

May 8, 2018

Kevin Kundert
General Manager
Four Corners Water & Sewer District
495 Quail Run Road
Bozeman, MT 59718

RE: Elk Grove Water Supply Well Improvements Cost Estimates

Mr. Kundert,

We understand that residents of Elk Grove Subdivision have requested more information regarding the budgetary cost estimates for the well improvements that were presented to Elk Grove in June of 2017. This letter describes the objective, scope, and budgetary cost estimate for the recommended improvements.

The Elk Grove Subdivision water system is supplied by three groundwater wells located on Remainder Tract 1 of Elk Grove Subdivision, Phase 4. The Montana Department of Natural Resources and Conservation (DNRC) requires that the flow rate from each well be continuously measured by an approved flow meter. The total volume of water pumped from each well is to be reported to DNRC on an annual basis.

Currently, none of the well flow meters are functional and must be replaced to comply with DNRC requirements. The flow meters also provide useful operational data to the Four Corners Water and Sewer District.

Supply Well No. 1 and Supply Well No. 2 were constructed in 2000 and have flow meters that are directly buried. Since the meters are buried in the soil, they must be dug up when in need of maintenance or replacement. Supply Well No. 3 was constructed in 2008 and has a 6' x 8' buried concrete meter vault that contains a magnetic flow meter, flow control valve, isolation valve, pressure gauge, and sample tap. The configuration of Supply Well No. 3 allows for access to the serviceable components of the well so that excavation can be avoided when maintenance or replacement is needed. This is a commonly accepted practice for public water systems where service and reliability are important.

When assessing the costs to operate and maintain the Elk Grove water and sewer systems in 2017, the following improvements were identified to bring the system into regulatory compliance and enhance the serviceability and reliability of Elk Grove's water supply:

- Construct meter vaults for Well No. 1 and Well No. 2 that are configured similar to Well No. 3. The record drawing for Well No. 3 is included as Attachment 1 for reference.
- Replace the existing flow meter for Well No. 3.
- Address power feed reliability issues suspected to be the result of a lightning strike.
- Install narrow band radios with communication to the existing Elk Grove booster station to capture flow data.

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Itemized Cost Estimate

An itemized breakdown of the costs presented to the residents of Elk Grove Subdivision in June of 2017 is shown in Table 1 below. Note that contingency, engineering, and construction administration were included in the total cost, which is customary for budgetary cost estimating.

Table 1 – Water Supply Well Improvements Cost Breakdown

Water Supply Well Improvements						
Project Rationale: DNRC Water Right requires approved flow meters for each point of diversion. Meters for Wells 1, 2 and 3 are not functional.						
Project Description: Well 1 and Well 2 to have existing direct bury propeller meters and valves replaced with concrete meter vaults containing new mag meters/transmitters, check valves, and isolation valves. Well 3 to have existing mag meter/transmitter and sump pump replaced within existing meter vault. All three wells to have new narrow band radios with comm. to booster station.						
					Estimated 2017 Construction Cost	
Item	Quantity	Unit	Description	Unit Price	Total	
1	1	LS	MOBILIZATION	\$6,000.00	\$6,000.00	
2	1	LS	TAXES, BONDS, AND INSURANCE	\$3,000.00	\$3,000.00	
3	1	LS	GENERAL REQUIREMENTS	\$5,000.00	\$5,000.00	
4	35	CY	EXCAVATION	\$80.00	\$2,800.00	
5	2	EA	8'x6' METER VAULT	\$8,000.00	\$16,000.00	
6	50	LF	6-INCH CL 150 C900 PVC WATER PIPE	\$80.00	\$4,000.00	
7	2	EA	6-INCH MAG METER AND TRANSMITTER	\$5,000.00	\$10,000.00	
	2	EA	6-INCH FLOW/PRESSURE REGULATING VALVE	\$3,600.00	\$7,200.00	
8						
9	2	EA	6-INCH GATE VALVE	\$1,000.00	\$2,000.00	
10	2	EA	WELL DISCHARGE BLOW-OFF	\$350.00	\$700.00	
11	3	EA	SUMP PUMP	\$500.00	\$1,500.00	
12	2	EA	ELECTRICAL AND CONTROLS	\$15,000.00	\$30,000.00	
13	3	EA	RADIO TRANSMITTERS	\$1,200.00	\$3,600.00	
14	1	LS	POWER FEED IMPROVEMENTS	\$5,000.00	\$5,000.00	
15	1	LS	CONTRACTOR INSTALLATION	\$32,000.00	\$32,000.00	
TOTAL					\$128,800.00	
CONTINGENCY (20%)					\$25,760.00	
ENGINEERING (10%)					\$12,880.00	
CONSTRUCTION ADMINISTRATION (5%)					\$6,440.00	
TOTAL					\$173,880.00	

Historical Cost Comparison

As an additional check, the actual costs associated with the construction of the Well No. 3 meter vault have been tabulated. These costs are documented in the valuation of the water system that was performed when the District was purchasing the system. Attachment 2 includes an excerpt of the valuation document. Relevant line items are highlighted and summarized in Table 2 below. Note that mobilization, taxes, bonds, and insurance constituted approximately 9% of the total cost of other items under Schedule II in the attached excerpt. This same percentage has been applied to the other line items tabulated below. Also note that these numbers would not include engineering, construction administration, power feed improvements, or replacement of the existing Well No. 3 flow meter.

This comparison is not intended to be a direct correlation of costs, but rather a rough check that the budgetary cost estimate appears reasonable when compared to actual historical cost data for similar work.

Table 2 – 2008 Well No. 3 Meter Vault Installation Cost Comparison

Item No.	Description	Actual 2008 Installation Cost	2017 Cost*
1	Mobilization, Taxes, Bonds and Insurance (9% of items below)	\$ 4,957	\$ 6,468
4	Site Electrical	\$ 10,775	\$ 14,059
5	Controls and Telemetry	\$ 7,718	\$ 10,070
6	Well Valve Vault	\$ 35,166	\$ 45,884
7	6" CL150 C900 PVC	\$ 1,421	\$ 1,854
Total		\$ 60,037	\$ 78,335

* Original 2008 Installation Costs converted to 2017 dollars assuming an annual construction cost inflation rate of 3%

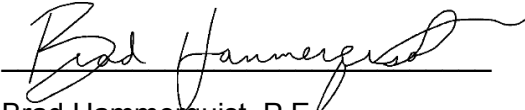
As tabulated above, one meter vault with internal equipment cost approximately \$60,000 to construct in 2008. At an annual construction inflation rate of 3%, it would cost approximately \$78,000 in 2017. Two vaults would cost about \$156,000. After adding 15% for engineering and construction administration, the total cost would be about \$180,000. While inflating the cost data over a nine year period may not provide an exact translation to today's costs, they appear to be comparable to the costs provided to Elk Grove in 2017.

It is recommended that the District continue to consider these improvements in capital planning efforts for the reasons previously described. Please let me know if you have any questions or need any additional information regarding improvements to the Elk Grove water supply system.

Sincerely,



**Morrison
Maierle**
engineers • surveyors • planners • scientists



Brad Hammerquist, P.E.

cc: MMI File
Martin Gagnon, PE

Four Corners Water and Sewer District

Table A-3(A)

Valuation of Utility Solutions Water System Using Reconstruction Cost Less Depreciation

Unit No.	Utility Plant Account Description	Original Installation Cost	Date of Installation	Years Since Install	ENR-CCI Installation Date	Useful Life (Months)	Useful Life (Years)	Annual Depr Ratio	Accum Depr to Date	Net Book Value	Reconstruction Cost	Reconstruction Cost Depreciation	Depreciated Reconstruction Cost
CURRENT DATE		6/30/2015											
ENR CCI 20 City, June 2015		10,039.0											
	Fluidyne labor allocated to WDF	36,191	6/30/2008	7.00	8184.9	600	50	2.00%	5,067	31,124	44,389	6,214	38,174
	Markup allocated to WDF	395	6/30/2008	7.00	8184.9	600	50	2.00%	55	340	485	68	417
	Dick Anderson Construction invoices	105,876	6/30/2008	7.00	8184.9	600	50	2.00%	14,823	91,054	129,859	18,180	111,679
		307,108											323,940
Utility Solutions Purchase													
	Unallocated purchase price	168,027	1/1/2004	11.50	6824.9			0.00%		168,027	168,027	-	168,027
	Land	23,744	1/1/2004	11.50	6824.9			0.00%		23,744	23,744	-	23,744
		191,771											191,771
EG Pumphouse Improvements (WP&H)													
	Total invoices	10,396	8/26/2008	6.84	8361.7	180	15	6.67%	4,744	5,652	12,481	5,695	6,786
Well #3 Improvements													
Schedule I (Haggerty)													
1	Well Casing, Screen, and Tailpipe	7,716	8/26/2008	6.84	8361.7	600	50	2.00%	1,056	6,660	9,264	1,268	7,996
2	Pitless Adapter	6,675	8/26/2008	6.84	8361.7	600	50	2.00%	914	5,761	8,014	1,097	6,917
3	Well Pump	10,130	8/26/2008	6.84	8361.7	600	50	2.00%	1,387	8,743	12,162	1,665	10,497
4	Labor and Equipment	4,968	8/26/2008	6.84	8361.7	600	50	2.00%	680	4,288	5,965	816	5,148
5	Deduct for Power Available	(688)	8/26/2008	6.84	8361.7	600	50	2.00%	(94)	(594)	(826)	(113)	(713)
		28,801											29,845
Schedule II (WP&H)													
1	Mobilization	5,976	8/26/2008	6.84	8361.7	360	30	3.33%	1,363	4,613	7,175	1,637	5,538
2	Taxes, Bonds, and Insurance	1,544	8/26/2008	6.84	8361.7	360	30	3.33%	352	1,192	1,854	423	1,431
3	Barbed Wire Fence	2,145	8/26/2008	6.84	8361.7	360	30	3.33%	489	1,656	2,575	588	1,988
4	Site Electrical	10,775	8/26/2008	6.84	8361.7	360	30	3.33%	2,458	8,317	12,936	2,951	9,985
5	Controls and Telemetry	7,718	8/26/2008	6.84	8361.7	360	30	3.33%	1,761	5,957	9,266	2,114	7,152
6	Well Valve Vault	35,166	8/26/2008	6.84	8361.7	360	30	3.33%	8,023	27,143	42,220	9,632	32,588
7	6" CL150 C900 PVC	1,421	8/26/2008	6.84	8361.7	360	30	3.33%	324	1,097	1,706	389	1,317
8	8" CL150 C900 PVC	8,680	8/26/2008	6.84	8361.7	360	30	3.33%	1,980	6,700	10,421	2,378	8,044
9	8" x 6" Tee	399	8/26/2008	6.84	8361.7	360	30	3.33%	91	308	479	109	370
10	8" End Cap	381	8/26/2008	6.84	8361.7	360	30	3.33%	87	294	457	104	353
11	8" Gate Valve	1,553	8/26/2008	6.84	8361.7	360	30	3.33%	354	1,199	1,865	425	1,439
		75,758											70,203
Schedule III (WP&H)													
1	Mobilization	2,205	8/26/2008	6.84	8361.7	240	20	5.00%	755	1,450	2,647	906	1,741
2	Taxes, Bonds, and Insurance	1,929	8/26/2008	6.84	8361.7	240	20	5.00%	660	1,269	2,316	793	1,523
3	Control Building Electrical	4,691	8/26/2008	6.84	8361.7	240	20	5.00%	1,605	3,086	5,632	1,927	3,705
4	Controls and Telemetry	8,534	8/26/2008	6.84	8361.7	240	20	5.00%	2,921	5,613	10,246	3,506	6,739
5	Disinfection Pump and Piping	16,122	8/26/2008	6.84	8361.7	240	20	5.00%	5,517	10,605	19,356	6,624	12,732
6	Eye Wash/Shower, Mixing Valve, Heater	1,329	8/26/2008	6.84	8361.7	240	20	5.00%	455	874	1,596	546	1,050
7	Move & Replum Hydropneumatic Tank	1,483	8/26/2008	6.84	8361.7	240	20	5.00%	508	975	1,780	609	1,171
8	8" Mag Meter	5,875	8/26/2008	6.84	8361.7	240	20	5.00%	2,011	3,864	7,053	2,414	4,640
9	CL17 Chlorine Analyzer	6,661	8/26/2008	6.84	8361.7	240	20	5.00%	2,280	4,381	7,997	2,737	5,260
10	Ventilation Improvements	3,528	8/26/2008	6.84	8361.7	240	20	5.00%	1,207	2,321	4,236	1,450	2,786
11	Spill Containment Improvements	1,606	8/26/2008	6.84	8361.7	240	20	5.00%	550	1,056	1,928	660	1,268
12	Concrete Flatework	1,076	8/26/2008	6.84	8361.7	240	20	5.00%	368	708	1,292	442	850
13	1 1/2" Minus Crushed Base Course	3,100	8/26/2008	6.84	8361.7	240	20	5.00%	1,061	2,039	3,722	1,274	2,448
		58,139											45,914
Schedule IV (WP&H)													
1	Backup Power	28,194	8/26/2008	6.84	8361.7	180	15	6.67%	12,865	15,329	33,849	15,445	18,404
2	Natural Gas Service	5,292	8/26/2008	6.84	8361.7	180	15	6.67%	2,415	2,877	6,354	2,899	3,454
		33,486											21,858

approx. 9% of all other work other items