

White-Department
 Yellow-Department
 Pink-Well Owner
 Gold-Driller

WELL LOG REPORT

CODED

State law requires that this form be filed by the water well driller within 60 days after completion of the well, and of Completion of Groundwater Development, be filed by the well owner within 60 days after the water has been

009482

<p>1. WELL OWNER Name <u>Shelby City Hall #10</u></p>	<p>2. CURRENT MAILING ADDRESS <u>City Hall</u> <u>Shelby MT 59474</u></p>																
<p>3. PROPOSED USE _____ domestic (includes lawn and garden); _____ stock; <input checked="" type="checkbox"/> municipal; _____ industrial; _____ irrigation; _____ other (specify) _____</p>																	
<p>4. WELL LOCATION</p> <div style="border: 1px solid black; width: 150px; height: 150px; margin: 0 auto; position: relative;"> <div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); font-size: 20px;">NW</div> <div style="position: absolute; top: 50%; right: 50%; transform: translate(50%, -50%); font-size: 20px;">NE</div> <div style="position: absolute; bottom: 50%; left: 50%; transform: translate(-50%, 50%); font-size: 20px;">SW</div> <div style="position: absolute; bottom: 50%; right: 50%; transform: translate(50%, 50%); font-size: 20px;">SE</div> </div> <p>T. <u>3/4</u> Section <u>21</u> R. <u>2W</u> N or S _____ E or W _____ OR Lot <u>#10</u> Block _____ Subdivision _____ City _____ County <u>Toule</u> Elevation _____ Accuracy: _____ -10'; _____ -50'; _____ +100';</p>	<p>8. WELL TEST DATA <input checked="" type="checkbox"/> pump _____ bailer _____ other _____ (if other, specify) _____ Pumping level below land surface: <u>14.5</u> ft. after <input checked="" type="checkbox"/> hrs. pumping <u>320</u> gpm _____ ft. after _____ hrs. pumping _____ gpm</p> <p>9. WAS WELL PLUGGED OR ABANDONED? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, how? _____</p> <p>10. DATE STARTED <u>Oct 20 1984</u> DATE COMPLETED <u>March 13 1985</u></p> <p>11. WELL LOG Depth (ft.)</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>From</th> <th>To</th> <th>Formation</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>15</td> <td>silt + sand</td> </tr> <tr> <td>15</td> <td>17</td> <td>gravel water</td> </tr> <tr> <td>17</td> <td>40</td> <td>sand + gravel</td> </tr> <tr> <td>40</td> <td>41</td> <td>dark shale</td> </tr> </tbody> </table>	From	To	Formation	0	15	silt + sand	15	17	gravel water	17	40	sand + gravel	40	41	dark shale	
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<p>5. DRILLING METHOD <input checked="" type="checkbox"/> cable _____ bored, _____ forward rotary, _____ reverse rotary, _____ jetted, _____ other (specify) _____</p>																	
<p>6. WELL CONSTRUCTION AND COMPLETION</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Size of drilled hole</th> <th>Size and weight of casing</th> <th>From (feet)</th> <th>To (feet)</th> <th>Perforations and/or Screen</th> <th>Kind Size</th> <th>From (feet)</th> <th>To (feet)</th> </tr> </thead> <tbody> <tr> <td>8</td> <td>8 3/8 bolts</td> <td>0</td> <td>29</td> <td>Screen <input checked="" type="checkbox"/></td> <td>Johnson Steels steel</td> <td>41</td> <td>29</td> </tr> </tbody> </table> <p>Was casing left open end? <input checked="" type="checkbox"/> Yes, _____ No Was a packer or seal used? <input checked="" type="checkbox"/> Yes, _____ No If so, what material <u>neoprene</u> Was the well gravel packed? <input checked="" type="checkbox"/> Yes, _____ No Was the well grouted? <input checked="" type="checkbox"/> Yes, _____ No To what depth? <u>0-30</u> Material used in grouting <u>cemest</u> Well head completion: Pitless adapter _____ 12 in. above grade <input checked="" type="checkbox"/> other _____ (if other, specify) _____ Pump horsepower _____, pump type _____ Pump intake level _____ feet below land surface Power (electric, diesel, etc.) _____</p>		Size of drilled hole	Size and weight of casing	From (feet)	To (feet)	Perforations and/or Screen	Kind Size	From (feet)	To (feet)	8	8 3/8 bolts	0	29	Screen <input checked="" type="checkbox"/>	Johnson Steels steel	41	29
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<p>7. WATER LEVEL Static water level <u>9</u> feet below land surface If flowing, closed-in pressure _____ psi _____ gpm flow through _____ inch pipe Controlled by: _____ valve, _____ reducers, _____ other (if other, specify) _____</p>																	
<p>12. DRILLER'S CERTIFICATION This well was drilled under my jurisdiction and this report is true to the best of my knowledge. Date <u>3/21/85</u> Signature <u>Harold Adkins</u> License No. <u>49</u> Firm name <u>Adkins Drilling Co</u> Address <u>15110 2nd Ave N Shelby MT 59474</u></p>																	

Received State
 water test 3/13/85

WELL LOG REPORT

File No. 41P-1058127

State law requires that the Bureau's copy be filed by the water well driller within 60 days after completion of the well.

<p>1. WELL OWNER Name <u>City of Shelby</u></p>	<p>f) Duration of test: Pumping time <u>24</u> hrs. g) Recovery time <u>2</u> hrs. h) Recovery water level <u>9</u> ft. at <u>1/2</u> hrs after pumping stopped.</p> <p><small>Wells intended to yield 100 gpm or more shall be tested for a period of 8 hours or more. The test shall follow the development of the well, and shall be conducted continuously at a constant discharge at least as great as the intended appropriation. In addition to the above information, water level data shall be collected and recorded on the Department's "Aquifer Test Data" form. NOTE: All wells shall be equipped with an access port 1/2 inch minimum or a pressure gauge that will indicate the shut-in pressure of a flowing well. Removable caps are acceptable as access ports.</small></p>																										
<p>2. CURRENT MAILING ADDRESS <u>P.O. Box 743</u> <u>Shelby, MT 59474</u></p>	<p>11. WAS WELL PLUGGED OR ABANDONED? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <u>X</u> If yes, how? _____</p>																										
<p>3. WELL LOCATION <u>NE</u> 1/4 <u>SE</u> 1/4 <u>SW</u> 1/4 Section <u>21</u> Township <u>31</u> Range <u>2</u> East County <u>Toole</u> Gov't Lot _____ or Lot _____ Block _____ Subdivision Name _____ Tract Number _____</p>	<p>12. WELL LOG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Depth (ft.)</th> <th rowspan="2">Formation</th> </tr> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4 1/2</td> <td>Brown Sand - Medium Grain</td> </tr> <tr> <td>4 1/2</td> <td>9</td> <td>Brown Sand - Small Gravel</td> </tr> <tr> <td>9</td> <td>12</td> <td>Brown Sand - Medium Grain</td> </tr> <tr> <td>12</td> <td>23</td> <td>Brown Sand - 1/2" - 1" Gravel</td> </tr> <tr> <td>23</td> <td>26</td> <td>Gravel Sand - Medium Grain</td> </tr> <tr> <td>26</td> <td>36</td> <td>Gravel Sand - 3/4" - 1 1/2" Gravel</td> </tr> <tr> <td>36</td> <td>38</td> <td>Gravel Shaly Clay</td> </tr> </tbody> </table>	Depth (ft.)		Formation	From	To	0	4 1/2	Brown Sand - Medium Grain	4 1/2	9	Brown Sand - Small Gravel	9	12	Brown Sand - Medium Grain	12	23	Brown Sand - 1/2" - 1" Gravel	23	26	Gravel Sand - Medium Grain	26	36	Gravel Sand - 3/4" - 1 1/2" Gravel	36	38	Gravel Shaly Clay
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<p>4. PROPOSED USE: Domestic <input checked="" type="checkbox"/> Stock <input type="checkbox"/> Irrigation <input type="checkbox"/> Other <input type="checkbox"/> specify <u>PWS</u></p>	<p style="text-align: center; font-size: 2em; font-weight: bold;">RECEIVED</p> <p style="text-align: center;">OCT 22 1993</p> <p style="text-align: center;">MONTANA D.N.R.C. HAYRE FIELD OFFICE</p>																										
<p>5. TYPE OF WORK: New well <input checked="" type="checkbox"/> Method: Dug <input type="checkbox"/> Bored <input type="checkbox"/> Deepened <input type="checkbox"/> Cable <input type="checkbox"/> Driven <input checked="" type="checkbox"/> <u>X</u> Reconditioned <input type="checkbox"/> Rotary <input type="checkbox"/> Jetted <input type="checkbox"/></p>	<p>ATTACH ADDITIONAL SHEETS IF NECESSARY</p>																										
<p>6. DIMENSIONS: Diameter of Hole Dia. <u>12</u> in. from <u>0</u> ft. to <u>20</u> ft. Dia. <u>8</u> in. from <u>20</u> ft. to <u>38</u> ft. Dia. _____ in. from _____ ft. to _____ ft.</p>	<p>13. DATE COMPLETED <u>5-31-93</u></p>																										
<p>7. CONSTRUCTION DETAILS: Casing: Steel Dia. <u>8</u> from <u>+10</u> ft. to <u>26</u> ft. Threaded <input type="checkbox"/> Welded <input checked="" type="checkbox"/> Dia. _____ from _____ ft. to _____ ft. Type <u>28.55 lb</u> Wall Thickness <u>.322</u> Casing: Plastic Dia. _____ from _____ ft. to _____ ft. Weight Dia. _____ from _____ ft. to _____ ft. PERFORATIONS: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <u>X</u> Type of perforator used _____ Size of perforations _____ in. by _____ in. _____ perforations from _____ ft. to _____ ft. _____ perforations from _____ ft. to _____ ft. _____ perforations from _____ ft. to _____ ft. SCREENS: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Manufacturer's Name <u>Houston Well Screen</u> Type <u>Slotless Steel</u> Model No. <u>304-SS</u> Dia. <u>8</u> Slot size <u>.060</u> from <u>26</u> ft. to <u>36</u> ft. Dia. _____ Slot size _____ from _____ ft. to _____ ft. GRAVEL PACKED: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <u>X</u> Size of gravel _____ Gravel placed from _____ ft. to _____ ft. GROUTED: To what depth? <u>20</u> ft. Material used in grouting: <u>Cement</u></p>	<p>14. DRILLER/CONTRACTOR'S CERTIFICATION This well was drilled under my jurisdiction and this report is true to the best of my knowledge. <u>152-1588</u> Date <u>7-24-93</u> <u>Boland Drilling Co.</u> Firm Name <u>4601 7th Ave. N. Great Falls,</u> Address <u>Chis Boland</u> 482 Signature License No.</p>																										
<p>8. WELL HEAD COMPLETION: Pitless Adapter <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <u>X</u></p>	<p>10. WELL TEST DATA The information requested in this section is required for all wells. All depth measurements shall be from the top of the well casing. All wells under 100 gpm must be tested for a minimum of one hour and provide the following information: a) Air _____ Pump <input checked="" type="checkbox"/> <u>X</u> Bailer _____ b) Static water level immediately before testing _____ ft. If flowing, closed-in pressure _____ psi. If flowing, flow controlled by: _____ valve, _____ reducers, other, (specify) _____ c) Depth at which pump is set for test _____ <u>36</u> d) The pumping rate: <u>400</u> gpm. e) Pumping water level _____ ft. at <u>1/2</u> hrs. after pumping began.</p>																										
<p>9. PUMP (if installed) Manufacturer's name _____ Type _____ Model No. _____ HP _____</p>	<p style="text-align: center; font-size: 2em; font-weight: bold;">RECEIVED</p> <p style="text-align: center;">SEP 08 2005</p> <p style="text-align: center;">MT DEC PUBLIC WATER & SUBDIVISIONS BUREAU</p>																										

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION
1820 EAST SIXTH AVENUE HELENA, MONTANA 59620-2201 444-8819

DNRC

Well No 11

Pos # 00325012

AN 02W - 20A

WELL LOG REPORT

File No. 41P-1058129

State law requires that the Bureau's copy be filed by the water well driller within 60 days after completion of the well.

1. WELL OWNER Name <u>City of Shelby</u>		f) Duration of test: Pumping time <u>24</u> hrs. g) Recovery time <u>2</u> hrs. h) Recovery water level <u>8</u> ft. at <u>1/2</u> hrs. after pumping stopped.																						
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7. CONSTRUCTION DETAILS: Casing: Steel Dia. <u>8"</u> from <u>10</u> ft. to <u>24</u> ft. Threaded <input type="checkbox"/> Welded <input checked="" type="checkbox"/> Dia. _____ from _____ ft. to _____ ft. Type <u>28556</u> Wall Thickness <u>332</u> Casing: Plastic Dia. _____ from _____ ft. to _____ ft. Weight _____ Dia. _____ from _____ ft. to _____ ft. PERFORATIONS: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Type of perforator used _____ Size of perforations _____ in. by _____ in. _____ perforations from _____ ft. to _____ ft. _____ perforations from _____ ft. to _____ ft. _____ perforations from _____ ft. to _____ ft.		ATTACH ADDITIONAL SHEETS IF NECESSARY																						
SCREENS: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Manufacturer's Name <u>Houston Well Screen</u> Type <u>Stainless Steel</u> Model No. <u>30455</u> Dia. <u>8"</u> Slot size <u>100</u> from <u>24</u> ft. to <u>36</u> ft. Dia. _____ Slot size _____ from _____ ft. to _____ ft.		13. DATE COMPLETED <u>5-31-93</u>																						
GRAVEL PACKED: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Size of gravel _____ Gravel placed from _____ ft. to _____ ft.		14. DRILLER/CONTRACTOR'S CERTIFICATION This well was drilled under my jurisdiction and this report is true to the best of my knowledge. <u>7-24-93</u> <u>Bohland Drilling Co.</u> 4601 7th Ave. So. Great Falls, MT 59405 <u>Chris Bohland</u> 482 Signature License No.																						
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8. WELL HEAD COMPLETION: Pitless Adapter <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		9. PUMP (if installed) Manufacturer's name _____ Type _____ Model No. _____ HP _____																						

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION
1820 EAST SIXTH AVENUE HELENA, MONTANA 59620-2301 444-6610

DNRC

well No 12

705 # 00328013

RECEIVED

SEP 08 2015

MT DEQ PUBLIC WATER & SUBDIVISIONS BUREAU

H-20112

KLJ WELL FIELD PUMPING TEST REPORT

2000 Airport Blvd Suite 10
PO Box 501
Helena, MT 59624-0501
406.443.7754
Mung.com



Shelby Well Field Pump Test

Date: 10/2/2013 - 10/3/2013

To: Larry Banderud (Shelby - NCMRWA)

Copy to: Julie Titchbourne (Missoula-KLJ)
Brad Koon (Helena-KLJ)
Mark Peterson (Helena - AE2S)

From: Jason Crawford (Helena-KLJ)

RE: NCMRWA Out Bank to Shelby



PURPOSE

On October 2nd and 3rd 2013, the City of Shelby Public Works Department and KLJ conducted pump tests on Shelby's well field. The purpose of the tests was to determine the quantity of water that could be pumped from the wells to the 100,000 gallon tank situated near Williamson Park.

WELL FIELD

All of the water for the City of Shelby is supplied from eleven wells located in Williamson Park near the Marias River. The wells vary in depth from 31 to 50 feet. Seven of the eleven wells are shut down during the winter months. Six (Wells No. 7-12) of the seven wells that are shut down in the winter months are removed from service to prevent them from freezing and the other well (Well No. 5, which is capable of operating during the winter months) is shut down because the additional water is not needed during the winter months. Following is a summary of the operations of the eleven wells:

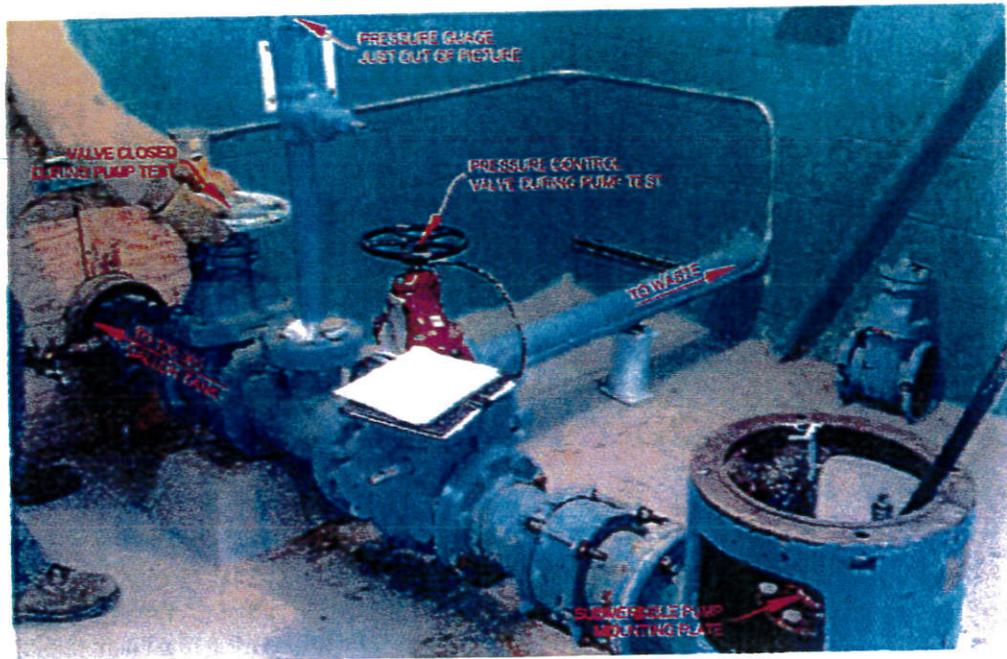


Well No.	Well Operation	Well Status
1	Pumps into the 100,000 gallon tank	Is used all year.
2	Pumps into the 100,000 gallon tank	Is used all year.
3	Pumps into the 100,000 gallon tank	Is used all year.
4 - 5	Pumps into the 100,000 gallon tank	Is shut down during winter months
6 - 7	Pumps into the 100,000 gallon tank	Must be shut down during winter months
8	Pumps into the 100,000 gallon tank	Must be shut down during winter months
9	Pumps into the casing of Well No. 1	Must be shut down during winter months
10	Pumps into the casing of Well No. 3	Must be shut down during winter months
11	Pumps into the casing of Well No. 5	Must be shut down during winter months
12	Pumps into the casing of Well No. 7	Must be shut down during winter months
13	Pumps into the 100,000 gallon tank	Is used all year.

PUMP TESTING

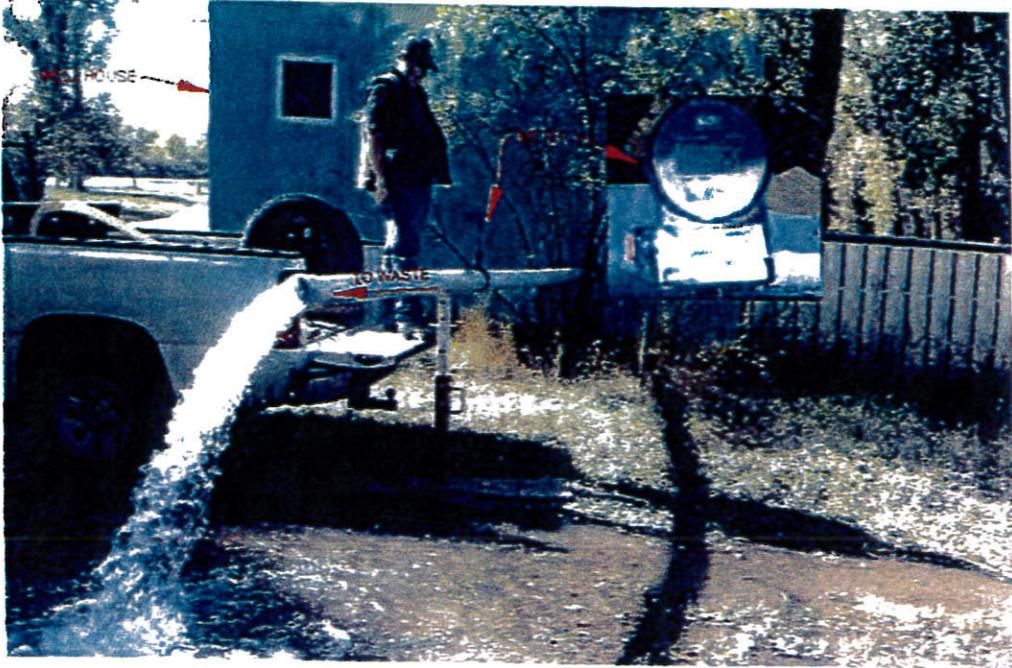
The tests were conducted by pumping those wells that directly supply water to the 100,000 gallon tank. The wells were pumped at a known flow rate and pressure. The rate and pressures were incrementally adjusted until a maximum pumping rate was achieved. The testing setup for the wells generally consisted of the well, pump, pressure gauge, meter, and the plumbing.

The following picture represents the typical well house plumbing:

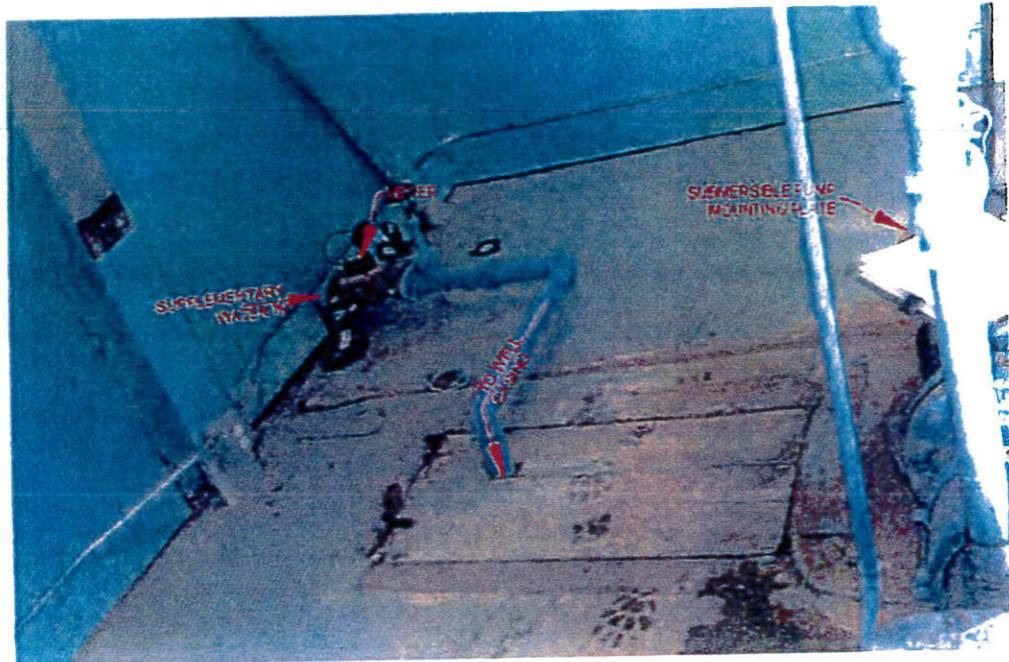




Wells 1-8 were pumped to waste.



Wells 1,3,5, and 7 receive supplementary water from wells 9-12. The supplementary water is pumped from the supplementary well to its corresponding receiving well casing.



The specifics of each test are as follows:

Well No. 1

Well No. 1 was pumped to waste. Well No. 9 pumps supplementary water into the casing of well No. 1. Prior to starting the pump test, well no. 9 was turned on and the pumping rate was recorded to be 160 gpm by review of the meter. Once the supplementary rate was recorded, well no. 1 was turned on. The pressure and pumping rate were incrementally adjusted and recorded. The following table provides a summary of the pump test results for well no. 1.



WELL # 1 - WITH WELL NO. 9 PUMPING TO IT AT 160 GPM	PRESSURE (PSI)	PUMPING RATE (GPM)	TIME (10/2/13)	COMMENT
	30	191	13:40	
	28	231		
	26	250		
	24	271		
	22	293		
	20	307		
	18	330		
	16	357		
	14	370		
	12	389		
	10	401		
	8	415		
	6	428		
5.5	437	14:13	VALVE WIDE OPEN	

Well No. 2

Well No. 2 was pumped to waste. Well No. 2 does not have supplementary water pumping to it. Well no. 2 was turned on and the pressure and pumping rate were incrementally adjusted and recorded. The following table provides a summary of the pump test results for well no. 2.

WELL # 2	PRESSURE (PSI)	PUMPING RATE (GPM)	TIME (10/3/13)	COMMENT
	40	35	9:28	
	35	70		
	32	73	9:45	MAXIMUM RATE

Well No. 3

Well No. 3 was pumped to waste. Well No. 10 pumps supplementary water into the casing of well No. 3. Prior to starting the pump test, well no. 10 was turned on and the



pumping rate was recorded to be 140 gpm by review of the meter. Once the supplementary rate was recorded, well no. 3 was turned on. The pressure and pumping rate were incrementally adjusted and recorded. The following table provides a summary of the pump test results for well no. 3.

WELL # 3 - WITH WELL NO. 10 PUMPING TO IT AT 140 GPM	PRESSURE (PSI)	PUMPING RATE (GPM)	TIME (10/2/13)	COMMENT
	30	87	15:07	
	25	163		
	20	235		
	15	271		
	10	298		
	6	370	15:30	VALVE WIDE OPEN

Well No. 5

Well No. 5 was pumped to waste. Well No. 11 pumps supplementary water into the casing of well No. 5. Prior to starting the pump test, well no. 11 was turned on and the pumping rate was recorded to be 175 gpm by review of the meter. Once the supplementary rate was recorded, well no. 5 was turned on. The pressure and pumping rate were incrementally adjusted and recorded. The following table provides a summary of the pump test results for well no. 5.

WELL # 5 - WITH WELL NO. 11 PUMPING TO IT AT 175 GPM	PRESSURE (PSI)	PUMPING RATE (GPM)	TIME (10/3/13)	COMMENT
	30	350	9:53	
	28	365		
	26	385		
	24	406		
	22	425		
	20	431		
	18	455		
	16	476		
	14	484		
	12	508	10:10	MAXIMUM RATE



Well No. 13

Well No. 13 was pumped to the tank because is it equipped with a meter inside the pump house unlike all of the other wells. Well No. 13 does not have supplementary water pumping to it. Well no. 13 was turned on and the pressure and pumping rate were incrementally adjusted and recorded. The following table provides a summary of the pump test results for well no. 13.

WELL # 13	PRESSURE (PSI)	PUMPING RATE (GPM)	TIME (10/3/13)	COMMENT
	54	40	10:30	
	40	190		
	35	265		
	32	320		
	24	340	10:45	VALVE WIDE OPEN

While well No. 13 was being test pumped to the tank, wells 1,2,3, and 5 were also pumping to the tank. Wells No. 3 and 13 both pump to the same 12" PVC water main that leads to the 100,000 gallon tank; therefore, resulting in a higher pressure reading when the valve was wide open than if pumped to waste or pumped to the tank on its own. Wells 1,2, & 5 all pump to a different 12" water main that leads to the 100,000 gallon tank.



SUMMARY

Well No.	Pumping Rate (GPM)	Volumes		Comments
		GPD	ACRE- FEET/YEAR	
1	437	629,280	704.9	Well No. 9 pumps to Well No. 1 at 160 gpm
2	73	105,120	117.8	
3	370	532,800	596.9	Well No. 10 pumps to Well No. 3 at 140 gpm
5	508	731,520	819.5	Well No. 11 pumps to Well No. 5 at 175 gpm
7	240	345,600	387.1	Well No. 12 pumps to Well No. 7 at 130 gpm
8	111	159,840	179.1	
9	160	230,400	258.1	These wells pump to the other wells as indicated above.
10	140	201,600	225.8	
11	175	252,000	282.3	
12	130	187,200	209.7	
13	340	489,600	548.5	
Totals	2,079	2,993,760	3,353.7	The rates from wells 9-12 have been included in the rates for 1,3,5, & 7.

KLJ WATER SYSTEM MODELING REPORT



Shelby Water System Model

Date: 1/22/2014

To: File

Copy to: Julie Titchbourne (Missoula-KLJ)
Brad Koon (Helena-KLJ)
Tyrel Clark (Billings-KLJ)
Doug Whitney (Billings-KLJ)
Mark Peterson (Helena-AE2S)

From: Jason Crawford (Helena-KLJ)

RE: NCMRWA Cut Bank to Shelby



PURPOSE

A WaterCAD model was prepared for the City of Shelby's water system. The model will be used to analyze the operations of the components of the City's system during the various demands that the system experiences and to determine if the system can handle additional demands at various locations. The purpose of this report is to document the strategies used to model the different components of the system.

MODELED OPERATIONS

The critical components of the system were included for modelling purposes. Those critical components include the well pumps, clear well, clear well booster station, south tank, shop tank, airport tank, prison tank booster station, prison tank, and water mains connecting the critical components. A schematic of the modeled operations is included in Exhibit A. The critical components are all placed at surveyed elevations. The pipe sizes, types, and lengths included in the model are all representative of actual conditions. Specific components of the system (i.e individual hydrants, services, and distribution pipes, etc.) have been excluded from this model.

Well Pumps

Pump testing was recently completed on the well field indicating that during the summer months the well field is capable of producing a maximum of 2,079 gpm. Instead of



modeling each of the wells and well pumps separately the well field was modeled as a reservoir with the water elevation set to the average static water elevation of the wells (3,055.00'). A single pump with a maximum operating point of 2,079 gpm was used in place of the 11 separate well pumps. The pump was set at the same elevation as the reservoir water level (3,055.00'). The well pumps are controlled by the water level of the clear well.

Clear Well

The 11 wells pump to a central 12" pvc water main. The 12" water main is approximately 400' long and delivers water to the 100,000 gallon clear well. The clear well is 34' in diameter which equates to 6,791 gallons per foot. The clear well has the ability to operate between 3,112.81' and 3,125.81'. The well field pump has been modeled to turn on when the clear well reaches a water level of 3,122.81' and off at 3,124.81'.

Clear Well Booster Station

The clear well booster station (CWBS) is situated adjacent to the clear well at an elevation of 3,106.31'. The CWBS pumps water from the clear well to the south tank, the shop tank, and the airport tank through approximately 7 miles of 16" asbestos concrete pipe. The CWBS consists of 4 constant speed pumps. The pumps have each been included in the model along with the corresponding constant speed pump curves. The booster station pump curves are included in Exhibit B. The CWBS pumps are controlled by the water level of the south tank, shop tank, and airport tank.

South Tank, Shop Tank, and Airport Tank(Low Pressure Zone)

The 1,000,000 gallon south tank is 67' in diameter which equates to 26,372 gallons per foot. The south tank has the ability to operate between 3,452.03' and 3,478.96'.

The 100,000 gallon airport tank is 28' in diameter which equates to 4,606 gallons per foot. The airport tank has the ability to operate between 3,450.41' and 3,478.96'.

The 1,500,000 gallon shop tank shop tank is 80.5' in diameter which equates to 38,070 gallons per foot. The shop tank has the ability to operate between 3,439.96' and 3,478.96'.

The total storage for the Low Pressure Zone is 2,600,000 gallons, based on the above mentioned tank diameters a fluctuation of 1' equates to 69,048 gallons.



CWBS Pump 1 is set to turn on when the water level of the tanks drops to 3,475.96', CWBS Pump 2 is set to turn on only if CWBS Pump 1 is on and the water level of the tanks drops to 3,475.46', CWBS Pump 3 is set to turn on only if CWBS Pumps 1 & 2 are on and the water level of the tanks drops to 3,474.96', CWBS Pump 4 is set to turn on only if CWBS Pumps 1, 2, & 3 are on and the water level of the tanks drops to 3,474.46'. CWBS Pumps 1, 2, 3, and 4 all turn off when the water level of the tanks reaches 3,477.96'.

Prison Tank Booster Station

The prison tank booster station (PTBS) is situated adjacent to the south tank at an elevation of 3,456.79'. The PTBS draws water from the south tank and pumps water into the 500,000 gallon prison tank through approximately 2 miles of 12" PVC pipe. The PTBS is made up of 3 constant speed pumps. The pumps have each been included in the model along with corresponding constant speed pump curves. The pumps were pump tested in September of 2013. The pump tests results were as follows:

- 1 Pump = 365 gpm, 91 psi

The pump curve used to define each of the pumps was created based on the pump test information. The PTBS pumps are controlled by the water level of the Prison Tank.

Prison Tank(High and Middle Pressure Zones)

The 500,000 gallon prison tank is 49.5' in diameter which equates to 14,395 gallons per foot. The prison tank has the ability to operate between 3,637.53' and 3,663.38'. PTBS Pump 1 is set to turn on when the water level drops to 3,660.38, PTBS Pump 2 is set to turn on only if PTBS Pump 1 is on and the water level drops to 3,659.88', and PTBS Pump 3 is set to turn on only if PTBS Pumps 1 & 2 are on and the water level drops to 3,659.38'.

PTBS Pumps 1, 2, and 3 all turn off at a water level of 3,662.38.

MODELED DEMANDS

The demands that have been modeled are the annual peak day demands for Shelby and Cut Bank. The Shelby demands have been calculated based on 2012 meter information from various metered locations throughout Shelby's system. The meter results and demand calculations are included in Exhibit C. The modeled Cut Bank demands include a peak day demand of 1 MGD. The demands were applied at appropriate locations and elevations throughout the model. The daily pattern applied to the demands was determined based on the Prison Tank Level monitoring equipment for 8/5/2013 - 8/12/2013. The output from the Prison Tank Level monitoring equipment has been included in Exhibit D. Model results of the system at peak day demands with Cut Bank



have been included in Exhibit E. It is important to note that when reviewing the “System Pressures @ Peak Day Demand Plus Cut Bank” reports that the following junctions are situated near the base of the various tanks around town: J21, J385, J551, J572, J577, J580-J585, J594, J597, J599.

The City is divided into three different pressure zones: high, middle and low. The high and middle pressure zones are controlled by the prison tank and are separated by a PRV. The low pressure zone is controlled by the south tank, the airport tank, and the shop tank.

High & Middle Pressure Zone (Prison Tank)

The high pressure zone is made up of Ethridge and the Prison, both of which are metered and the middle pressure zone is made up of Shelby Heights. To determine the demands of Shelby Heights, the Ethridge demands plus the Prison demands were subtracted from the total number of gallons pumped to the prison tank. Following are the high and middle pressure zone 2012 calculated demands:

- Ethridge (High Press. Zone)
 - o Avg Day - 13,345 gallons (9.27 gpm)
 - o Peak Day - 35,304 gallons (24.52 gpm)
- Prison (High Press Zone)
 - o Avg Day - 65,682 gallons (45.61 gpm)
 - o Peak Day - 173,755 gallons (120.66 gpm)
- Shelby Heights (Middle Press. Zone)
 - o Avg Day - 83,710 gallons (58.13 gpm)
 - o Peak Day - 221,446 gallons (153.78 gpm)

Low Pressure Zone (South Tank, Airport Tank, and Shop Tank)

The low pressure zone is made up of the remainder of the town. To determine the demands of the low pressure zone the total number of gallons pumped to the prison tank were subtracted from the total number of gallons pumped to town. Following are the low pressure zone 2012 calculated demands:

- Remainder of Shelby (Low Press. Zone)
 - o Avg Day - 472,326 gallons (328.00 gpm)
 - o Peak Day - 1,249,494 gallons (867.70 gpm)



EXHIBIT A

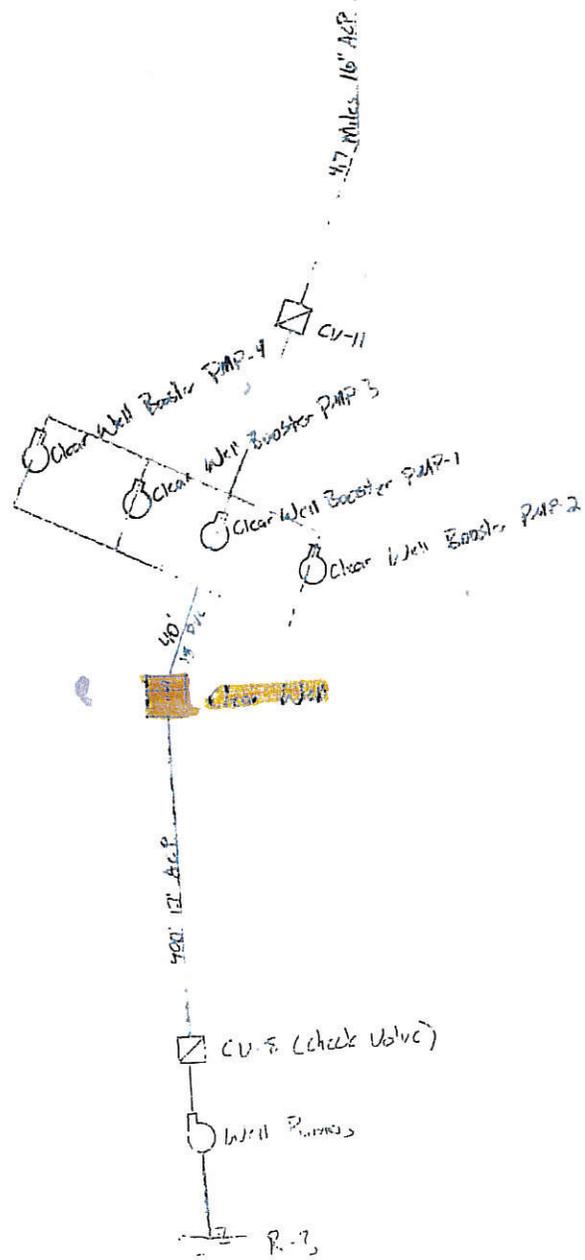
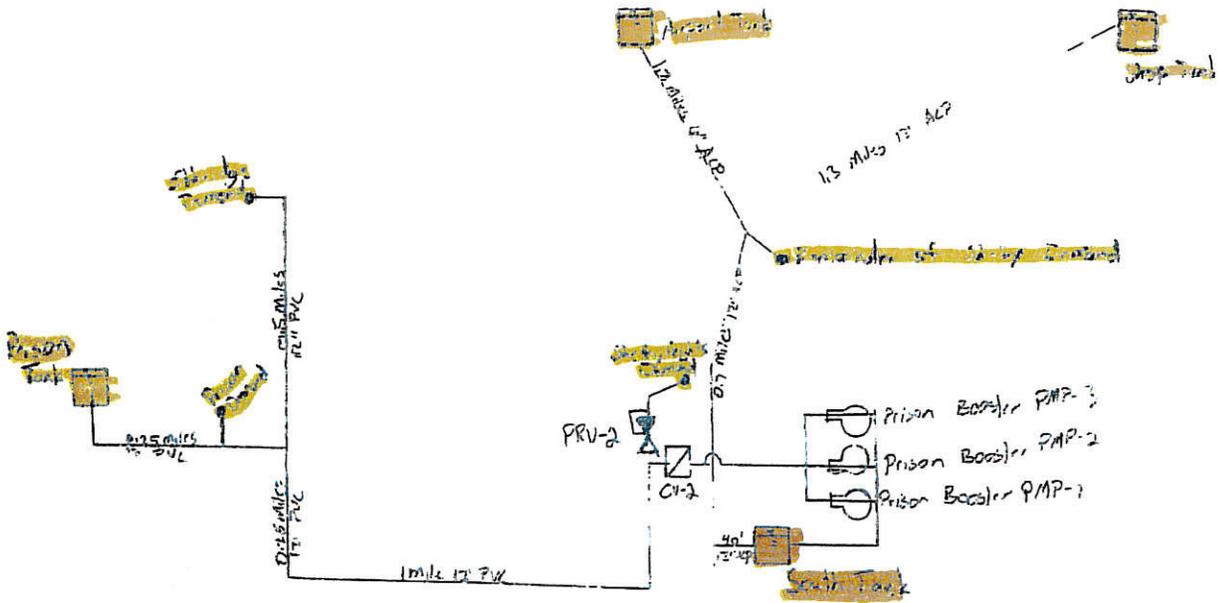
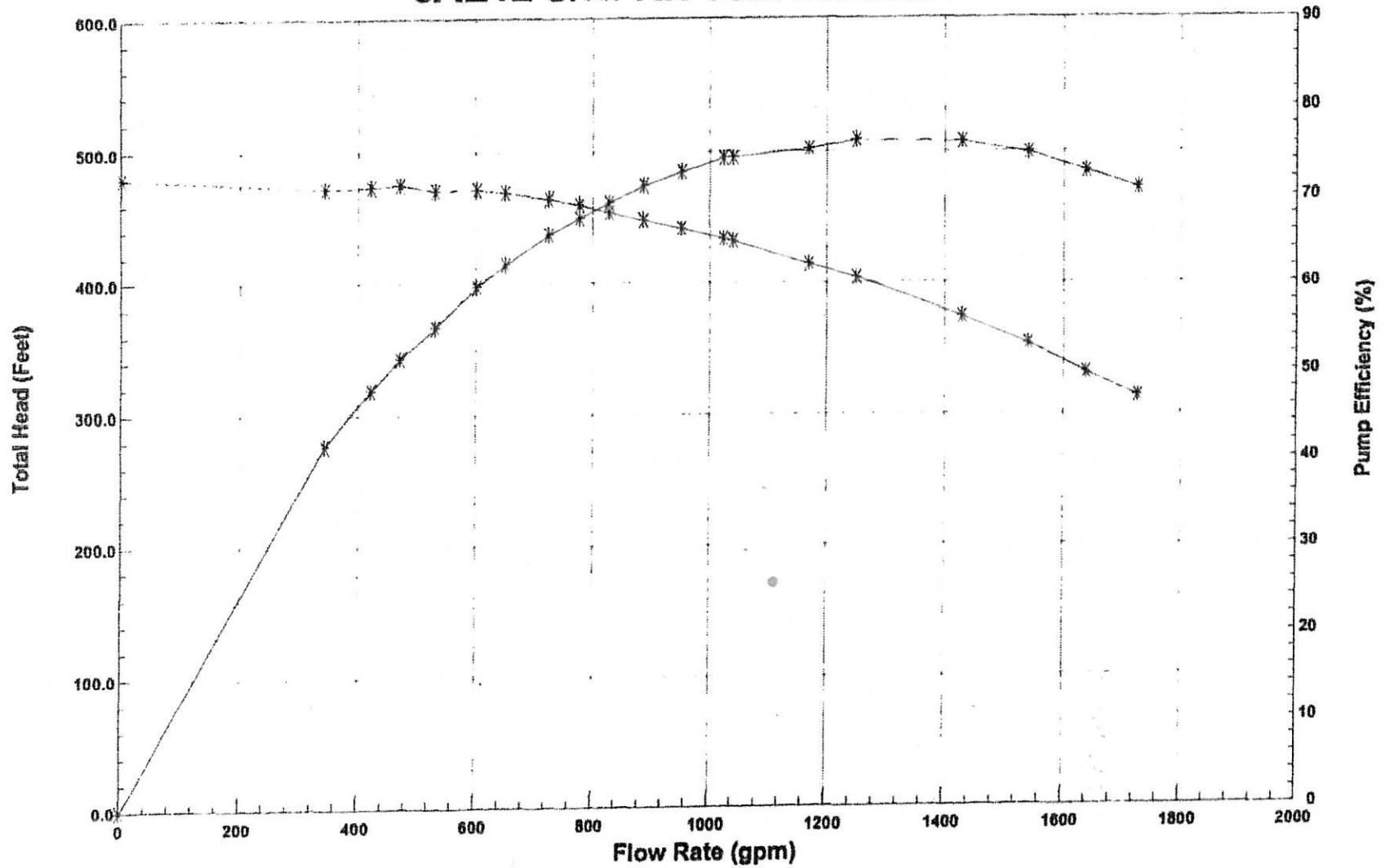




EXHIBIT B

5AE12 S/N: RH-9927017069A



Date: 11/30/10

International Center for Water Technology



EXHIBIT C

PRISON TANK	HIGH PRESSURE ZONE	Ethridge - 2012	
		Month	Usage (gal)
		January	198,900
		February	128,800
		March	165,800
		April	204,200
		May	654,800
		June	470,000
		July	906,400
		August	731,100
		September	883,500
		October	246,900
		November	120,600
		December	160,100
	Prison - 2012		
	Month	Usage (gal)	
	January	2,082,400	
	February	1,827,600	
	March	1,887,800	
	April	2,208,700	
	May	2,142,000	
	June	2,057,700	
	July	1,779,800	
	August	2,011,900	
	September	1,995,800	
	October	2,059,300	
	November	1,882,800	
	December	2,038,100	
Shelby Heights - 2012			
Month	Usage (gal)		
January	788,700		
February	950,600		
March	1,058,400		
April	1,879,100		
May	2,933,200		
June	2,305,300		
July	6,423,800		
August	6,696,000		
September	3,178,700		
October	1,473,800		
November	1,498,600		
December	1,367,800		

Avg Day - 13,345 gallons
9.27 gpm
Peak Day - 35,304 gallons
24.517 gpm

Avg Day - 65,682 gallons
45.61 gpm
Peak Day - 173,755 gallons
120.66 gpm

Avg Day - 83,710 gallons
58.13 gpm
Peak Day - 221,446 gallons
153.78 gpm

LOW PRESSURE ZONE - ALL OTHER TANKS	Remainder of Town - 2012	
	Month	Usage (gal)
	January	10,251,000
	February	7,194,000
	March	7,552,000
	April	12,490,000
	May	17,728,000
	June	16,357,000
	July	28,493,000
	August	27,344,000
	September	18,644,000
	October	11,679,000
	November	7,230,000
December	7,437,000	

Avg Day - 472,326 gallons
328.00 gpm
Peak Day - 1,249,494 gallons
867.70 gpm

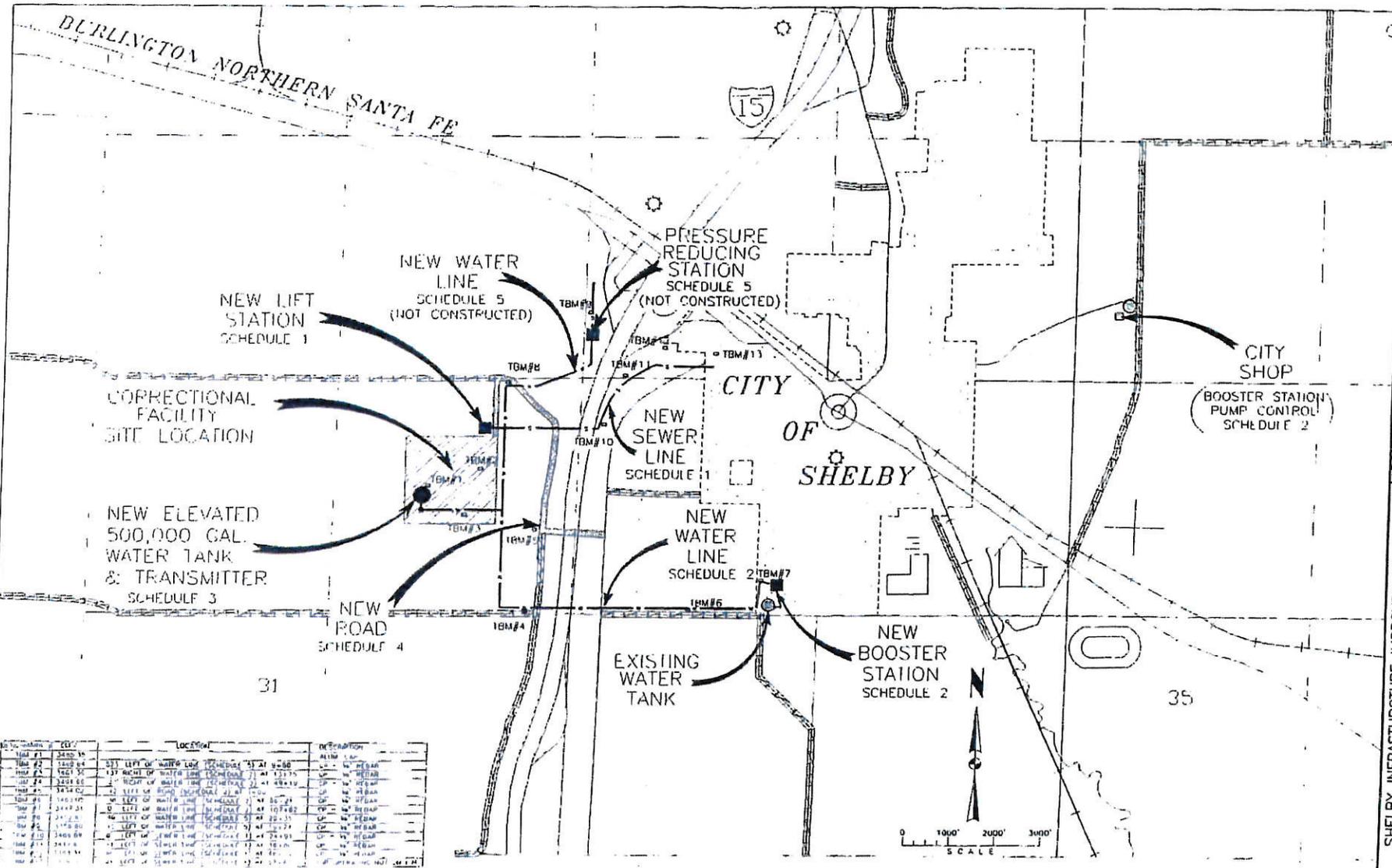
TOTAL PUMPED TO TOWN - 2012	Total to Town - 2012		
	Month	Usage (gal)	Max Day (gal)
	January	13,321,000	457,000
	February	10,101,000	793,000
	March	10,664,000	638,000
	April	16,782,000	872,000
	May	23,458,000	1,303,000
	June	21,190,000	817,000
	July	37,603,000	1,680,000
	August	36,783,000	1,659,000
	September	24,702,000	903,000
	October	15,459,000	889,000
	November	10,732,000	519,000
December	11,003,000	662,000	

Avg Day - 635,063 gallons
441.02 gpm
Peak Day - 1,680,000 gallons
1166.67 gpm

TOTAL PUMPED TO PRISON TANK - 2012	Total to Prison Tank - 2012	
	Month	Usage (gal)
	January	3,070,000
	February	2,907,000
	March	3,112,000
	April	4,292,000
	May	5,730,000
	June	4,833,000
	July	9,110,000
	August	9,439,000
	September	6,058,000
	October	3,780,000
	November	3,502,000
December	3,566,000	

WATER SERVICE AREA DESIGN AND RECORD DRAWINGS

3:11 PM 11/11/2019 1:30 PM RECORDS CH-198125-02 emp. 3-26-2012 04:20:16 PM, id#, TDH Great Falls



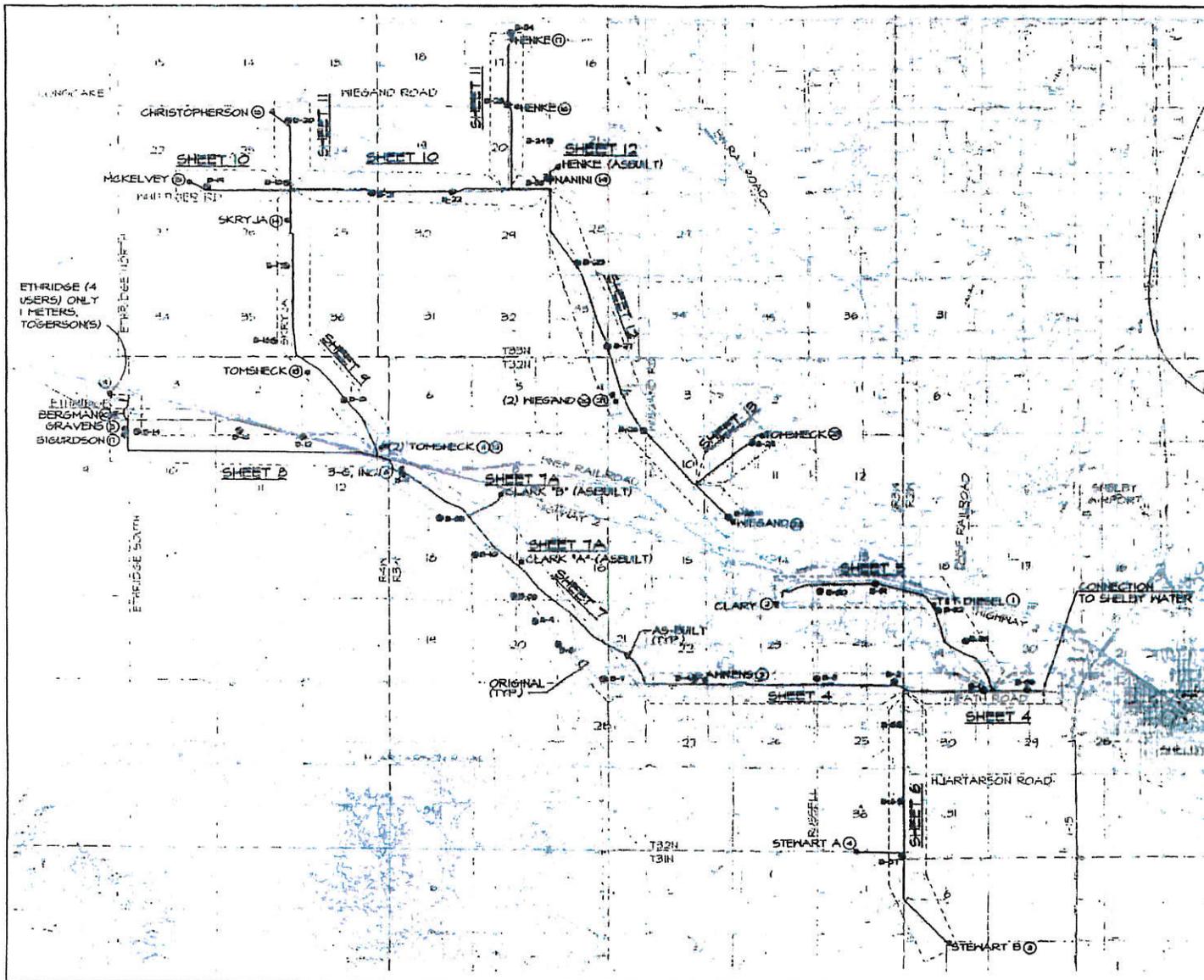
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1009	1009	1009
1010	1010	1010
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1012	1012	1012
1013	1013	1013
1014	1014	1014
1015	1015	1015
1016	1016	1016
1017	1017	1017
1018	1018	1018
1019	1019	1019
1020	1020	1020

PROJECT LOCATION & SCHEDULING MAP

THOMAS DEAN & HOSKINS, INC.
 ENGINEERING CONSULTANTS
 1000 N. 10TH ST. SHELBY, MONTANA 59601

NAME BY: [] DATE: [] DESIGNED BY: []
 QUALITY CHECK: [] DATE: 3/31/99
 TOWN JOB NO. 98-158

SHELBY INFRASTRUCTURE IMPROVEMENTS
 SHELBY, MONTANA
 PROJECT LOCATION & SCHEDULING MAP



- USERS - NAMES**
- 1) 1st USER
 - 2) CLARY
 - 3) STEWART A
 - 4) STEWART B
 - 5) ANDREWS
 - 6) S-C, INC
 - 7) EDWARDS
 - 8) LEAVINE
 - 9) TONGERSON (ETHRIDGE)
 - 10) BERGMAN (ETHRIDGE)
 - 11) TOSCHECK
 - 12) SKRYJA
 - 13) MCKELVEY
 - 14) CHRISTOPHERSON
 - 15) HENKE
 - 16) ANANINI
 - 17) TOSCHECK
 - 18) TOSCHECK
 - 19) TOSCHECK
 - 20) TOSCHECK
- * INITIAL PRESSURE
 MEDIAN VALVE IN NETWORK
 (1) TO LOCATION

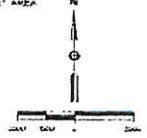
This does not affect any 26 + old l's

NOV 17 2003
 MONTANA
 DEPT OF ENVIRONMENTAL QUALITY

AS-RECORDED
 SEPTEMBER 2003
 SULLIVAN BROTHERS
 CONSTRUCTION

POINT	NORTHING	EASTING	ELEVATION
1	10000.000	14224.000	2583.20
2	10000.000	20000.000	2444.00
3	10000.000	22000.000	2409.00
4	10000.000	18000.000	2287.00

- LEGEND**
- CONTROL POINTS BALZOU
 - ⊙ HOME HOLE (10-30)
 - ⊙ USER NAME
 - WATER MAIN
 - PLAN SHEET AREA



Revision	By	Date

File No.	224.02	Job No.	0207-02
Date	2/20/03	Sheet	AS SHOWN

Engineers
 Planners
 Designers

NEIL CONSULTANTS, INC.
 4500 North Star Boulevard
 P.O. Box 4310
 Great Falls, MT 59404
 Phone 406-453-2474
 Fax 406-453-2097

ETHRIDGE WATER DISTRICT

ETHRIDGE RURAL WATER DISTRIBUTION SYSTEM

Overall Map

Sheet No.	3	14
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NIR.8 AFFIDAVIT & CERTIFICATION

All undivided interest owners must sign as applicants.

Read carefully before you sign and review with legal counsel if you have any questions.

I affirm the information provided for this application is to the best of my knowledge true and correct. I also affirm I have possessory interest, or the written consent of the person with the possessory interest, in the property where the water is to be put to beneficial use.

I understand that making a false statement under oath or affirmation in this application and official proceedings throughout the examination of my application may subject me to prosecution under §45-7-202, MCA, a misdemeanor punishable by a jail term not to exceed 6 months or a fine not to exceed \$500, or both. I have read this Affidavit and understand the terms and conditions

I declare under penalty of perjury and under the laws of the state of Montana that the foregoing is true and correct.

Printed Name	<u>Larry J. Bonderud</u> Mayor	Date:	<u>3/23/2015</u>
Applicant Signature	<u><i>Larry J. Bonderud</i></u>		
Printed Name	_____	Date:	_____
Applicant Signature	_____		

WATER RESOURCES OFFICES

- | | | | |
|------------------|---|-------------------|---|
| BILLINGS: | AIRPORT INDUSTRIAL PARK, 1371 RIMTOP DR., BILLINGS MT 59105-1978
PHONE: 406-247-4415 FAX: 406-247-4416
SERVING: Big Horn, Carbon, Carter, Custer, Fallon, Powder River, Prairie, Rosebud, Stillwater, Sweet Grass, Treasure, and Yellowstone Counties | HELENA: | 1424 9TH AVE., PO BOX 201601, HELENA MT 59620-1601
PHONE: 406-444-6999 FAX: 406-444-9317
SERVING: Beaverhead, Broadwater, Dear Lodge, Jefferson, Lewis and Clark, Powell, and Silver Bow Counties |
| BOZEMAN: | 2273 BOOT HILL COURT, SUITE 110, BOZEMAN MT 59715
PHONE: 406-586-3136 FAX: 406-587-9726
SERVING: Gallatin, Madison, and Park Counties | KALISPELL: | 655 TIMBERWOLF PARKWAY, SUITE 4, KALISPELL MT 59901-1215
PHONE: 406-752-2288 FAX: 406-752-2843
SERVING: Flathead, Lake, Lincoln, and Sanders Counties |
| GLASGOW: | 222 6TH STREET SOUTH, PO BOX 1269, GLASGOW MT 59230-1269
PHONE: 406-228-2561 FAX: 406-228-8706
SERVING: Daniels, Dawson, Garfield, McCone, Phillips, Richland, Roosevelt, Sheridan, Valley, and Wibaux Counties | LEWISTOWN: | 613 NORTHEAST MAIN ST., SUITE E, LEWISTOWN MT 59457-2020
PHONE: 406-538-7459 FAX: 406-538-7089
SERVING: Cascade, Fergus, Golden Valley, Judith Basin, Meagher, Musselshell, Petroleum, and Wheatland Counties |
| HAVRE: | 210 6TH AVENUE, PO BOX 1828, HAVRE MT 59501-1828
PHONE: 406-265-5516 FAX: 406-265-2225
SERVING: Blaine, Chouteau, Glacier, Hill, Liberty, Pondera, Teton, and Toole Counties | MISSOULA: | 2705 SPURGIN RD. BLDG. C, PO BOX 5004, MISSOULA MT 59806-5004
PHONE: 406-721-4284 FAX: 406-542-5899
SERVING: Granite, Mineral, Missoula, and Ravalli Counties |

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
Water Resources Division - Water Rights Bureau
WEBSITE: <http://dnrc.mt.gov/wrd/>





March 30, 2015

Mr. Matt Miles
DNRC Water Resources Division
Havre Regional Office
210 Sixth Avenue
Havre, Montana 59501

Subject: Submittal of Application to Change Two Existing Non-Irrigation Water Rights, Partial Year Water Rights; Change Application Number 2 Change in Place of Use and Change in Point of Diversion for Municipal Water Rights 41P 192877 00 and 41P 192879 00 Marias River – Basin 41P

Dear Mr. Miles:

On behalf of the City of Shelby, HydroSolutions Inc (HydroSolutions), submits the change application package for the water rights listed above. The purpose of the application is to change the place of use and points of diversion for two water rights. The subject application is requesting a temporary change in place of use to include the City of Shelby, Cut Bank, Ethridge, Big Rose Colony, Devon, and Dunkirk. The City has developed a reliable water source with good water quality that has historically served and presently serves its residents and a portion of the surrounding community. The purpose of the temporary change application is to provide a reliable interim water source for communities surrounding Shelby until the Rocky Boy's/North Central Montana Regional Water Authority (NCMRWA) pipeline is in place. When the NCMRWA pipeline is completed and in service, the proposed changes would no longer be needed and these water rights would revert back to their current elements

No additional volume or flow is requested or required as part of this change application to the City of Shelby's municipal water rights. Since the source of water is the same for each water right and waters comingle in the water treatment plant, a change in the point of diversion is requested.

This change application will be referenced as change application number 2. The City is submitting a separate water right change application, referenced as change application number 1, for year-around water rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00 and water reservation 41P 71891 00. The end goal of both applications is the same except for the period of use for water rights 41P 192877 00 and 41P 192879. In total these nine water rights and one water reservation make up the City's municipal water supply.

This application is organized into a submittal package following requirements of DNRC's Form No. 606 NIR (R 12-10-2012), Form 606-TCA (New 10-12-2012), and one supplemental attachment with supporting documentation. The package is submitted in hard copy and an electronic copy will be sent to you via email.

Billings Office
PO Box 80866
Billings, MT 59108-0866
Phone: (406) 655-9555
Fax: (406) 655-0575

www.hydrosi.com

Helena Office
PO Box 1779
Helena, MT 59624
Phone: (406) 443-6169
Fax: (406) 443-6385