833,063	\$ 81,417	\$ 116,214	\$ 1,949,277
F16	Future Support Building	2029	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 81,968	\$ 117,002	\$ 117,002
F17	Future Office	2029	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 21,595	\$ 30,825	\$ 30,825
F18	Future Stud. Activities Building	2030	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 82,997	\$ 118,470	\$ 118,470
F19	Future Retail Office Building	2031	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 19,802	\$ 28,266	\$ 28,266
Housing	Future Housing Building	2032	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
F21/F22	Future Academic Building	2033	\$ 786,319	\$ 181,179	\$ 604,313	\$ 1,571,811	\$ 1,917,610	\$ 79,020	\$ 112,792	\$ 2,030,402
F23	Future Support Building	2034	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 79,699	\$ 113,763	\$ 113,763
F24	Future Office	2034	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 21,143	\$ 30,179	\$ 30,179
F25	Future Stud. Activities Building	2035	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 80,700	\$ 115,191	\$ 115,191
F26	Future Retail Office Building	2036	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 19,402	\$ 27,694	\$ 27,694
Housing	Future Housing Building	2037	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Main Header Distribution Costs

Size (in)	Year Built	Service	Piping Location	Rounded Length of Trench (L.F.)	Piping	Fittings	Joint Kits	Valves	Trenching	Total Cost:	Total Cost w/ Contingency & Professional Services
24	N/A	CHW	N/A	200	\$164,724	\$64,329	\$24,939	\$75,215	\$46,529	\$375,736	\$536,326
20	N/A	CHW	N/A	2800	\$1,982,779	\$313,198	\$276,692	\$225,201	\$651,403	\$3,449,274	\$4,923,493
18	N/A	CHW	N/A	2900	\$1,886,139	\$276,811	\$250,769	\$187,372	\$674,667	\$3,275,758	\$4,675,817
12	N/A	CHW	N/A	2900	\$1,383,778	\$167,649	\$137,425	\$73,883	\$674,667	\$2,437,402	\$3,479,147
10	N/A	CHW	N/A	1900	\$757,614	\$95,786	\$76,680	\$42,874	\$442,023	\$1,414,978	\$2,019,739
8	N/A	CHW	N/A	400	\$128,129	\$19,952	\$13,125	\$10,957	\$93,058	\$265,220	\$378,576
12	N/A	STM	N/A	200	\$59,924	\$38,992	\$5,495	\$9,235	\$46,529	\$160,175	\$228,634
10	N/A	STM	N/A	4700	\$1,191,221	\$259,495	\$110,386	\$42,874	\$1,093,426	\$2,697,403	\$3,850,274
8	N/A	STM	N/A	1000	\$207,283	\$51,763	\$19,300	\$10,957	\$232,644	\$521,947	\$745,027
4	N/A	STM	N/A	3100	\$353,949	\$89,397	\$42,659	\$11,257	\$721,196	\$1,218,457	\$1,739,226
2	N/A	CR	N/A	9000	\$368,687	\$79,570	\$50,862	\$21,515		\$520,634	\$743,153

Option 3: Mechanical Equipment Costs

Heating Equipment

2020						
FTPP x Boiler #11 & #12 Demolition & 1 - 20000 MBH Firetube Boiler Installation						
FTPP						
Heating	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
20000 MBH Firetube Boiler (Equipment)	1	20,000	20,000	MBH	\$ 20	\$ 400,000
Boiler Demolition	2	25,000	50,000	MBH	\$ 2	\$ 100,000
Auxiliary Equipment	1	20,000	20,000	MBH	\$ 2	\$ 40,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Boiler Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Pump Controls	0	6	0	pt.	\$ 1,740	\$ -
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 644,372
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 12,887	\$ 657,260
Design Contingency (10%)				10%	\$ 64,437	\$ 721,697
Construction Contingency (10%)				10%	\$ 64,437	\$ 786,134
Total with Contingencies						\$ 786,134
Design & CA				8%	\$ 62,891	\$ 849,025
Construction Management				5%	\$ 39,307	\$ 888,332
Commissioning				2.0%	\$ 15,723	\$ 904,054
Start-up & TAB				2.0%	\$ 15,723	\$ 919,777
Total with Contingencies & Professional Services						\$ 919,777

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2022						
FTPP Boiler #10 Replacement						
FTPP						
Heating	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
20 MMBtu/hr Firetube Boiler (Equipment)	1	20,000	20,000	MBH	\$ 20	\$ 400,000
Boiler Demolition	1	20,000	20,000	MBH	\$ 2	\$ 40,000
Deaerator	1	110,000	110,000	MBH	\$ 1	\$ 100,000
Deaerator Demolition	1	110,000	110,000	MBH	\$ 2	\$ 220,000
Feedwater Pumps	3	15	45	hp	\$ 933	\$ 42,000
Pump Demolition	3	15	45	hp	\$ 28	\$ 1,253
RO	1	50	50	gpm	\$ 3,000	\$ 150,000
Auxiliary Equipment	1	20,000	20,000	MBH	\$ 2	\$ 40,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Boiler Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Pump Controls	3	6	18	pt.	\$ 1,740	\$ 31,312
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 1,128,937
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 22,579	\$ 1,151,515
Design Contingency (10%)				10%	\$ 112,894	\$ 1,264,409
Construction Contingency (10%)				10%	\$ 112,894	\$ 1,377,303
Total with Contingencies						\$ 1,377,303
Design & CA				8%	\$ 110,184	\$ 1,487,487
Construction Management				5%	\$ 68,865	\$ 1,556,352
Commissioning				2.0%	\$ 27,546	\$ 1,583,898
Start-up & TAB				2.0%	\$ 27,546	\$ 1,611,444
Total with Contingencies & Professional Services						\$ 1,611,444

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

Chilled Water Equipment

2018						
FTPP x 1 - 1700 Ton Chiller Replacement						
FTPP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1700 Ton Chiller with VFD's (Equipment)	1	1,700	1,700	tons	\$ 376	\$ 639,200
Chw Plant Pumps with VFD's - 3400 gpm, 115ft head	1	160	160	hp	\$ 448	\$ 71,680
Condenser Water Pumps with VFD's - 5100 gpm, 75 ft head	1	160	160	hp	\$ 448	\$ 71,680
Chiller Demolition	1	1,100	1,100	tons	\$ 13	\$ 14,300
Pump Demolition	1	200	200	hp	\$ 28	\$ 5,567
Auxiliary Equipment	1	1,700	1,700	tons	\$ 48	\$ 81,600
CHW Piping to Header (14")	1	100	100	ft	\$ 270	\$ 27,000
CW Piping to Header (16")	1	100	100	ft	\$ 300	\$ 30,000
Gear Relocation	1	1	1	N/A	\$ 200,000	\$ 200,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 1,277,566
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 25,551	\$ 1,303,118
Design Contingency (10%)				10%	\$ 127,757	\$ 1,430,874
Construction Contingency (10%)				10%	\$ 127,757	\$ 1,558,631
Total with Contingencies						\$ 1,558,631
Design & CA				8%	\$ 124,690	\$ 1,683,322
Construction Management				5%	\$ 77,932	\$ 1,761,253
Commissioning				2.0%	\$ 31,173	\$ 1,792,426
Start-up & TAB				2.0%	\$ 31,173	\$ 1,823,598
Total with Contingencies & Professional Services						\$ 1,823,598

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2020						
FTPP x 1 - 1700 Ton Chiller Addition						
FTPP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Building Expansion	1	5,160	5,160	sf	\$ 348	\$ 1,795,205
1700 Ton Chiller with VFD's (Equipment)	1	1,700	1,700	tons	\$ 376	\$ 639,200
Chw Plant Pumps with VFD's - 3400 gpm, 115ft head	1	160	160	hp	\$ 448	\$ 71,680
Packaged S.S. Cooling Towers with VFDs	1	1,700	1,700	tons	\$ 395	\$ 671,500
Condenser Water Pumps with VFD's - 5100 gpm, 75 ft head	1	160	160	hp	\$ 448	\$ 71,680
2 x 24" Bagstop Services / 2 x 30" Bagstop Services	1	1	1	pipe	\$ 75,000	\$ 75,000
Auxiliary Equipment	1	1,700	1,700	tons	\$ 48	\$ 81,600
CHW Piping to Header (14")	1	150	150	ft	\$ 270	\$ 40,500
CW Piping to Header (16")	1	150	150	ft	\$ 300	\$ 45,000
Gear Relocation	1	1	1	N/A	\$ 400,000	\$ 400,000
Wall Demolition	1	1	1	N/A	\$ 50,000	\$ 50,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 4,077,905
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 81,558	\$ 4,159,463
Design Contingency (10%)				10%	\$ 407,791	\$ 4,567,254
Construction Contingency (10%)				10%	\$ 407,791	\$ 4,975,044
Total with Contingencies						\$ 4,975,044
Design & CA				8%	\$ 398,004	\$ 5,373,048
Construction Management				5%	\$ 248,752	\$ 5,621,800
Commissioning				2.0%	\$ 99,501	\$ 5,721,301
Start-up & TAB				2.0%	\$ 99,501	\$ 5,820,802
Total with Contingencies & Professional Services						\$ 5,820,802

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2022						
FTPP x 1 - 1700 Ton Chiller Replacement						
FTPP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1700 Ton Chiller with VFD's (Equipment)	1	1,700	1,700	tons	\$ 376	\$ 639,200
Chw Plant Pumps with VFD's - 3400 gpm, 115ft head	1	160	160	hp	\$ 448	\$ 71,680
Packaged S.S. Cooling Towers with VFDs	1	1,700	1,700	tons	\$ 395	\$ 671,500
Condenser Water Pumps with VFD's - 5100 gpm, 75 ft head	1	160	160	hp	\$ 448	\$ 71,680
Chiller Demolition	1	1,100	1,100	tons	\$ 13	\$ 14,300
Pump Demolition	1	200	200	hp	\$ 28	\$ 5,567
Auxiliary Equipment	1	1,700	1,700	tons	\$ 48	\$ 81,600
CHW Piping to Header (14")	1	100	100	ft	\$ 270	\$ 27,000
CW Piping to Header (16")	1	100	100	ft	\$ 300	\$ 30,000
Gear Relocation	1	1	1	N/A	\$ 200,000	\$ 200,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 1,949,066
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 38,981	\$ 1,988,048
Design Contingency (10%)				10%	\$ 194,907	\$ 2,182,954
Construction Contingency (10%)				10%	\$ 194,907	\$ 2,377,861
Total with Contingencies						\$ 2,377,861
Design & CA				8%	\$ 190,229	\$ 2,568,090
Construction Management				5%	\$ 118,893	\$ 2,686,983
Commissioning				2.0%	\$ 47,557	\$ 2,734,540
Start-up & TAB				2.0%	\$ 47,557	\$ 2,782,097
Total with Contingencies & Professional Services						\$ 2,782,097

* Costs are estimates of probable construction cost and are estimated in 2017 dollars.

2025						
FTPP x 1 - 1700 Ton Chiller Replacement						
FTPP						
Cooling	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
1700 Ton Chiller with VFD's (Equipment)	1	1,700	1,700	tons	\$ 376	\$ 639,200
Chw Plant Pumps with VFD's - 3400 gpm, 115ft head	1	160	160	hp	\$ 448	\$ 71,680
Condenser Water Pumps with VFD's - 5100 gpm, 75 ft head	1	160	160	hp	\$ 448	\$ 71,680
Chiller Demolition	1	1,100	1,100	tons	\$ 13	\$ 14,300
Pump Demolition	1	200	200	hp	\$ 28	\$ 5,567
Auxiliary Equipment	1	1,700	1,700	tons	\$ 48	\$ 81,600
CHW Piping to Header (14")	1	100	100	ft	\$ 270	\$ 27,000
CW Piping to Header (16")	1	100	100	ft	\$ 300	\$ 30,000
Gear Relocation	1	1	1	N/A	\$ 200,000	\$ 200,000
Controls	Qty.	Capacity (Each)	Total Capacity	Units	Unit Estimate	Total Estimate
Chiller Controls	1	30	30	pt.	\$ 2,000	\$ 60,000
Pump Controls	1	6	6	pt.	\$ 1,740	\$ 10,437
Cooling Tower Controls	1	8	8	pt.	\$ 1,740	\$ 13,916
Electrical Controls	1	30	30	pt.	\$ 1,740	\$ 52,186
Sub-Total						\$ 1,277,566
Soft Costs & Contingencies				Cost	Sub-Total	Total Estimate
General Conditions				2.0%	\$ 25,551	\$ 1,303,118
Design Contingency (10%)				10%	\$ 127,757	\$ 1,430,874
Construction Contingency (10%)				10%	\$ 127,757	\$ 1,558,631
Total with Contingencies						\$ 1,558,631
Design & CA				8%	\$ 124,690	\$ 1,683,322
Construction Management				5%	\$ 77,932	\$ 1,761,253
Commissioning				2.0%	\$ 31,173	\$ 1,792,426
Start-up & TAB				2.0%	\$ 31,173	\$ 1,823,598
Total with Contingencies & Professional Services						\$ 1,823,598

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