

### **NIR.1.D Application Details**

*Are you proposing to change all of the historic water right(s) associated with the place of use? If no, attach an explanation of why not.*

No. The City is not changing water right 41P 192874 00 which is a surface water right on an unnamed tributary to Sullivan Coulee for the purpose of flood control. Lake Shel-oolie is backed up behind a 49 foot high dam for the purpose of flood control with a maximum volume of 550 acre feet. The place of use is listed as locations within Section 22, T32N, R2W. This water right does not affect municipal water supply and does not need to be changed.

The City has two additional municipal water rights, 41P 192877 00 and 41P192879, (corresponding to Wells 1 and 3, respectively) that have periods of use over half the year that will be changed under a separate application (change application number 2).

### **NIR.1.E Application Details**

*Identify the water rights used on the place of use that are not included in this application.*

**Table NIR.1.E**

Water Right	Purpose	Priority Date
41P 192877 00	Municipal (Well 1)	June 6, 1940
41P 192879 00	Municipal (Well 3)	July 7, 1939
41P 192874 00	Flood Control	June 23, 1966

### **NIR.2. MAP – ARM 36.12.111**

*Maps depicting the historic and proposed water system are required. Aerial photos may be available from the DNRC, NRIS, NRCS, USGS, and on the Internet and may be available from the 1940s up until today.*

#### **NIR.2.A**

*Note the section corners, township, range, and add a north arrow to the map for all maps submitted.*

All maps include the required information.

#### **NIR.2.B Historical Use**

*For each water right being changed, provide a map depicting the historic point(s) of diversion, means of conveyance, place of use, and place of storage. Be sure to identify the water right number on each map.*

See Map NIR.2.B for a map showing the historic use of the water rights to be changed. Separate maps are provided for the place of use and the points of diversion (well field map). Since the water reservation has not been put to use, there is no historic use that can be analyzed or mapped.

### **NIR.2.C Historical Use**

*If you measure water near the historical point of diversion or place of use, please identify where the measurement occurs*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

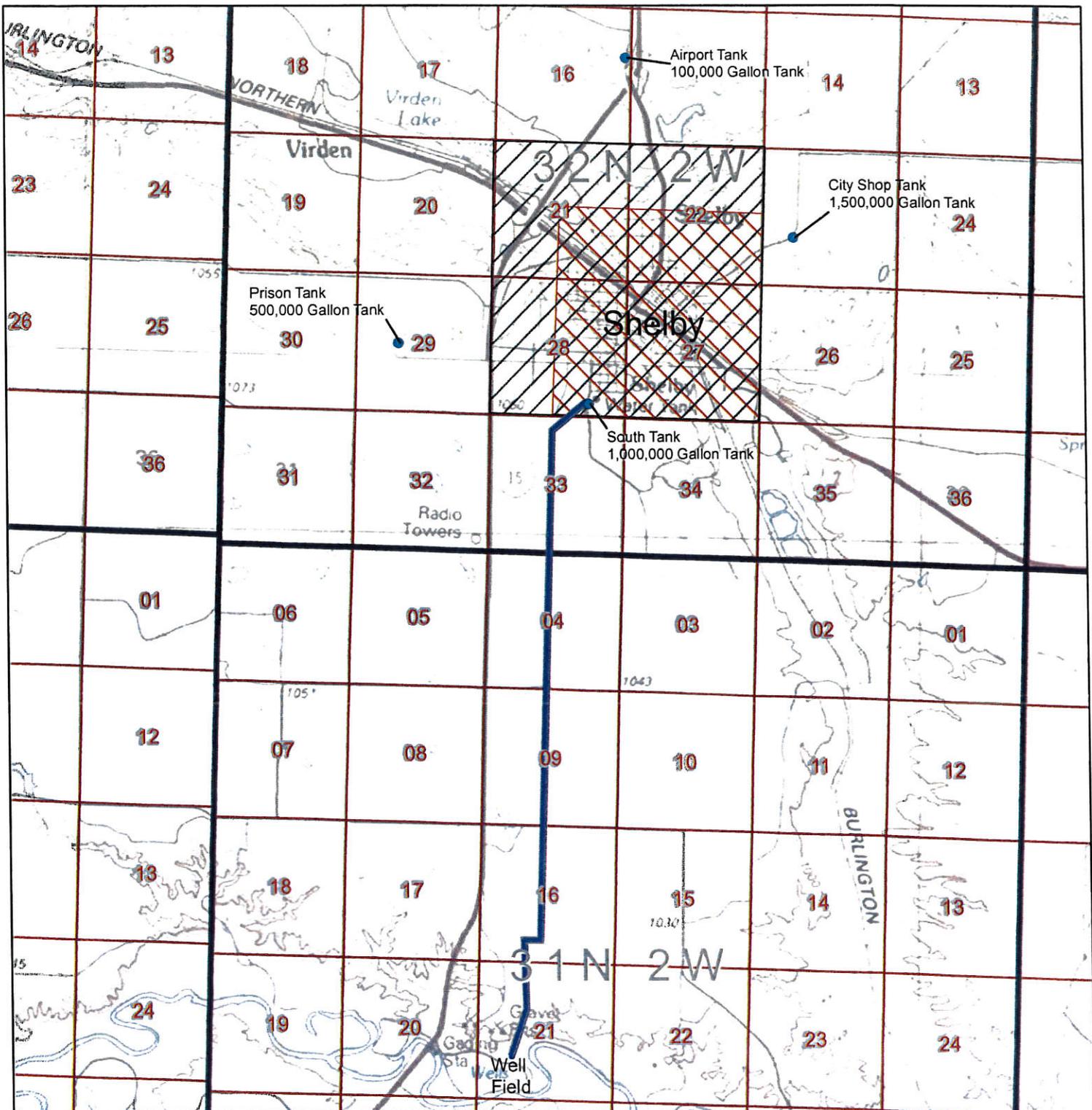
Historically water diversions were measured but do not appear to be recorded until early 1980s. The 1961 Preliminary Engineers Report on Water Supply and Distribution System for Shelby by Stanley J. Thill (1961 PER) indicates that the terminal storage tank, which was a 1 million gallon concrete tank at the south side of Shelby, had a propeller water meter, but it was not accurately measuring and recording flow. The PER indicated that the meter was likely worn and underestimating the amount of flow. Actual flow records do not appear to be available in the PER. The 1988 water reservation application completed by Aquoneering describes a master meter installed in the manifold piping which combines the flows from the entire well field. The water reservation application states that operators have kept reliable and accurate records for several years and tabulates monthly water use for the years 1982 to 1986 from the entire well field. Use from individual wells was not historically metered. Currently a master water meter that measures all water diverted from the well field is located near the storage tank on the south side of Shelby. Other water meters maintained by the City measure or will measure water distributed to the water service areas proposed in the application. A map of all current and proposed water meters is shown on the Water Meter Location Map NIR.5.C.

**Water Reservation:** Since the water reservation has not been put to use, historical water use measurement has not occurred.

### **NIR.2.D Proposed Use**

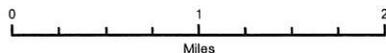
*Provide a map which clearly identifies the proposed point(s) of diversion, place of use, and place of storage. For partial changes, the map should reflect the entire water right including the proposed change and the remaining historic use.*

See Map NIR.2.D, City of Shelby's Proposed Place of Use below. This map shows the proposed place of use of water with the addition of the communities of Devon, Dunkirk, Ethridge, Big Rose Colony, and the City of Cut Bank.



Map NIR.2.B Change Application #1  
 Historic Use, City of Shelby Water Rights

- Water Tank
- Means of Conveyance (Pipeline)
- Place of Use, 41P 192878 00, 41P192880 00, 41P192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00
- Place of Use, 41P 58129 00



Prepared By: R.Svingen  
 File Name: NIR2B\_CityofShelby\_historic  
 Production Date: 3/19/2015  
 Original Scale: 1:62,500

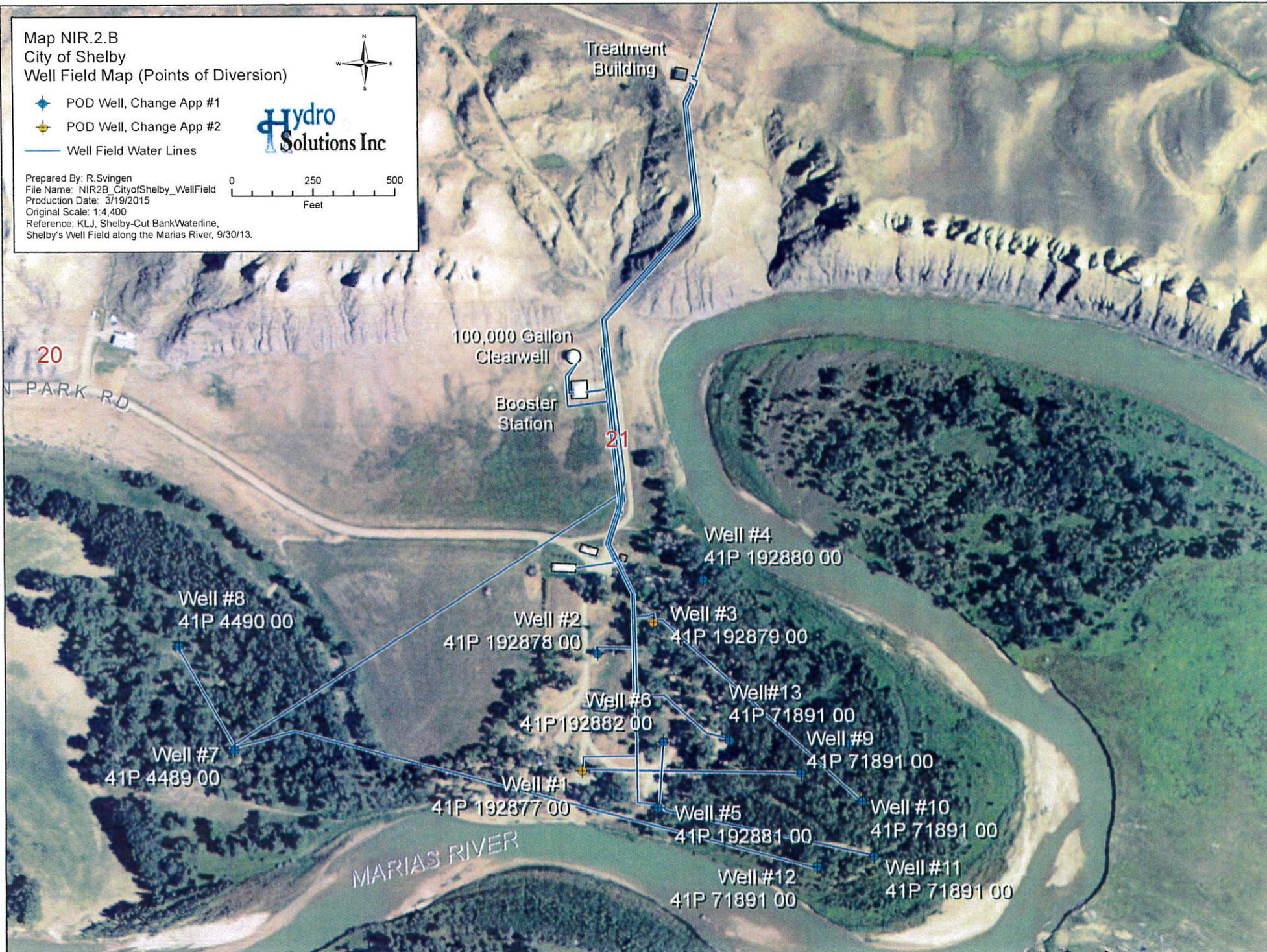
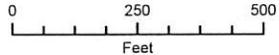
Map NIR.2.B  
City of Shelby  
Well Field Map (Points of Diversion)



- POD Well, Change App #1
- POD Well, Change App #2
- Well Field Water Lines



Prepared By: R.Svingen  
File Name: NIR2B\_CityofShelby\_WellField  
Production Date: 3/19/2015  
Original Scale: 1:4,400  
Reference: KLJ, Shelby-Cut Bank Waterline,  
Shelby's Well Field along the Marias River, 9/30/13.



Treatment Building

100,000 Gallon Clearwell

Booster Station

Well #8  
41P 4490 00

Well #7  
41P 4489 00

Well #2  
41P 192878 00

Well #1  
41P 192877 00

Well #3  
41P 192879 00

Well #6  
41P 192882 00

Well #4  
41P 192880 00

Well #5  
41P 192881 00

Well #13  
41P 71891 00

Well #9  
41P 71891 00

Well #10  
41P 71891 00

Well #12  
41P 71891 00

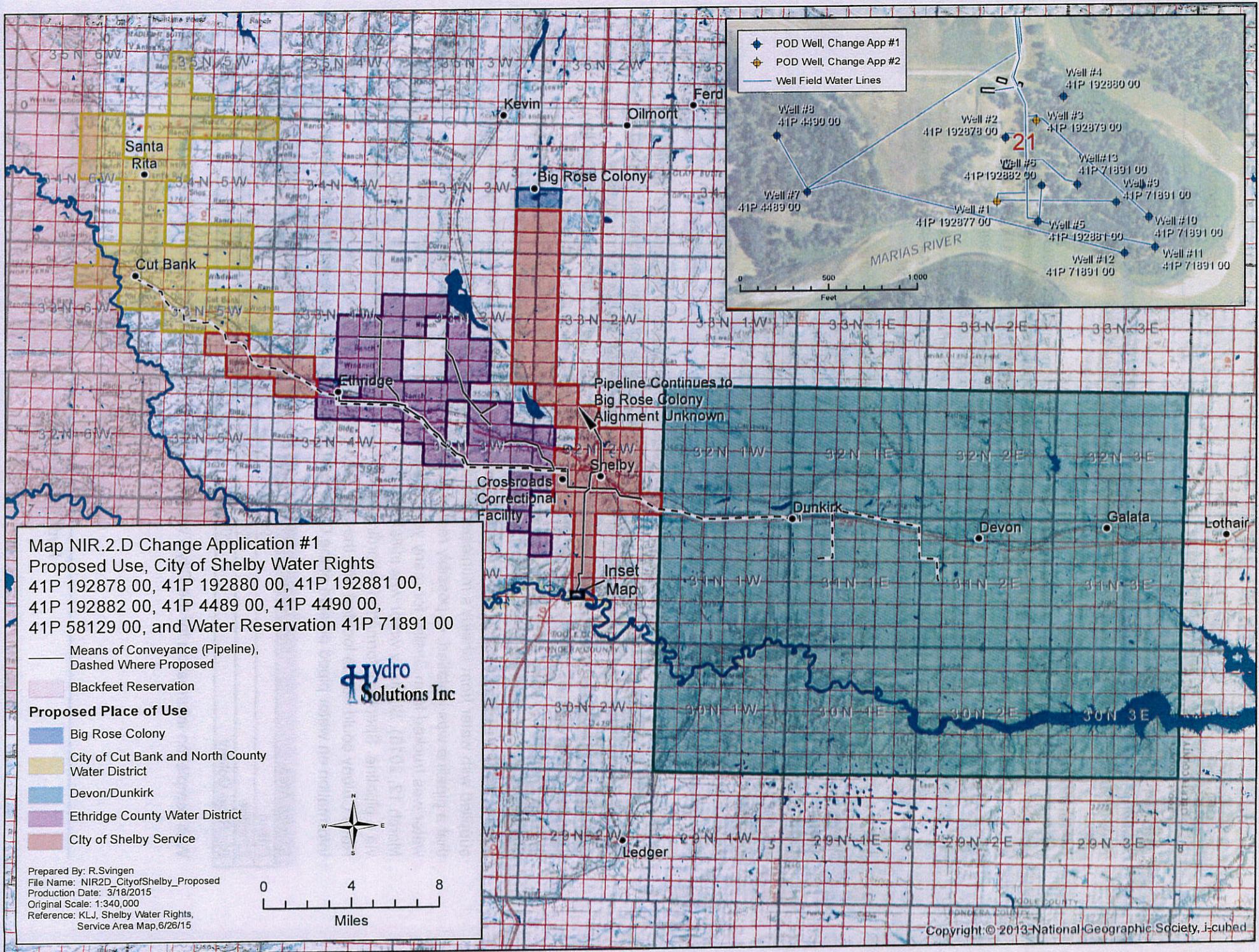
Well #11  
41P 71891 00

MARIAS RIVER

20

N PARK RD

21



- ◆ POD Well, Change App #1
- ◆ POD Well, Change App #2
- Well Field Water Lines

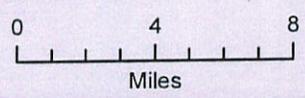


Map NIR.2.D Change Application #1  
 Proposed Use, City of Shelby Water Rights  
 41P 192878 00, 41P 192880 00, 41P 192881 00,  
 41P 192882 00, 41P 4489 00, 41P 4490 00,  
 41P 58129 00, and Water Reservation 41P 71891 00

— Means of Conveyance (Pipeline),  
 Dashed Where Proposed  
 Blackfeet Reservation



- Proposed Place of Use**
- Big Rose Colony
  - City of Cut Bank and North County Water District
  - Devon/Dunkirk
  - Ethridge County Water District
  - City of Shelby Service



Prepared By: R.Svingen  
 File Name: NIR2D\_CityofShelby\_Proposed  
 Production Date: 3/18/2015  
 Original Scale: 1:340,000  
 Reference: KLJ, Shelby Water Rights,  
 Service Area Map,6/26/15

### **NIR.3.A Historic Use**

*Attach a description of how the system operated from the point of diversion through the place of use. Include a description of wastewater collection and treatment if used, if any.*

#### **General Historic Water Use**

Historic water use of Shelby's water system can be found in three primary sources:

1. The 1961 Preliminary Engineers Report on Water Supply and Distribution System for Shelby, Toole County, Montana by Stanley J. Thill, Conrad, Montana (1961 PER)
2. Application for Reservation of Water for the City of Shelby by Aquoneering, Roger Perkins, Laurel Montana, August 1988 (1988 Reservation Application)
3. Preliminary Engineering Report Water System Improvements prepared for City of Shelby, Montana by Kadrmas, Lee & Jackson Engineers and Surveyors Planners (KLJ), 2010 (2010 PER), and correspondence with KLJ, the City's engineer

All of the City of Shelby's water supply is obtained from a well field located approximately 6 miles south of the City and one mile east of the interstate highway along the north side of the Marias River. The entire well field currently consists of 13 wells drilled to a total depth ranging from 31 feet to 50 feet bgs. Wells are completed in alluvial deposits of the old river bed. The depth of the aquifer varies in each well as shown in the perforated intervals in Table NIR.3.A. All water pumped from the individual wells is comingled and pumped in a transmission line to the south side of Shelby where it enters the City's distribution system. Water is distributed throughout the City to meet municipal demands.

As reported in the 1988 Reservation Application, given their reliable source and good quality, the City has a long history of supplying local communities outside of their designated place of use with water. The 1988 Reservation Application describes water service connections to additional people on the fringe of the City and also available for users to haul water from a City standpipe. This use has more or less occurred throughout the service life of Shelby's water system. Historically water use outside of the designated place of use was primarily trucked and more recently has included pipelines to outlying areas. The prison, Ethridge, and Big Rose Colony are three areas outside of the place of use designated in the City's water rights currently supplied with water from Shelby's municipal well field via pipelines. Record drawings indicate that a pipeline was installed, or possibly reconstructed to Ethridge in 2003, but prior to that water was trucked from Shelby for many years (personal communication, Jason Crawford, KLJ, March 12, 2015). Similarly water was initially trucked to Big Rose Colony, and is now delivered via a pipeline. Specific information regarding the dimensions and alignment of pipeline to Big Rose Colony could not be located with the City. All pipelines out of the city are metered. Information on water piped outside of the City's designated place of use is summarized below.

Service Area	Date Water First Piped from Shelby	Water Distribution Method
Prison	1999	12-inch diameter pipeline
Ethridge	2003	12-inch diameter pipeline
Big Rose Colony	2004	Pipeline

Well completion information for the City's well field is presented below in Table NIR.3.A.

**Table NIR.3.A Well Completion Information, City of Shelby Municipal Water Supply Wells**

Well Name	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 8	Well 9	Well 10	Well 11	Well 12	Well 13
<b>MBMG GWIC Number</b>	87581	87577	87576	87478	87579	87580	87572	87573	87574	87575	251163	251162	225363
<b>Basin</b>	41P	41P	41P	41P	41P	41P	41P	41P	41P	41P	41P	41P	41P
<b>Water Right Number</b>	19287700	19287800	19287900	19288000	19288100	19288200	448900	449000	7189100	7189100	7189100	7189100	7189100
<b>Date of Completion</b>	06 June 1940	01 Jan 1946	07 July 1939	12 Oct 1946	01 Jan 1962	04 Aug 1962	14 Jan 1975	12 Mar 1975	13 Mar 1985	13 Mar 1985	31 May 1993	31 May 1993	30 Sept 2005
<b>Date Placed in Service</b>	1940	1946	1939	1946	NA	NA	NA	NA	Jul 1985	Jul 1985	NA	NA	2006
<b>Total Depth (ft bgs)</b>	49	48	48	50	44	41	31	39	40	41	38	38	42
<b>Perforated Interval (ft bgs)</b>	26-36	13-15 19-32	24-34	15-30	34-44	31-41	28-38	20-30	24-40	29-41	24-36	24-36	27-37
<b>Static Water Level (ft bgs)</b>	18	15	15.6	20	20	20	7	7	10	9	8	8	9.8
<b>Pumping Water Level (ft bgs)</b>	36	30	NA	29	34	30	NA	NA	18	15	23	23	37
<b>Draw Down (ft)</b>	18	15	NA	9	14	10	NA	NA	8	6	15	15	12.4
<b>Yield (gpm)</b>	300	300	300	300	350	250	250	250	235	320	440	440	320

Notes:

NA Data or information not available

The information contained in this table was provide by the City of Shelby or obtained from a query of MBMG GWIC database.

Yields shown are permitted values and do not necessarily represent pumping capacity.

Historically each of the wells has come in and out of service for various reasons. Overall, the wells are used in combination with the others to meet municipal demands that vary with the season. Historically well pumps were designed to pump from the well directly to the terminal storage tank located on the south end of the City. In 2010 a clear well and treatment system was constructed. The clear well provided intermediate storage near the well field and allowed well pumps to be sized more efficiently. Booster pumps at the clear well (clear well booster station) pump water through the treatment system and deliver water to storage tanks in the City.

The discharge pipes of some of the wells are plumbed into the casings of other wells in the subsurface. Other wells pump directly to the 100,000 gallon clear well. All wells are able to operate independently. The following is a summary of the well operation and supplementary plumbing:

- Well 1 pumps into the 100,000 gallon clear well, Well 9 pumps into Well 1
- Well 2 pumps into the 100,000 gallon clear well
- Well 3 pumps into the 100,000 gallon clear well, Well 10 pumps into Well 3
- Well 4 is currently offline, piping is being redone
- Well 5 pumps into the 100,000 gallon clear well, Well 6 and Well 11 pump into Well 5
- Well 6 pumps into Well 5, but has been offline since 2009
- Well 7 pumps into the 100,000 gallon clear well, Well 12 pumps into Well 7
- Well 8 pumps into the 100,000 gallon clear well
- Well 9 pumps into the casing of Well 1
- Well 10 pumps into the casing of Well 3
- Well 11 pumps into the casing of Well 5
- Well 12 pumps into the casing of Well 7
- Well 13 pumps into the 100,000 gallon clear well

Discussion of all of the City's municipal wells and water rights are included in this section since the well field is operated as a whole and all are part of the overall historic use.

***Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:***

***Wells 2 and 4 (Water Rights 41P 192878 00 and 41P 192880 00)***

Wells 1 to 4 were completed between 1939 and 1946. Although Wells 1 and 3 (water rights 41P 192877 00 and 41P 192879 00) have partial year periods of use (May through October), a review of historical records do not indicate their use was limited to those times. These water rights will be changed under a separate application. Wells 1 and 3 discussion is included in this application since they were part of the overall historic use. The historic use of Wells 1 to 4 is described in the 1961 PER.

The 1961 PER states that separate six and eight inch cast or steel lines transmitted water from the wells into a common twelve inch steel line running from the well field area to the top of the breaks approximately 1,500 feet. From the top of the breaks the transmission line transitions into a twelve inch wooden line. The report states that the wooden line was a source of considerable trouble due to collar and pipe leaks. The wooden line was held together by steel bands that were badly corroded. The wooden line transmitted water to one of two terminal

storage tanks. According to the 1961 PER, no water treatment occurred at that time. Terminal storage tanks included a one million gallon concrete tank located at the southwest edge of town, and a one hundred thousand gallon elevated steel tank located north of the city. The 1961 PER reported that the tank had undergone several recent repairs; however, there were indications that leaks were still occurring. The one hundred thousand gallon storage tank was placed on the north side of town in 1957. The 1961 PER reports the storage tank is in fair condition.

The 1961 PER describes the City's distribution system. In 1961 the system included 76,000 feet of line in various sizes:

- 2.1% of the lines were less than 4-inches in diameter
- 36.3% of the lines were 4-inch in diameter
- 52.3% were 6-inch diameter
- 9% were made up of 8 and 10-inch diameter lines

The main distribution system consists of cast iron and asbestos cement pipe, however, the 1961 PER notes that at the time some wooden pipe was still in use.

Water use in Wells 1 to 4, based on 1961 PER, is described as follows:

- Wells 1 to 4 can deliver maximum flow rate of 1,195 gallons per minute (gpm) without drawing air; over a 24 hour period could deliver 1,720,800 gallons
- Wells 1 to 4 are capable of each delivering approximately 300 gpm without entraining air.
- Specific yield test completed on Well 4 found results of 85 gpm per foot of drawdown to 47.6 gpm per foot of drawdown at corresponding pumping rates of 200 gpm and 500 gpm respectively.

***Wells 5 and 6 (Water Rights 41P 192881 00 and 41P 192882 00)***

Wells 5 and 6 were completed in 1962 after the 1961 PER. Since the same general infrastructure was in place when Wells 5 and 6 were completed, these wells have the same historic use pattern as Wells 1 to 4 described above.

***Wells 7 to 13 (Water Rights 41P 4489 00, 41P 4490 00, and 41P 58129 00)***

Wells 7 and 8 were completed in 1975. Wells 9 and 10 were completed in 1985. Wells 11 and 12 were completed in 1993, and Well 13 was completed in 2005. Historic water use of these wells follow a similar pattern of use as described above.

Besides adding new wells, the system infrastructure was upgraded over the years to include a new transmission line, additional storage, water treatment, booster pumps, and other improvements.

The 1988 Reservation Application and the 2010 PER report that a 16-inch asbestos-cement pipeline is now used to convey water from the well field to the City. This line was constructed in 1962. In 1988 the City had 2.6 million gallons of storage to control pumping and to meet peak hourly demands. A large format map, Figure 2, included in the 1988 Reservation Application shows Shelby water system details including wells, transmission line, storage tanks, and sewage lagoons. The 1988 Reservation Application reports that the City used seven of the well as primary pumping wells while three of the wells were used to supplement the others during

low flows. The Application does not state which of those well are primary and which are supplemental.

The 2010 PER describes the current system, which is applicable to the entire well field and includes historic use for water right 41P 58129 00. Well 13 is the latest well completed for the City's water system. It was completed in 2005 and placed into service in 2006. In 2005, a new water treatment facility was constructed and houses the chlorination unit and ultraviolet (UV) disinfection equipment. Currently comingled well water is pumped to the 100,000 gallon clear well. Booster pumps at the clear well pump water through the treatment system where it is disinfected and then pumped in the transmission line to the City.

Transmission lines within the well field were replaced in 2006. Portions of the historic 1940s water distribution system still exist within the City, but numerous improvements have been made. A booster station, 500,000 gallon elevated steel tank and several thousand feet of distribution mains were constructed in 2001. Several more thousand feet of distribution mains were constructed in 2004 and 2008.

The following information from the Shelby Water System Model (KLJ 2014) describing the current water supply system for the service area is included. 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. The low pressure zone is controlled by the south tank, the airport tank, and the shop 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. The low pressure zone includes the remainder of the town (south tank, airport tank, and shop tank).

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

The 1,000,000 gallon south tank is 67 feet in diameter and holds 26,372 gallons per foot. The south tank has the ability to operate at an elevation between 3,452.03 feet and 3,478.96 feet. The 100,000 gallon airport tank is 28 feet in diameter and holds up to 4,606 gallons per foot. The airport tank has the ability to operate at an elevation between 3,450.41 feet and 3,478.96 feet. The 1,500,000 gallon shop tank is 80.5 feet in diameter and holds up to 38,070 gallons per foot. The shop tank has the ability to operate at an elevation between 3,439.96 feet and 3,478.96 feet. The total storage for the Low Pressure Zone is 2,600,000 gallons.

The clear well booster station (CWBS) is located just north of the well field and is used to deliver water from the well field through the treatment system to the City. The CWBS is made up of four separate pumps. The pumps can operate in multiple configurations (individually or in tandem) to maximize efficiency in delivering water to the City.

#### Prison Tank Booster Station

The prison tank booster station (PTBS) is situated adjacent to the south tank at an elevation of 3,456.79 feet. The PTBS draws water from the south tank and pumps water into the 500,000 gallon prison tank through approximately 2 miles of 12-inch PVC pipe. The PTBS is made up of 3 constant speed pumps.

### Prison Tank (High and Middle Pressure Zones)

The 500,000 gallon prison tank is 49.5 feet in diameter and holds up to 14,395 gallons per foot. The prison tank has the ability to operate at elevations between 3,637.53 feet' and 3,663.38 feet. The 3 pumps can operate in multiple configurations (individually or in tandem) to maximize efficiency in delivering water to the prison.

### **Wastewater Collection, Treatment, and Disposal**

Wastewater is collected via a municipal wastewater collection system and conveyed to the City's wastewater treatment facility. The 1988 Reservation Application describes a facultative sewage lagoon system located along Medicine Rock Coulee southeast of the City, which is tributary to the Marias River. The 1988 Reservation Application reports an average effluent flow of 0.33 million gallons per day, but records showed very little to no flow from the lagoon during summer months of July and August. The Application states that most flow is depleted by evaporation in the lagoons or by evapo-transpiration by vegetation in Medicine Rock Coulee and that discharges generally do not reach the Marias River.

**Water Reservation:** The water reservation has not been put to use at this time. The purpose of this change application is to change its point of diversion and place of use. Therefore, there is no historic use associated with the water reservation.

### **NIR.3.B Historic Use**

*Attach a description of the uses (i.e. domestic, stock, irrigation of parks, industrial, commercial, etc.) and provided a narrative detailing the approximate amount of water associated with those uses.*

Historic water use for the subject water rights besides the water reservation has been for municipal use. Historic municipal use has included domestic use in houses, lawn and garden irrigation, park irrigation, firefighting, commercial and industrial use, and marketing through the sale of water at City standpipes. While water use for each specific use is not metered the amount can be approximated from water use in other communities through comparable analysis. In water right change application for the City of Conrad (41M 30069920), DNRC found 60% of diverted volume is used for domestic and commercial purposes and 40% is used for lawn and garden irrigation. This method of analysis is used to estimate the amount of water associated with those uses.

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

**Wells 1 to 6:** Historically water diversions were measured but do not appear to be recorded until the early 1980s. The 1961 PER indicates that the terminal storage tank, which was a 1 million gallon concrete tank at the south side of Shelby, had a propeller water meter, but it was not accurately measuring and recording flow. The PER indicated that the meter was likely worn and underestimating the amount of flow. Flow records are not available in the 1961 PER. Since historic water use records do not exist, estimates of historic use are based on census data and water use of 250 gallons per capita day (gpcd), which is consistent with previous historic use analysis conducted by DNRC for municipal use.

According to census data, Shelby's peak population occurred in 1960 at 4,017. At 250 gpcd, maximum the historic diversions totaled 1,004,250 gallons per day, 366,551,250 gallons per year, and 1,124.90 acre-feet per year. Based on the assumptions described above 674.94 acre-feet were used for domestic and commercial purposes and 449.96 acre-feet were used for lawn and garden irrigation. As shown in Table NIR.3.B-1 these totals are achievable with Wells 1 to 6, but also alone with Wells 1 to 4.

Assuming that a similar population of 4,017 existed in 1962-63 when Wells 5 and 6 were completed, the proportional historic use for Wells 1 to 6 can be calculated. The proportion each well (i.e. water right) contributed to the historic diverted volume is assumed to be the proportion of the well's maximum possible diverted volume (well flow rate in gpm x 1440 minutes/day x number of days = gallons per year) to the sum total maximum volume of Wells 1 to 6. The result of this calculation is shown in Table NIR.3.B-1.

**Table NIR.3.B-1 Estimate of Maximum Water Diversion, City of Shelby Wells 1 through 6.**

Well #	Water Right no. (41P)	Flow Rate (gpm)	Max Vol (ac-ft)	Period of Use	Days	Max Day Use (gpd)	Max Diversion per year (gal)	Max Diversion (ac-ft)	Percent Diversion (%)
1	192877	300	250	May1-Oct31	183	432,000	79,056,000	242.61	10%
2	192878	300	450	Jan1-Dec31	365	432,000	157,680,000	483.90	20%
3	192879	300	250	May1-Oct31	183	432,000	79,056,000	242.61	10%
4	192880	300	450	Jan1-Dec31	365	432,000	157,680,000	483.90	20%
5	192881	350	550	Jan1-Dec31	365	504,000	183,960,000	564.55	23%
6	192882	250	400	Jan1-Dec31	365	360,000	131,400,000	403.25	17%
Totals		1,800	2,350				788,832,000	2,420.84	

Note that Wells 1 and 3 are included in a separate change application, but are analyzed here since they were also used in combination with Wells 2, 4, 5, and 6. Based on the proportional contribution of each well shown above the historic volume for each well can be found. The historic volume is based on a peak population of 4,017 in 1960 and per capita use of 250 gpcd. Historic diverted volumes for each Well 1 to 6, and their respective water rights, are shown in Table NIR.3.B-2.

**Table NIR.3.B-2 Estimate of Historic Volume Diverted, City of Shelby Wells 1 through 6.**

Source	Water Right no.	Percent Diversion (%)	Historic Volume Diverted (ac-ft)	Domestic & Commercial (ac-ft)	Lawn & Garden (ac-ft)
WELL 1	41P 192877 00	10%	112.74	67.64	45.09
WELL 2	41P 192878 00	20%	224.86	134.91	89.94
WELL 3	41P 192879 00	10%	112.74	67.64	45.09
WELL 4	41P 192880 00	20%	224.86	134.91	89.94
WELL 5	41P 192881 00	23%	262.33	157.40	104.93
WELL 6	41P 192882 00	17%	187.38	112.43	74.95
Totals			1,124.90	674.94	449.96

**Wells 7 to 13:** These wells provide supplemental water to meet municipal demands of the City. These wells provide additional pumping capacity at times when river and aquifer tables drop decreasing productivity of Wells 1 to 6. These wells do not add to the historic volume, but do

increase the overall pumping rate available to the City. Table NIR.3.B-3 provides an estimate of the proportion that each well/water right is used and an estimate of the historic volume of use. While the maximum historic diverted volume is shown in Table NIR.3.B-3, actual water use varies year to year. At times there are wells that are taken off line for water quality or operational concerns so the estimated volumes in Table NIR.3.B-3 are intended to provide a representation of the entire well field over a broad range of time, based on the maximum historic diverted volume.

**Table NIR.3.B-3 Estimate of Historic Volume Diverted, City of Shelby Municipal Water Rights (Wells 1 through 13).**

Source	Water Right no.	Percent Diversion (%)	Historic Volume Diverted (ac-ft)	Domestic & Commercial (ac-ft)	Lawn & Garden (ac-ft)
WELL 1	41P 192877 00	10%	112.49	67.49	45.00
WELL 2	41P 192878 00	5%	56.25	33.75	22.50
WELL 3	41P 192879 00	10%	112.49	67.49	45.00
WELL 4	41P 192880 00	12%	134.99	80.99	54.00
WELL 5	41P 192881 00	10%	112.49	67.49	45.00
WELL 6	41P 192882 00	7%	78.74	47.25	31.50
WELL 7	41P 4489 00	4%	45.00	27.00	18.00
WELL 8	41P 4490 00	4%	45.00	27.00	18.00
WELL 9-13	41P 58129 00	38%	427.46	256.48	170.99
Totals			1,124.90	674.94	449.96

**Water Reservation:** Since the water reservation has not been put to use, there is no historic use that can be analyzed.

**NIR.3.C Historic Use**

*What has been used to convey the water to the place of use?*

In general a single transmission line from the well field at Williamson Park to a storage tank on the south side of Shelby conveys water about 5 miles to the place of use.

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

**Wells 1 to 6:** Historically and as documented in the 1961 PER, six and eight inch cast or steel lines transmitted water from the wells into a common twelve inch steel line running from the well field area to the top of the breaks approximately 1500 feet. Historically, well pumps were designed to pump from the well to directly to the terminal storage tank located on the south end of the City. From the top of the breaks the transmission line transitions into a twelve inch wooden line. The 1961 PER states that the wooden line was a source of considerable trouble due to collar and pipe leaks. The wooden line was held together by steel bands that were badly corroded. The 12-inch wooden transmission line was replaced with a 16-inch asbestos-cement pipeline in 1962 about the same time Wells 5 and 6 were constructed.

**Wells 7 to 13:** A 16-inch asbestos-cement pipeline is used to convey water to the place of use. Additionally, there have been recent upgrades to the transmission pipelines within the well field

at Williamson Park. In 2010, a clear well and treatment system was constructed. The clear well provided intermediate storage near the well field and allowed well pumps to be sized more efficiently. Booster pumps at the clear well pump water through the treatment system and deliver water to storage tanks in the City.

**Water Reservation:** Since the water reservation has not been put to use, there is no historic use that can be analyzed.

**NIR.3.D Historic Use**

*What is your diversion method type and capacity?*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

The diversion method for each point of diversion is a submersible pump in each well. A summary of known information regarding the pump model, type, and capacity for each well is provided in Table NIR.3.D.

**Table NIR.3.D City of Shelby Municipal Well Pumps**

Water Right	Well No.	Historic		Current	
		Historic Pump Make/Model	Capacity (GPM)	Current Pump Make/Model	Capacity (GPM)
41P 192877 00	1	Fairbanks Morse and Co., 20 stage, 50 hp turbine	320	Gould's 7CLC Submersible/Franklin-Electric NO. 23661290, 10HP	320
41P 192878 00	2	Fairbanks Morse and Co., 20 stage, 50 hp turbine	300	Gould's 7CLC Submersible/Franklin-Electric NO. 23661290, 7.5HP	350
41P 192879 00	3	Fairbanks Morse and Co., 20 stage, 50 hp turbine	370	Gould's 7CLC Submersible/Franklin-Electric NO. 23661290, 10HP	320
41P 192880 00	4	Fairbanks Morse and Co., 20 stage, 50 hp turbine	300	FE STS Submersible/Franklin Electric 6" 460V Sand Fighter, 7.5 HP	350
41P 192881 00	5	Fairbank- Morse Vertical Turbine Pump/13 Stage, 10" LC	500	Gould's 7CLC Submersible/Franklin-Electric NO. 23661460, 20HP	500
41P 192882 00	6	Layne	250	Out of service	Out of service
41P 4489 00	7	Deming Pumps Fig. 4700/19 Stage	250	Gould's 7CLC Submersible/Franklin-Electric NO. 23661390, 15HP	250
41P 4490 00	8	Deming Pumps Fig. 4700/19 Stage	250	Gould's 7CLC Submersible/Franklin-Electric NO. 23661390, 15HP	250
41P 58129 00	9	Aermotor Submersible	260	Aermotor Submersible	260
	10	Aermotor Submersible	260	Aermotor Submersible	260
	11	Aermotor Submersible	260	Aermotor Submersible	260
	12	Aermotor Submersible	260	Aermotor Submersible	260

Water Right	Well No.	Historic		Current	
		Historic Pump Make/Model	Capacity (GPM)	Current Pump Make/Model	Capacity (GPM)
	13	NA	NA	Gould's 7CLC Submersible/Franklin-Electric NO. 23661190, 15HP	350

Note: Well pump information obtained from City's engineer

Additionally, the City's engineer completed pump and pipeline questionnaires for Wells 1 to 4. These questionnaires are on file with the DNRC Water Adjudication Bureau and address specifics historic of diversion, conveyance, flow rate, history and condition, and other information.

**Water Reservation:** Since the water reservation has not been put to use, there is no historic use that can be analyzed.

**NIR.3.E Historic Use**

*How did you determine capacity?*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

Capacity of each well was determined through multiple methods including:

- 1) Directly from the results of a pumping test completed at the time of well completion.
- 2) Pump capacity specifications
- 3) Knowledge of aquifer transmissivity and capacity from previously completed pumping tests

Multiple pumping tests have been accomplished over the years by the City and their engineers to determine sustainable pumping rates. The 1961 PER provides additional documentation of the capacity of Wells 1 to 4, described above. The 1988 Reservation Application and the 2010 PER document overall system use, but do not evaluate individual well capacities since individual wells are not metered.

**Water Reservations:** Since the water reservation has not been put to use, there is no historic use that can be analyzed.

**NIR.3.F Historic Use**

*How often do you divert water?*

Water is diverted from the City's well field on a daily basis to meet municipal demands. Demands vary with the season, peaking in the summer months when residents use water for lawn and garden irrigation.

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

Historically Wells 2, 4, and 5 to 13 have diverted water up to year around to meet municipal demands. Wells may be shut down for maintenance or during cold weather to prevent freezing. The 1961 PER recommends installing well field automation indicating that prior to 1961 wells

pumps were operated manually by the City. The system is now automated so that at a certain elevation in the water tank pumps will automatically turn on to fill the tank.

Correspondence from the City's engineer indicates that Wells 7 to 12 are currently shut down in winter to prevent freezing. At times Well 5 is also shut down in the winter due to decreased municipal demand. Well 5 and Wells 7 to 12 are primarily used in the summer to meet additional demands (typically lawn and garden irrigation).

**Water Reservation:** Since the water reservation has not been put to use, there is no historic use that can be analyzed.

### **NIR.3.G Historic Use**

*What is the duration of each diversion?*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

The duration of each diversion has not been measured. System automation and storage tanks in the City provide a continuous source of municipal water and prevent cycling of the well pumps. Based on the total historic volume diverted shown in Table NIR.3.B-2, Wells 1 to 6 would have had to operate just over 11 hours per day at their listed flow rate to pump the required maximum historic volume. Wells 7 to 13 are supplemental and used primarily in the summer to meet increased demands. These wells decrease the overall time that each well must be pumped.

**Water Reservation:** Since the water reservation has not been put to use, there is no historic use that can be analyzed.

### **NIR.3.H Historic Use**

*If wastewater is discharged, what amount of water is discharged?*

Wastewater is collected via a municipal wastewater collection system and conveyed to the City's wastewater treatment facility. The 1988 Reservation Application describes a facultative sewage lagoon system located along Medicine Rock Coulee southeast of the City, which is tributary to the Marias River. The 1988 Reservation Application reports an average effluent flow of 0.33 million gallons per day. The Reservation Application goes on to report that very little to no flow was discharged from the lagoon during the summer months of July and August. The Application states that most flow during other months is depleted by evaporation in the lagoons or by evapo-transpiration by vegetation in Medicine Rock Coulee and that discharges generally do not reach the Marias River.

Since the water reservation has not been put to use, there is no historic use that can be analyzed.

**NIR.3.I**

*Do you measure water near the existing point of diversion or near/at your place of use? If yes, what type of measuring device do you use?*

Historically water diversions were measured but do not appear to be recorded until the early 1980s. The 1961 PER indicates that the terminal storage tank, which was a 1 million gallon concrete tank at the south side of Shelby, had a propeller water meter, but it was not accurately measuring and recording flow. The PER indicated that the meter was likely worn and underestimating the amount of flow. Actual flow records do not appear to be available in the PER. The 1988 water reservation application completed by Aquoneering describes a master meter installed in the manifold piping which combines the flows from the entire well field. The water reservation application states that operators have kept reliable and accurate records for several years and tabulates monthly water use for the years 1982 to 1986 from the entire well field.

Currently a master water meter that measures all water diverted from the well field is located near the storage tank on the south side of Shelby. Other water meters maintained by the City measure or will measure water going to the service areas proposed in this application. A map of all current and proposed water meters is provided on the Water Meter Location Map NIR.5.C. The City currently maintains the water meters shown in Table NIR.3.I.

**Table NIR.3.I City of Shelby Water Meters**

Meter Location/Service Area	Meter Type
Transmission Main Master Meter	Seametrics EX215, Insertion Electromagnetic Meter
Big Rose	4-inch Badger Meter
Ethridge	4-inch Neptune T10
Cut Bank	6-inch Badger Meter
Prison	4-inch Neptune T10
Devon-Dunkirk	4-inch Neptune T10

Individual residential water meters (Neptune T10) are present at service connections in the City. Most of the water main meters and all residential meters are radio-read, allowing the City to simply drive by the meter to pick up the output. Meters are read by the City once per month for total volume. The City also monitors and records peak day water use in the transmission main master meter.

**NIR.3.J Historic Use**

*Do you have water commissioner, water measurement records available, or other documents that support the amount of water you have historically diverted or used?*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

Water measurement records are not available to document the historic diverted volume. Water use records for the entire well field do exist in the 1988 Reservation Application and the 2010 PER. Records of current water use are maintained by the City. These water use records may

not be representative of historic use since many water system improvements have occurred including replacement of a wooden transmission line and leaky storage tanks. The wooden transmission line and terminal storage tank documented in the 1961 PER indicates that water leakage from these sources would have increased the overall per capita historic water use.

**Water Reservation:** Since the water reservation has not been put to use, there is no historic use that can be analyzed.

### **NIR.3.K Historic Use**

*Do you supplement your water usage with water from another water right? If yes, attach an explanation of that water right and how and when it is used to supplement this water right.*

Yes. Wells 1 and 3 (water rights 41P 192877 00 and 41P 192879 00) are part of the City's well field, but have periods of use from May 1 to October 31 listed on the water rights. The historic use of these wells is described above. These wells will be changed under change application number 2. Since the water reservation has not been put to use, there is no historic use that can be analyzed.

### **NIR.4 Adverse Effect – ARM 36.12.1903**

#### **NIR.4.A Adverse Effect**

*Attach an explanation of how all points of diversion will be operated in order to not exceed historical diverted flow rate?*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

The City would operate all points of diversion associated with their municipal water rights as they have operated historically. Together the well field would divert no more than the historic volume shown in Table NIR.3.B-3 along with the additional volume provided in the City's water reservation. Consistent with current operations, water would be diverted from each well and pumped into the clear well where it comingles with water from other wells (all from the same groundwater source) and then pumped in a single transmission line through the water treatment system to the south side of Shelby. From there Shelby water would be stored in tanks and distributed throughout the City or distributed in pipelines to the outlying communities within the service area. The following is a summary of the well operation and supplementary plumbing:

- Well 1 pumps into the 100,000 gallon clear well, Well 9 pumps into Well 1
- Well 2 pumps into the 100,000 gallon clear well
- Well 3 pumps into the 100,000 gallon clear well, Well 10 pumps into Well 3
- Well 4 is currently offline, piping is being redone
- Well 5 pumps into the 100,000 gallon clear well, Well 6 and Well 11 pump into Well 5
- Well 6 pumps into Well 5, but has been offline since 2009
- Well 7 pumps into the 100,000 gallon clear well, Well 12 pumps into Well 7
- Well 8 pumps into the 100,000 gallon clear well
- Well 9 pumps into the casing of Well 1
- Well 10 pumps into the casing of Well 3
- Well 11 pumps into the casing of Well 5
- Well 12 pumps into the casing of Well 7
- Well 13 pumps into the 100,000 gallon clear well

Wells 1 and 3 will also be used throughout their period of use from May 1 through October 31 to supplement higher summer time water use.

Based on existing water use records, water use planning factors, and water use agreements the City has with communities in the proposed service area, the expected flow rate and volume to be diverted by the City's municipal well field is estimated below. Actual water use will vary year to year for each community, and would be metered to ensure the historic volume plus water reservation is not exceeded.

**Proposed water use:**

**City of Shelby**

Current Population	3,304	Source: 2015 DEQ Public Water Supply (PWS) records
Use	Municipal (domestic, commercial, industrial, lawn and garden)	
Average Day Demand (gpd)	631,064	
Average Day Demand (gpd)	438	
Use per person (gpcd)	191	Source: 2010 PER (KLJ)
Annual Demand (ac-ft)	706.88	
Peak Day Demand (gpd)	1,672,320	Peaking Factor of 2.65 source: KLJ 2012 water use data
Peak Day Demand (gpm)	1,161	

**Prison**

Current Population	783	623 inmates and 160 daily staff (City economic impact report, 2009)
Use	Commercial/Industrial/Institutional	
Date First Served by Shelby	1999	
Average Day Demand (gpd)	65,682	Source: KLJ 2012 water use data
Average Day Demand (gpd)	46	
Use per person (gpcd)	84	
Annual Demand (ac-ft)	73.57	
Peak Day Demand (gpd)	173,755	Source: KLJ 2012 water use data
Peak Day Demand (gpm)	121	

**Ethridge**

Current Population	70	Source: 2015 DEQ PWS records
Use	Domestic/Lawn and Garden	
Date First Served by Shelby	Pipeline constructed in 2003; water was truck from Shelby earlier	
Average Day Demand (gpd)	13,345	Source: KLJ 2012 water use data
Average Day Demand (gpm)	9	
Use per person (gpcd)	191	Average Day Demand / Current population
Annual Demand (ac-ft)	14.95	
Peak Day Demand (gpd)	35,304	Source: KLJ 2012 water use data
Peak Day Demand (gpm)	25	

### Big Rose Colony

Current Population	60	Source: Personal communication, KLJ 1/12/2015
Use	Domestic/Lawn and Garden	
Date First Served by Shelby	Pipeline constructed in 2004, water was truck from Shelby earlier	
Average Day Demand (gpd)	3,874	Source: Personal communication, KLJ 11/11 2014
Average Day Demand (gpm)	3	
Use per person (gpcd)	65	Average Day Demand/Current Population
Annual Demand (ac-ft)	4.34	
Peak Day Demand (gpd)	11,235	Peaking Factor of 2.9 based 2010 PER (KLJ)
Peak Day Demand (gpm)	8	

### Devon and Dunkirk

Current Population	75	Based on MT DEQ PWS records, 2015; 25 households (Devon Water Inc.)
Use	Domestic/Lawn and Garden/Agricultural Crop Spraying	
Date First Served by Shelby	Not yet served	
Average Day Demand (gpd)	33,225	Source: average current use 2006-2012 records (personal communication, Roy Benjamin, Devon Water Inc., 2/4/2015)
Average Day Demand (gpm)	57.7	Orifice limiting system at 2.3 gpm/connection (personal correspondence, Mike O'Brien, TD&H, January 19, 2015)
Use per person (gpcd)	443	
Annual Demand (ac-ft)	37.22	
Peak Day Demand (gpd)	96,353	Based on peaking factor of 2.9; maximum established in agreement with Shelby is 120,000 gpd
Peak Day Demand (gpm)	57.7	

### Cut Bank

Current Population	3,105	Source: 2015 DEQ PWS records
Use	Supplemental municipal (domestic, commercial, industrial, lawn and garden)	
Date First Served by Shelby	Not yet served	
Average Day Demand (gpd)	349,650	Calculated from requested peak day demand with peaking factor of 2.86
Average Day Demand (gpm)	243	
Use per person (gpcd)	113	
Annual Demand (ac-ft)	391.66	
Peak Day Demand (gpd)	1,000,000	Maximum requested amount established with Shelby
Peak Day Demand (gpm)	694	

**Total Estimated Water Use Summary**

	City of Shelby	Prison	Ethridge	Big Rose	Devon/Dunkirk	Cut Bank	Total
Current Population	3,304	783	70	60	75	3,105 (supplemental)	<b>7,397</b>
Average Day Demand (gpd)	631,064	65,682	13,345	3,874	33,225	349,650	<b>1,096,840</b>
Average Day Demand (gpm)	438	46	9	3	58	243	<b>796</b>
Annual Demand (ac-ft)	706.88	73.57	14.95	4.34	37.22	391.66	<b>1,228.62</b>
Peak Day Demand (gpd)	1,672,320	173,755	35,304	11,235	96,353	1,000,000	<b>2,988,966</b>
Peak Day Demand (gpm)	1,161	121	25	8	58	694	<b>2,066</b>

The total historic diverted volume as presented above in Table NIR.3.B-2 is 1,124.90 acre-feet. This historic use includes Wells 1 and 3, which are being changed under a separate application, but are analyzed together since they are all part of the same well field. The water reservation adds an additional 161 acre-feet of volume available to the City for a total of 1,285.90 acre-feet. As shown above in the total estimated water use summary the annual demand is expected to be 1,228.62 acre-feet, which is less than the total volume available. The estimated total average day demand flow rate and peak day demand flow rate are both less than the sum of the flow rates of the water rights being changed under both applications. The proposed change will cause no adverse effect since the proposed use would be less than the total historic use plus the City's water reservation.

Historical diverted flow of the existing water rights plus the water reservation will not be exceeded under this proposed change and the change of Wells 1 and 3. Flow meters are present on the City of Shelby and other distribution points to each place of use so that diverted flow is monitored. During winter months total diverted flow rate cannot exceed the sum maximum flow rate for water rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, 41P 58129 00, and reservation 41P 71891 00 of 3,653.23 gpm. During summer months diverted flow rate can increase another 600 gpm with the addition of Wells 1 and 3. If the Shelby water service area experiences significant population growth or changes to existing water use patterns, or expects estimated water use to exceed historical volumes, new sources of water would need to be appropriated. The City has water service agreements with each of the communities served. These agreements serve as caps to ensure no community will receive more water than what they have purchased.

The legal descriptions of the proposed water service area (place of use) for the change are described below.

**Proposed Place of Use:**

Shelby		
Township	Range	Section
31N	02W	4, 9, 16, 21
32N	02W	5, 6, 8, 9, 14, 15, 16, 20, 21, 22, 23, 26, 27, 28, 29, 32, 33, 34, 35, 36
32N	04W	5, 6
33N	02W	6, 7, 18, 19, 30, 31
33N	03W	1, 12, 13, 24, 25, 36
33N	04W	31, 32
33N	05W	26, 27, 35, 36
34N	02W	30, 31
34N	03W	25, 36

Ethridge		
Township	Range	Section
31N	02W	7
31N	03W	1
32N	02W	18, 19, 30
32N	03W	4, 5, 6, 7, 8, 10, 11, 13, 14, 15, 17, 18, 20, 21, 22, 23, 24, 25, 36
32N	04W	1, 2, 4, 9, 10, 11, 12
33N	03W	17, 18, 19, 21, 27, 28, 33, 34
33N	04W	13, 22, 23, 24, 25, 26, 27, 34, 35, 36

Big Rose		
Township	Range	Section
34N	02W	19
34N	03W	24

Devon Dunkirk		
Township	Range	Section
30N	01E	1-36
30N	01W	1-36
30N	02E	1-36
30N	03E	1-36
31N	01E	1-36
31N	01W	1-36
31N	02E	1-36
31N	03E	1-36
32N	01E	1-36
32N	01W	1-36
32N	02E	1-36
32N	03E	1-36

Cut Bank		
Township	Range	Section
33N	05W	2, 3, 4, 5, 6, 7, 8, 9, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24
33N	06W	1, 2, 10, 11, 12, 13
34N	05W	1, 2, 3, 4, 5, 6, 7, 8, 17, 18, 19, 30, 31, 33, 34, 35
34N	06W	2, 3, 10, 11, 13, 14, 15, 24, 25, 36
35N	05W	20, 29, 32, 33

The water reservation has not yet been put to use, so therefore the historic diverted flow rate or volume of the reservation will not be exceeded. No changes to the operational function of the existing points of diversion will be made. The water reservation volume will be distributed among the 13 wells and will increase the amount of water pumped from each well by approximately 8 gallons per minute. The Findings of Fact for the City of Shelby water reservation states the following:

*F. OTHER FINDINGS RELATED TO BOARD DECISION (Montana Code Annotated §85-2-316(3)(B), (4) (a) (iv) (b), (5), (6), and (9) (e) (1991); ARM 36.16.107B(5) through (8).)*

*Number 30. As conditioned, the City of Shelby's water reservation will not adversely affect any senior water rights (ARM 36.16.107B(8).)*

#### **NIR.4.B Adverse Effect**

*Attach an explanation of what your plan is to not create an adverse effect to existing water rights, certificates, permits, and water reservations?*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

The City would operate all points of diversion associated with their municipal water rights as they have operated historically. Together the well field would divert no more than the historic volume shown in Table NIR.3.B-3 along with the additional volume provided in the City's water reservation. The seasonal and daily timing of diversions from the source aquifer would remain the same as historic diversion. Since the proposed use is less than the historical diverted flow of the existing water rights plus the water reservation under this proposed change and the change of wells 1 and 3, no adverse effect will be experienced by other water users. There is no adverse effect to existing water users from continuing to use this municipal water right. The amount of water that is diverted by the City of Shelby will be measured and recorded as part of the agreement the City has with each community. The City of Shelby and all proposed service areas will have flow meters installed on the primary distribution lines so that the volume of water provided to all service areas will be accurately monitored and recorded.

#### **Water Reservation:**

The water reservation has not yet been put to use. No changes to the operational function of the existing points of diversion will be made. The water reservation volume will be distributed among the 13 wells and will increase the amount of water pumped from each well by approximately 8 gallons per minute. The Findings of Fact for the City of Shelby water reservation states the following:

*F. OTHER FINDINGS RELATED TO BOARD DECISION (Montana Code Annotated §85-2-316(3)(B), (4) (a) (iv) (b), (5), (6), and (9) (e) (1991); ARM 36.16.107B(5) through (8).)*

*Number 30. As conditioned, the City of Shelby's water reservation will not adversely affect any senior water rights (ARM 36.16.107B(8).)*

#### **NIR.4.C Adverse Effect**

*Attach an explanation of when the last time water was appropriated and used beneficially to the extent identified in your water right? If there has been a period of non-use, explain why the water right was not used, and explain why a resumption of use will not adversely affect other water users.*

**Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

Water from the City's well field has continually been put to beneficial use by the City of Shelby since the first wells were put into service around 1940. Each well in the well field diverts a portion of the City's daily and annual municipal water demand. There has been no period of non-use. As documented in the 1988 Reservation Application the City has a history of also supplying water outside of their designated place of use. Some operational problems have resulted in temporary suspensions of two wells in the City's well field. Well Number 6 has been out of service since 2009 due to vandalism. The pump was turned on and ran continual when water level was lower than the pump intake and the motor burned out. Well Number 4 has been out of service since 2003. Undercutting of the river bank of the Marias River decreased the distance from the well to surface water and resulted in failure of the Microscopic Particulate Analysis (MPA) test. Since then, increased deposition along that bank has increased the distance from the well to the surface water. MPA testing will be conducted to evaluate if the well can be brought back on-line.

**Water Reservation:** Since the water reservation has not yet been put to use, there has been no period of beneficial use that can be analyzed.

#### **NIR.5 Adequate Diversion Means and Operation – ARM 36.12.1904**

##### **NIR.5.A Adequate Diversion Means and Operation**

*Is the means of diversion a well? If yes, provide a copy of the well log. If the well log is not available, who drilled the well?*

All points of diversion are wells. A copy of each well log is attached. There is no well log for the water reservation.

##### **NIR.5.B Adequate Diversion Means and Operation**

*Is another agency requiring you to measure your water use?*

Montana Department of Environmental Quality may require public water supply usage to be measured.

##### **NIR.5.C Adequate Diversion Means and Operation**

*Do you have any plans to measure your diversion and use? If yes, attach a description of the plan and the type of measurements you will take.*

**Water Reservation and Water Rights 41P 192878 00, 41P 192880 00, 41P 192881 00, 41P 192882 00, 41P 4489 00, 41P 4490 00, and 41P 58129 00:**

Water will be measured at multiple points throughout the City's transmission and pipeline systems. Water meter locations are shown on Map NIR.5.C.