

Town of Johnstown

Water Treatment Plant Expansion from 5 to 12.5 mgd

Work Breakdown Structure and Fee Schedule - Option 4 Ozone & Biologically Active Filtration

BASIC SERVICES	Project Manager	Quality Control	Lead Process	Process	Structural	Architectural	Civil	Mechanical	Electrical, Instrumentation & Controls	Construction	CAD / Designer	Fire Protection	Environmental	BMcD Total Labor		Expenses	Sub-Consultants	Total Cost
	Pugh	Schaefer	Kinser	Rachelson Lundgren	Kienholz	Lang Dalglish	Tessitore	Olsen	Johnson Patwari	Herrington Other	Ellis	DeGroff Ginsberg	Woehler Rowe	Hours	Cost	Direct	Cost	
	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Cost	Direct	Cost	
TASK SERIES 100 - Project Initiation & Coordination																		
101 - Project Kick Off Meeting	4		4											8	2024	\$80		\$ 2,104
102 - Weekly Review Meetings	120		60	60	8		8	8	16					280	\$64,999	\$2,600		\$ 67,599
103 - Project, Risk and Resource Management, Schedule and Budget Controls	240													240	\$60,480	\$2,420		\$ 62,900
Sub-Total Series 100	364	0	64	60	8	0	8	8	16	0	0	0	0	528	\$127,503	\$5,100	\$0	\$132,603
TASK SERIES 200 - Review Existing Data & Basis of Design																		
201 - Review Existing Records	4		8	16										28	\$6,008	\$240		\$ 6,248
202 - Develop Permitting Matrix	2			4									4	10	\$2,072	\$80		\$ 2,152
203 - Desktop Analysis ¹	24	4	60	100	60	24	24		40		40			376	\$76,673	\$3,070		\$ 79,743
204 - Workshop 1 - Overall Treatment Train Options Selection	4		4	4										12	\$2,766	\$110		\$ 2,876
205 - Water Characterization ²	8		24	40										72	\$15,532	\$620	\$20,000	\$ 36,152
206 - Pretreatment Capacity Analysis ³	4		24	40										68	\$14,524	\$580		\$ 15,104
207 - Prepare 2 Layout Options for Selected Treatment Train	20		40	80							60			200	\$35,920	\$1,440		\$ 37,360
208 - Taste & Odor Control Option Selection ⁴	40		60	80										180	\$40,160	\$1,610		\$ 41,770
209 - Workshop 2 - Taste & Odor Control Option Selection	4		4	4										12	\$2,766	\$110		\$ 2,876
210 - Disinfection & Distribution Pump Station Options Development ⁵	12		24	40	8				8					92	\$20,114	\$800		\$ 20,914
211 - Workshop 3 - Alternative Design Comparison ⁶	4		4											8	\$2,024	\$80		\$ 2,104
212 - Prepare Conceptual Design ⁷	8		16	60	16	8	32	4	40		40			224	\$41,420	\$1,660		\$ 43,080
213 - Prepare WTP Siting Options, Construction & Prioritization Phases ⁸	12		24	48	20				24	8	60			196	\$35,699	\$1,430		\$ 37,129
214 - Basis of Design Report ⁹	4	2	4	40	4	4	8	4	8	4	8		24	114	\$22,435	\$900		\$ 23,335
215 - Workshop 4 - Review Conceptual Design	4		4	4										12	\$2,766	\$110		\$ 2,876
Sub-Total Series 200	518	6	364	620	116	36	72	16	136	12	208	0	28	2132	\$448,383	\$17,940	\$20,000	\$486,323
TASK SERIES 300 - Preliminary Design 30%																		
301 - Develop Preliminary Design	60	4	120	360	220	100	80	60	240		240	20		1,504	\$291,616	\$11,660		\$ 303,276
302 - Topographic Survey							8							8	\$1,408	\$60	\$15,525	\$ 16,993
303 - Geotechnical Investigations					8									8	\$1,920	\$80	\$26,268	\$ 28,268
304 - Review Meeting 1 - Preliminary Design	4		4						2					10	\$2,438	\$100		\$ 2,538
305 - Preliminary Design Report	16	4	40	120	36	24	40	8	32	8		20	24	372	\$77,682	\$3,110		\$ 80,792
Sub-Total Series 300	80	8	164	480	264	124	128	68	274	8	240	40	24	1902	\$375,064	\$15,010	\$41,793	\$431,867
TASK SERIES 400 - Detailed Design 60%																		
401 - Prepare 60% Design	60	4	120	400	360	160	80	80	320	8	280	20		1,892	\$372,040	\$14,880		\$ 386,920
402 - Utility Locates & Test Holes ¹⁰				2										2	\$371	\$10	\$30,000	\$ 30,381
403 - Review Meeting 2 - 60% Design	2		2						2					6	\$1,426	\$60		\$ 1,486
404 - Initial Permitting Support ¹¹	32	2	12	40	12	12	12	2	4		8	8	16	160	\$33,556	\$1,340		\$ 34,896
Sub-Total Series 400	94	6	134	442	372	172	92	82	326	8	288	28	16	2,060	\$407,392	\$16,290	\$30,000	\$453,682

TASK SERIES 500 - Final Design																		
501 - Prepare 90% Design	60	4	80	360	340	120	120	60	240	8	240	30		1,662	\$325,592	\$13,020		\$ 338,612
502 - Review Meeting 3 - 90% Design	2		2											4	\$1,012	\$40		\$ 1,052
503 - Final Permitting Support	8			16		24						8	24	80	\$16,619	\$660		\$ 17,279
504 - Prepare Construction Documents	4	2	8	30	16	8	12	8	32		40			160	\$29,021	\$1,160		\$ 30,181
505 - Review Meeting 4 - Construction Documents	2		2											4	\$1,012	\$40		\$ 1,052
Sub-Total Series 500	76	6	92	406	356	152	132	68	272	8	280	38	0	1910	\$373,256	\$14,920	\$0	\$388,176
TASK SERIES 600 - CMAR Selection																		
601 - Project Delivery Workshop	4		4	4										12	\$2,766	\$110		\$ 2,876
602 - CMAR Execution Workshop	4		4	4										12	\$2,766	\$110		\$ 2,876
603 - Preparation of Request for Qualifications Documents	8	2	8	16										34	\$7,520	\$300		\$ 7,820
604 - Review Meeting 5 - CMAR RFQ Documents	4		4	4										12	\$2,766	\$110		\$ 2,876
605 - Evaluation of Received Qualification Packages & Development of Short List	6	4	4	4										18	\$4,278	\$170		\$ 4,448
606 - Preparation of Request for Proposals	8	2	8	16				2						38	\$8,438	\$340		\$ 8,778
607 - RFP Period Support	4		4	16										20	\$3,976	\$160		\$ 4,136
608 - Evaluation of CMAR Proposals & Contractor Negotiation	8	4	8											20	\$5,056	\$200		\$ 5,256
609 - Review of Cost Estimates, Schedules, Value Engineering & Constructability Issues	16		16	32	6	8	6	12						104	\$22,746	\$910		\$ 23,656
Sub-Total Series 600	62	12	56	96	6	8	6	14	0	0	0	0	0	270	\$60,312	\$2,410	\$0	\$62,722
TASK SERIES 700 - Equipment Procurement																		
701 - Prepare Documents for Early Procurement Packages	4	1		16										21	\$4,228	\$170		\$ 4,398
702 - Prepare Procurement Request for Proposal Packages	2	1	4	16				8						35	\$7,452	\$300		\$ 7,752
703 - Review Meeting - Procurement Documents	2		2											4	\$1,012	\$40		\$ 1,052
704 - Procurement Period Support	4			6										10	\$2,121	\$80		\$ 2,201
705 - Evaluation & Negotiation of Procurement Packages	4		4	8				8						26	\$5,740	\$230		\$ 5,970
706 - Submittal Review	16		60	120	40			16	60					318	\$68,484	\$2,740		\$ 71,224
707 - Coordination with Installing Contractor	32			16										48	\$11,032	\$440		\$ 11,472
Sub-Total Series 1000	64	2	70	182	40	0	0	32	60	0	0	0	0	462	\$100,069	\$4,000	\$0	\$104,069
Project Subtotals - Basic Services	1258	40	944	2286	1162	492	438	288	1084	36	1016	106	68	9264	\$1,891,979	\$75,670	\$91,793	\$2,059,442
ADDITIONAL SERVICES																		
TASK SERIES 800 - Optimize Operations																		
801 - Identify Optimization Tasks	8	2	8	24					4					46	\$9,831	\$390		\$ 10,221
802 - Workshop 6 - Operations Investigation	4		4	4										12	\$2,766	\$110		\$ 2,876
803 - WTP Operations Support	20		80	80										180	\$40,200	\$1,610		\$ 41,810
804 - Procurement & Installation Support	16		40	60	16			8	32					172	\$37,532	\$1,500		\$ 39,032
Sub-Total Series 500	48	2	132	168	16	0	0	8	36	0	0	0	0	410	\$90,329	\$3,610	\$0	\$93,939
TASK SERIES 900 - Pilot Testing																		
206 - Jar Testing ^{2A}	16	4	60	120										200	\$42,540	\$1,700	\$24,000	\$ 68,240
207 - Bench Scale Ozone Testing ^{2B}	16	4	60	80										160	\$35,120	\$1,400	\$22,000	\$ 58,520
251 - Develop testing protocol	16	2	16	40										74	\$16,020	\$640		\$ 16,660
252 - Field Implementation of Pilot Testing	8		40	60	20		8		40	8	24			208	\$42,170	\$1,690		\$ 43,860
253 - Pilot Testing Supervision	16		80	320										416	\$83,712	\$3,350	\$55,000	\$ 142,062
254 - Evaluation of Results	8	2	32	40										82	\$18,068	\$720		\$ 18,788
255 - TM7 - Pilot Testing Results	8	2	24	80							8			122	\$24,240	\$970		\$ 25,210
256 - Workshop 4 - Confirmation of Process Design	4		4	4										12	\$2,766	\$110		\$ 2,876
Sub-Total Series 200A - Pilot Testing	92	14	316	744	20	0	8	0	40	8	32	0	0	1274	\$264,636	\$10,580	\$101,000	\$376,216
TASK SERIES 1000 - Owner Costs by Engineer																		
251 - Ozone Pilot Testing Equipment Rental	8													8	\$2,016	\$80	\$140,800	\$ 142,896
252 - BAF Pilot Testing Equipment Rental	8													8	\$2,016	\$80	\$160,600	\$ 162,696
253 - Pilot Site Implementation	16	2	24	40	8									90	\$19,972	\$800	\$128,700	\$ 149,472
Sub-Total Series 200A - Pilot Testing	32	2	24	40	8	0	0	0	0	0	0	0	0	106	\$24,004	\$960	\$430,100	\$455,064
Project Subtotals - Additional Services (Allowance Not to Exceed)	124	16	340	784	28	0	8	0	40	8	32	0	0	1380	\$288,640	\$11,540	\$531,100	\$831,280
Project Total	1382	56	1284	3070	1190	492	446	288	1124	44	1048	106	68	10644	\$2,180,619	\$87,210	\$622,893	\$2,890,722

Notes:

- Review data provided by Town (record drawings, operating records). Conduct field visual assessment of existing assets to determine if assets suitable to integrate in expanded WTP.
- Town to provide population projections as basis for future water demand calculations. Use existing water quality data and conduct additional lab analysis to characterize water quality. Includes \$10,000 allowance for laboratory costs.
- Jar testing scope to assess chemical dosing options for select constituent removals.
- Conduct bench scale testing to determine if raw or intermediate ozone preferred. Determine bromate interaction and disinfection byproduct formation potential. Use BMcD owned ozone generator and laboratory analysis. Spike feed water to simulate peak taste and odor conditions.
- Convert existing DAF to SAF. Send sample water to SAF vendor for jar testing.
- Prepare comparison of T&O options including GAC, Ozone, BAF. Prepare conceptual design for GAC system, leased to own system to incorporate in WTP expansion.
- Develop disinfection, distribution storage and pumping analysis, including design of new disinfection contact basin. Perform desktop analysis on corrosion impact to distribution system.
- Select process train for conceptual design.
- Resolve treatment train, layout on existing WTP site, estimate construction cost, schedule and phases.
- Prepare 3 concepts for WTP layout on the existing property and two additional properties.
- Document decisions and design criteria, based on feedback at Workshop. Select WTP site.
- Includes allowance for 10 utility test holes at \$1,000 each.
- Prepare initial submittals to CDPHE Water Quality Division, Town Planning and Building Permit, Weld County.

Basic	\$2,059,442
Additional	\$831,280

Owner Costs

Our experiences shows that it is more efficient for the Owner to contract directly with pilot equipment suppliers. Below are estimated costs for ozone and biologically active filtration pilot tests. These costs are incorporated into the additional services above. Our approach is flexible if the Town prefers the consultant to carry these

Activity	Total Cost
Ozone Pilot Testing Equipment (Inuitech)	
Equipment Rental (12 weeks)	\$ 35,000
Round Trip Shipping	\$ 15,000
Onsite Commissioning and Training	\$ 10,000
Laboratory Analysis	\$ 20,000
Operation	\$ 48,000
Sub-Total - Ozone Pilot Testing Equipment	\$128,000
Biologically Active Filter Pilot Testing Equipment (WesTech or DeNora)	
Equipment Rental (12 weeks)	\$ 35,000
Chemical Systems	\$ 18,000
Round Trip Shipping	\$ 15,000
Onsite Commissioning and Training	\$ 10,000
Laboratory Analysis	\$ 20,000
Operation	\$ 48,000
Sub-Total - BAF Pilot Testing Equipment	\$146,000
Pilot Testing System Installation (General Contractor)	
Mobilization	\$ 30,000
Site Preparation	\$ 20,000
Ozone Pilot Installation	\$ 15,000
Chemical Systems Installation	\$ 12,000
Filter Pilot Installation	\$ 15,000
Demobilization	\$ 25,000
Sub-Total - Pilots System Installation	\$117,000
Owner Cost Sub-Totals (Estimated, Pending Supplier Quotes)	\$391,000

Notes:
 1. Excludes operating costs (water, power, chemicals, waste removal).