



City of Roundup Water

2020 Preliminary Engineering Report

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1.0 EXECUTIVE SUMMARY

1.1 Introduction and Background

The City of Roundup is the county seat for Musselshell County and is located 50 miles north of Billings on the northern edge of the Bull Mountains in the Musselshell River Valley. The City has continuously battled major challenges related to their water distribution system and poor water quality. The purpose of this report is to identify all deficiencies within the water system, prioritize those deficiencies, and create a plan to mitigate them. The main deficiencies are related to the corroded condition of the cast iron water mains within the system, as well as inoperable valves and fire hydrants.

As part of this PER, a thorough analysis of the water system was conducted. Alternatives will be considered to address the problems noted with the existing conditions. The alternatives will consider improvements needed and provide recommendations for those improvements. This PER will also provide estimates and a funding strategy for those improvements.

1.2 Problem Definition

Distribution System:

The greatest challenge currently facing the City of Roundup is the physical condition of their distribution system. Approximately 13% of their water mains are cast iron pipe over 100 years of age. These pipes are rusted and deteriorated to the point that they severely impact the City's water quality, significantly decrease fire flow capacity and pose a significant health risk. **Iron concentration 68 times as high as the Maximum Contaminant Level specified in the National Secondary Drinking Water Quality Regulations (NSDWQR) have been observed under normal operating conditions.** The degradation of water quality is primarily attributed to the rust buildup in the cast iron mains.

The City's existing water system has proven ineffective in supplying water for fire suppression. During two house fires in 2013, the City Fire Department was unable to adequately fight the fires because of their fire hoses clogging from chunks of rust and low water flow. Additionally, during the house fire of 2014, only one fire hydrant was within 1,000 feet of the homes and it is attached to a 4" diameter cast iron main. The fire department was unable to knock down the fire and it

quickly spread to the adjacent homes. In total, two of the three homes involved were completely destroyed. The City is also hesitant to open fire hydrants for fear that they will plug up with chunks of rust or that they will not re-seal when they are closed. Potential catastrophic failure of a pipe is also a concern when opening hydrants.

Most of the existing cast iron mains are undersized for fire protection. Approximately 38% of all cast iron mains are 4" diameter with nearly a 1" thick layer of rust on the inside wall. This makes them hydraulically equivalent to a 2" diameter main. Consequently, over 7% of the distribution system is unable to provide minimum fire flows specified by the National Fire Protection Agency as determined from computer water modeling of the system that was conducted as part of this PER. Figure 1.1 illustrates the typical condition of the cast iron mains in which the residents' drinking water flows. This pipe was replaced as part of Phase 3 in 2016.

The aged system has posed high maintenance demands on the City. In recent years an excessive amount of time has been required to repair water leaks on the cast iron mains. Many of the water valves in the old cast iron portions of the system have been rusted into the open position. This makes it very difficult for the City to isolate portions of their system to make repairs.

The City has repaired 49 water main leaks in the last six years, 30 of which were on cast iron water mains. The frequency of repairs in the system is about 0.36 per year per mile of cast iron pipe. Proportionately, the City of Roundup repairs over two times as many leaks as should be expected for a typical distribution system. The number of leaks is expected to increase as these mains continue to age.

Since 2000, the City has spent over \$2.3 million dollars of reserves and taken almost \$1.6 million dollars in loans to complete water main replacement projects, in addition to over \$260,000 spent for capital planning documents to make improvements to the water system.

Figure 1.1: 4-Inch Cast Iron Main Condition



Financial Status:

The City of Roundup has taken a very proactive approach to correct these deficiencies. Over the last several years they have consistently increased water user rates as an attempt to finance capital improvement projects. Water rates have almost tripled since 1997 from \$14.98 to \$62.40 per month. Current water rates are 168.3% of the City's target rate for combined water and wastewater as determined by the income survey held in May and June 2017.

1.3 Alternatives Considered

Five alternatives were considered to address the major concerns with the distribution system. Some of the alternatives were not considered feasible and were eliminated in a preliminary screening process. The three feasible alternatives which were further evaluated in greater detail were:

Distribution System Alternatives:

- Alternative D-2:** Replace all cast iron water mains within the system with PVC water mains with a minimum diameter of 8".
- Alternative D-3:** Complete all the improvements in Alternative D-2, plus replace three blocks of existing 4" PVC main in 8th Avenue with 8" PVC.
- Alternative D-4:** Complete all improvements in Alternative D-2 and D-3, plus replace remaining existing 4" main with new 8" PVC main, and add hydrants.

1.4 Preferred Alternative

After a detailed analysis of the alternatives, the following alternative was recommended:

- Alternative D-3:** Complete all of the improvements in Alternative D-2, plus replace three blocks of existing 4" diameter PVC in 8th Avenue with 8" diameter PVC.

However, the City will not be able to fund the entire \$4.6 million in one project. The next phase for main replacement is located in Fourth Street East, Third Street East, 16th Avenue, 13th Avenue and 10th Avenue. This will be known as Phase 6 and includes replacement of up to approximately 6,000 feet of cast iron water main, installation of fire hydrants and valves at each intersection as shown on Figure 1.2. Phase 6 will require replacement of existing water main within MDT right-of-way and a utility occupancy permit from MDT for the work in the highway will be required.

The actual phasing of the improvements may vary some between projects, depending on funding and maintenance needs. Phasing for the remainder of the water main replacements will be determined based on the concentration of leaks, lack of available fire flow, the size of the main and benefits to City residents.

Table 1.1 shows the estimated cost of Alternative D-3.

Table 1.1: Cost Estimate of Alternative D-3

Item #	Description	QTY	UNITS	UNIT PRICE ¹	TOTAL
1	8" Dia. PVC Water Main	10,950	LF	\$ 49.00	\$ 536,550
2	10" Dia. PVC Water Main	1,820	LF	\$ 55.00	\$ 100,100
3	8" Gate Valves	69	EA	\$ 1,800.00	\$ 124,200
4	10" Gate Valves	4	EA	\$ 2,100.00	\$ 8,400
5	8" Dia. DI Water Main	120	LF	\$ 80.00	\$ 9,600
6	Fire Hydrants	18	EA	\$ 6,300.00	\$ 113,400
7	DI 90-deg Elbows	3	EA	\$ 840.00	\$ 2,520
8	DI Tees	9	EA	\$ 1,550.00	\$ 13,950
9	DI Crosses	7	EA	\$ 1,850.00	\$ 12,950
10	Connect to Existing Main	39	EA	\$ 1,900.00	\$ 74,100
11	1" Water Service Corp and Curb Stop	120	EA	\$ 900.00	\$ 108,000
12	1" Water Service Line	3,600	LF	\$ 60.00	\$ 216,000
13	AC Pipe Disposal	200	LF	\$ 15.00	\$ 3,000
14	Landfarm Hydrocarbon Soil	2,740	CY	\$ 25.00	\$ 68,500
15	Imported Backfill	200	CY	\$ 30.00	\$ 6,000
16	Pavement Surface Restoration	16,100	LF	\$ 50.00	\$ 805,000
17	Underground Utility Crossings	55	EA	\$ 500.00	\$ 27,500
18	Flowable Fill	400	CY	\$ 160.00	\$ 64,000
19	Curb & Gutter Remove & Replace	1,150	LF	\$ 35.00	\$ 40,250
20	Concrete Replacement	2,000	SF	\$ 25.00	\$ 50,000
21	Bore & Jack Highway Crossings	400	LF	\$ 360.00	\$ 144,000
Subtotal: 2020 Direct Construction Cost					\$ 2,529,000
	Mobilization		10.0%		\$ 252,900
	Traffic Control		1%		\$ 25,300
Subtotal: 2020 Construction Cost					\$ 2,808,000
	2022 Construction Cost ²		3.0%	annually	\$ 2,979,000
	Contingency		10%		\$ 298,000
Subtotal: 2022 Construction Cost					\$ 3,277,000
	Geotechnical Investigation				\$ 30,000
	Engineering		18%		\$ 590,000
	Legal & Administrative		3%		\$ 99,000
TOTAL: 2022 CAPITAL COST					\$ 3,996,000

¹ Estimated unit costs are based upon estimates from suppliers and bid tabs for similar projects throughout Montana.

² The ENR 20 year average Construction Cost Index is +3.09% (as of Dec 2017). Capital improvement costs are projected to 2020 using 3.0% factor.

1.5 Project Costs and Budget

The proposed Phase 6 Improvements includes replacement of fifteen blocks of water distribution main. The proposed Phase 6 Improvements includes:

- Schedule 1: Fourth Street East from 16th Avenue to 10th Avenue, 16th Avenue North from Fourth Street East to Third Street East, 13th Avenue from Fourth Street East to Second Street East, and 10th Avenue from Fourth Street East to Second Street East.
- Schedule 2: Third Street East from 16th Avenue to 13th Avenue.

The total estimated capital cost for the Phase 6 is \$1.6 million, which is detailed in Table 1.2. Various funding sources for the improvements were considered in Chapter 8 and included a variety of grant and low interest loan sources available to the City. The recommended funding strategy includes utilizing funds from the City funds, Treasure State Endowment Program (TSEP), Department of Natural Resources (DNRC-RRGL) and Community Development Block Grant (CDBG).

Table 1.2: Summarized Cost Estimate of Phase 6 Water System Improvements

Description	Base Project	Additive Alternates	Total Project
	Schedule 1	Schedule 2	
Linear Feet Replaced	4,840	1,110	5,950
2022 Construction Cost	\$ 1,039,000	\$ 287,000	\$ 1,326,000
Contingency	\$ 104,000	\$ 29,000	\$ 133,000
Total Construction Cost	\$ 1,143,000	\$ 316,000	\$ 1,459,000
Engineering	\$ 210,000	\$ 58,000	\$ 268,000
Legal and Administrative	\$ 34,000	\$ 9,000	\$ 43,000
Total Project Costs	\$ 1,387,000	\$ 383,000	\$ 1,770,000

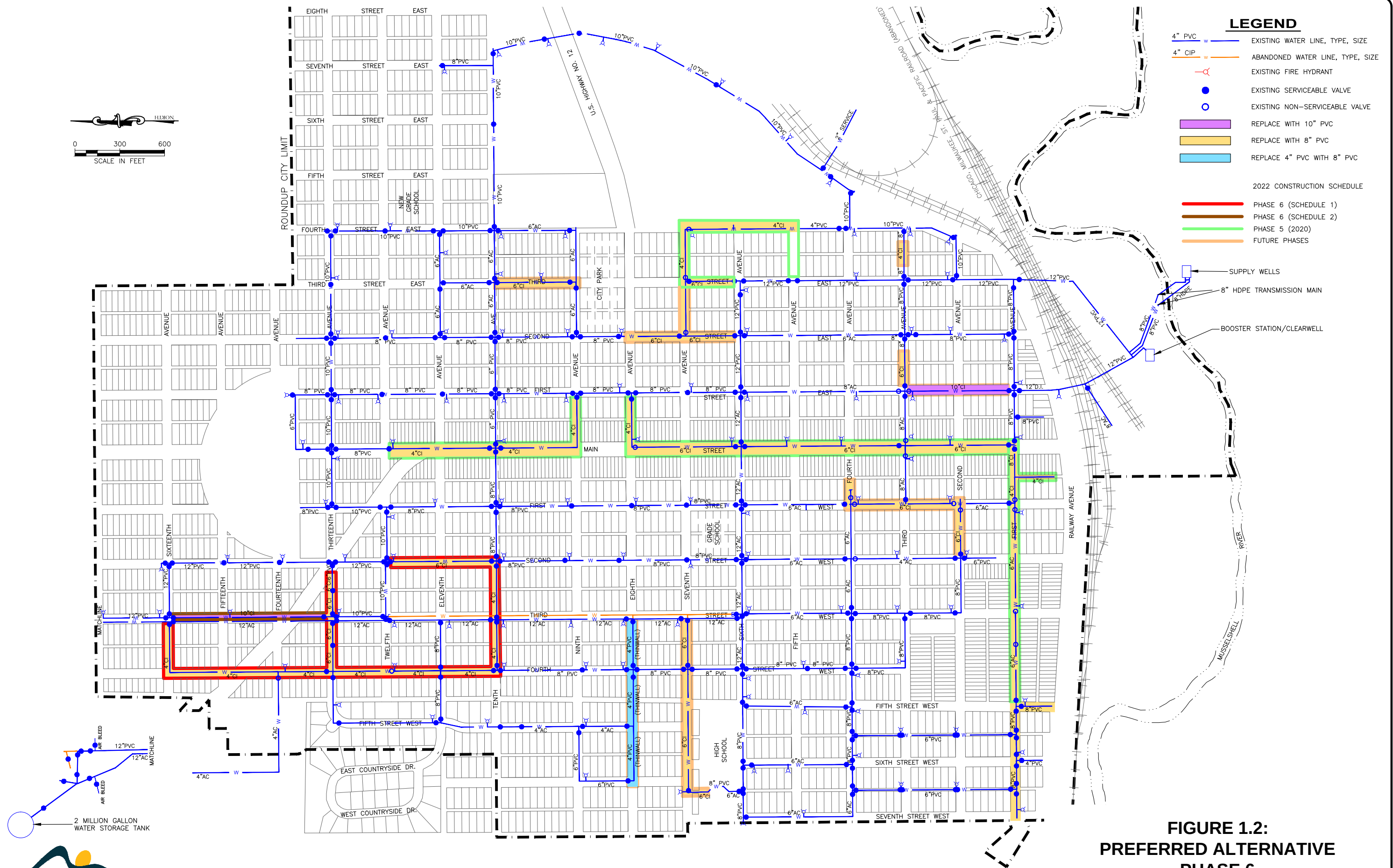
Table 1.3 presents a detailed project budget based upon the proposed funding strategy. Since obtaining grants is very competitive, the City also has a contingency plan in case they are not awarded a grant from one or more agencies. Should the City not receive a TSEP, DNRC, or CDBG grant, they will either reduce the amount of improvements within Phase 6 or contribute

more from reserves to make up the difference. With a large water rate increase coming with the connection to the CMRWA, estimated at \$35/EDU, they want to limit the amount of debt they incur to keep their rates from increasing even more. Figure 1.2 shows the proposed Phase 6 improvements.

Table 1.3: Funding Strategy

City of Roundup FUNDING OPTIONS FOR Phase 6 Water System Improvements		
ITEM	SCENARIO #1	SCENARIO #2
	TSEP, DNRC, CDBG w/Town Reserves & SRF Loan	TSEP and CDBG w/Town Reserves & SRF Loan
Phase 6 Water System Improvements	\$1,770,000	\$1,770,000
Rounded Total	\$1,770,000	\$1,770,000
TSEP	\$750,000	\$750,000
DNRC	\$125,000	\$0
CDBG	\$450,000	\$450,000
City of Roundup	\$445,000	\$445,000
Total Project Funds	\$1,770,000	\$1,645,000
SRF Bond Reserve (1/2 year payment)	\$0	\$0
Total Loan Amount	\$0	\$0
Annual Loan Payment	\$0	\$0
Total Loan Payments Over Life of Loan	\$0	\$0
Total Interest Paid Over Life of Loan	\$0	\$0
Annual Loan Coverage	\$0	\$0
TOTAL ANNUAL CAPITAL DEBT SERVICE COST	\$0	\$0
User Capital Cost/Month	\$0.00	\$0.00
Current Annual O&M ¹	\$229,986	\$229,986
Current Annual Debt Service	\$138,313	\$138,313
Short Lived Assets	\$15,000	\$15,000
Reserves for Emergency Repairs	\$100,000	\$100,000
Reserves for Future Improvements	\$127,000	\$127,000
TOTAL ANNUAL O&M COSTS	\$610,299	\$610,299
User O&M Cost/Month	\$62.40	\$62.40
USER COST/MONTH FOR PROJECT²	\$62.40	\$62.40
Existing Average User Cost/Month	\$62.40	\$62.40
COST/MONTH INCREASE/EDU	\$0.00	\$0.00
Existing Other System Cost/Month	\$29.66	\$29.66
Total Proposed Water & Sewer Cost/Month	\$92.06	\$92.06
Combined Systems Target Rate	\$54.70	\$54.70
PERCENT OF COMBINED TARGET RATE	168.3%	168.3%

¹ Based average O&M for last five fiscal years.² Table is based on an estimated 815 water users.



2.0 PROJECT PLANNING

The City of Roundup was founded in the early 1900s and in 1911 became the county seat for Musselshell County.

The planning and service area considered in this report is all land located within the City limits. Large areas of undeveloped land in the east and northern parts of the City are the most likely location for growth over the next 20 years. The undeveloped portions of land located adjacent to U.S. Highway 12 are planned for commercial business. Heavy industrial use is planned for the undeveloped land in the southeast corner of the City. A new elementary school was recently constructed in the northeast corner of the City. Most of the remaining undeveloped land is planned for residential growth with a small area of light industrial anticipated in the northeast part of the City.

2.1 Location

The City of Roundup is located approximately 50 miles north of Billings at the junction of Highway 12 and Highway 87. The City lies in the Musselshell River Valley, on the northern edge of the Bull Mountains. The Musselshell River borders the south side of the City. The City lies within Sections 12, 13 and 14 of Township 8 North, Range 25 East, at Latitude 46°26'55" North, Longitude 108°32'31" West.

The City is surrounded by rolling hills. The ground slopes gently to the south toward the Musselshell River. Elevations vary across the City from about 3,200 feet to 3,300 feet above sea level. Surrounding hills consist of patches of forest, grassland and rock outcroppings. Agriculture use includes mostly grazing and farming. All improvements take place inside City boundaries similar to the area shown in Figure 2.1. Figure 2.2 shows a topographic map of the City and surrounding area.

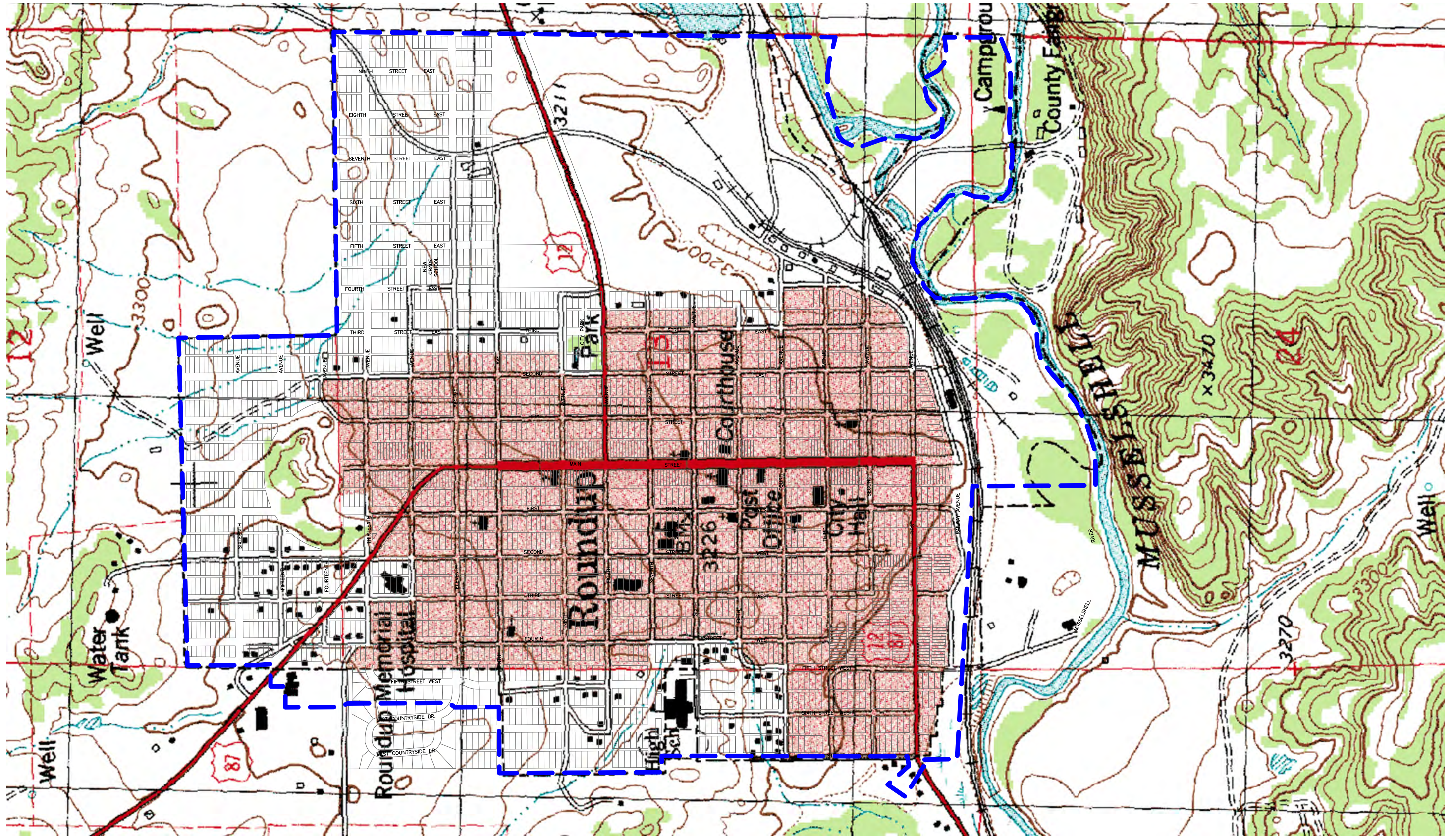
Figure 2.1: Downtown Roundup

2.2 Environmental Resources Present

As part of any major construction project, potential environmental impacts should be considered, and provisions should be made to mitigate any negative impacts. To identify any potential impacts with the water improvement projects recommended in later chapters of this report, various local, state, and federal agencies were consulted. The correspondence from these agencies along with other research information presented in this chapter provided the basis for completing the Uniform Environmental Checklist (included in Appendix A). As shown in the checklist no negative environmental impacts are anticipated to result from the recommended water main replacement alternatives.

2.2.1 Land Resources

The project planning area includes primarily urban land as confirmed by from the NRCS Web Soil Survey – See Appendix B. The land within City limits is all classified as urban land, while the land immediately surrounding the City is primarily grazing land and open-space. Information obtained regarding the soils in the area confirmed that most of the planning area is not considered to be prime farmland. There is one area, however, in the northeast portion of the City with soil



LEGEND

--- CITY LIMITS/DISTRICT BOUNDARY



FIGURE 2.2
TOPOGRAPHIC MAP OF CITY AND
PANNING AREA

CITY OF ROUNDUP
2020 WATER PER-PHASE 6

designated as farmland of statewide importance. This soil only covers a fraction of the overall planning area, and much of it has already been developed.

All recommended improvements within the City are confined to water main replacement projects within existing roadways and alleys. Therefore, there are no anticipated impacts to farmland of statewide importance. There are also no anticipated changes to land use in any other areas of the City with the recommended improvements. Thus, no negative impacts to land resources are expected.

2.2.2 Biological Resources

A search of species of concern was conducted through the Natural Heritage Program website. Several species of concern were found in the vicinity of Roundup. These species are listed in Table 2.1 with rankings from various government agencies.

Table 2.1: Species of Concern for Roundup

SPECIES OF CONCERN	GLOBAL RANK	STATE RANK	USFS	BLM
Townsend's Big-Eared Bat (Mammal)	G3, G4	S3	SENSITIVE	SENSITIVE
Black-tailed Prairie Dog	G4	S3	SENSITIVE	SENSITIVE
Spotted Bat	G4	S3	SENSITIVE	SENSITIVE
Eastern Red Bat	G3, G4	S3		
Hoary Bat	G3, G4	S3		
Little Brown Myotis	G3	S3		
Spiny Softshell Turtle (Reptile)	G5	S3		SENSITIVE
Western Milksnake	G5	S2	SENSITIVE	SENSITIVE
Greater Short-Horned Lizard (Reptile)	G5	S3	SENSITIVE	SENSITIVE
Great Plains Toad (Amphibian)	G5	S2	SENSITIVE	SENSITIVE
Sprague's Pipits (Birds)	G3, G4	S3B		SENSITIVE
Golden Eagles	G5	S3		SENSITIVE
Great Blue Heron	G5	S3		
Ferruginous Hawk	G4	S3		SENSITIVE
Chestnut-collared Longspur	G5	S2B		SENSITIVE
Greater Sage-Grouse (Upland Game Birds)	G3, G4	S2	SENSITIVE	SENSITIVE
Baird's Sparrow	G4	S3B		SENSITIVE
Mountain Plover	G3	S2B		SENSITIVE
Pinyon Jay	G5	S3		

Cassin's Finch	G5	S3		
Loggerhead Shrike	G4	S3B		SENSITIVE
Long-billed Curlew	G5	S3B		SENSITIVE
Sage Thrasher	G4	S3B		SENSITIVE
McCown's Longspur	G4	S3B		SENSITIVE
Brewer's Sparrow	G5	S3B		SENSITIVE
Northern Redbelly Dace (Minnow)	G5	S3		
Northern Redbelly X Finescale Dace	GNA	S3		SENSITIVE
Scribner's Ragwort (Plant)	G5, T2, T3	S2, S3		

The global ranking (G) is for range-wide ranking of the species, and the state ranking (S) is a ranking that is state specific. The rank of the species ranges from 1 to 5 with a 1 being critically imperiled and a 5 being demonstrably secure. Thus, the numerical ranking reflects the degree to which the species is at risk. In summary, all of the species of concern are generally globally common, widespread and abundant or not rare. State wide species are generally not rare or potentially at risk with the exception of the sage grouse and great plains toad. It should be noted that since the water system improvements will take place within existing streets and alleys, none of these biological resources are expected to be adversely affected.

2.2.3 Water Resources

Groundwater

Much of the information in this section was gathered from a document entitled *Draft Source Water Delineation & Assessment Report* (DSWDAR) prepared by the DEQ in January 2005. The purpose of the report was to provide information that would assist the City of Roundup with protection of their water supply.

The City of Roundup's water supply is groundwater drawn by two wells located on the south side of the Musselshell River. The wells are located within the same well house, both draw water from a flooded void of an abandoned coal mine known as *Republic Number 1*. The mine is constructed in consolidated sandstone bedrock. The aquifer is recharged mostly by infiltration of precipitation and surface water in the Bull Mountains south of Roundup. Appendix E contains a map from the DSWDAR showing the boundary of recharge area.

Although there are currently no violations of EPA's enforceable maximum contaminant levels (MCL), the water quality from this groundwater supply is considered to be poor. There are high amounts of total dissolved solids, iron, manganese and sulfate all of which exceed EPA's National Secondary Drinking Water Regulations (NSDWR).

The wells have an estimated yield of 1,150 gallons per minute. The City owns water rights to pump a maximum flow of 2,100 gallons per minute or a total of 2,240 acre-feet per year from each well (See Appendix F for water rights). The City currently only pumps about 350 acre-feet per year.

Surface Water

The south side of the City is bordered by the Musselshell River which has its headwaters in the Little Belt Mountains approximately 100 miles west of the City. Since the wells are nearly 100 feet deep, surface water does not have any influence on the City's water supply.

Figure 2.3: Riverwalk Trail and Musselshell River



2.2.4 Floodplains

The Federal Emergency Management Agency (FEMA) Map Service Center website was reviewed for floodplain maps of the area. Appendix B contains a copy of the Flood Insurance Rate Maps (FIRM) for the area of Roundup (Panel No. 3000050 0001 B). An area in the southwest region of the City and all land on the south side of Railway Avenue near the Musselshell River are located in a Zone AE floodplain. These areas are estimated to have a 1% annual chance of flooding (100-year floodplain) and a 26% chance of flooding over the life of a 30-year mortgage. Small areas around this are considered to be in the 500-year floodplain or having a 0.2% annual chance of flooding. However, most of the remainder of the City is classified outside of floodplain. Figure 2.4 shows a map of the floodplain.

Some of the City's water system is located within the area of the floodplain. This includes the wells located on the south side of the Musselshell River, the well house located near the river on the south side, the transmission lines from the well to the distribution system, and the portion of the distribution system lying west of 1st West Street and south of 3rd Avenue.

The floodplain was very well identified in 2011 when the Musselshell River flooded and severely damaged low-lying areas of the City. No portion of the proposed Phase 6 project is located within the area classified as Zone AE, so a floodplain permit will not be required.

2.2.5 Wetlands

The Natural Heritage Program and US Fish and Wildlife Service's websites were searched for wetlands mapping of the area. There are some wetlands in the proximity of some of Roundup's water facilities adjacent to the Musselshell River, but since none of the recommended system improvements will be completed there, a wetlands delineation survey is not necessary.

2.2.6 Cultural Resources

The Montana Register of Historic Places lists two historical sites within the City of Roundup. The names, addresses, dates listed and national register number for both sites are given in Table 2.2.

Table 2.2: Registered Historic Places in Roundup, Montana

Name	Address	Date Listed	NR No.
Roundup Center School	600 1 st Street West	12/6/2007	07001243
St. Benedict's Catholic School	524 1 st Street West	7/21/1988	88001120

Neither of these resources would be impacted by the recommended improvements. The State Historical Preservation Office (SHPO) was also consulted for input on cultural resources and they confirmed that recommended improvements have a low likelihood of impacting any cultural resources. SHPO specifically stated that “there is a low likelihood cultural properties will be impacted.” Correspondence with SHPO is included in Appendix A.

2.2.7 Socio-economic and Environmental Justice Issues

According to the Montana Department of Commerce, median household incomes were at \$30,609 in 2016. However, the City felt this information was not representative, so an income survey was conducted in 2017. Questionnaires on the approved CDBG and RD example forms that were provided by CDBG administration were sent to all residents by the City and results were tallied by Great West Engineering. The form requested both their annual income and the number of individuals in their households. This revealed an MHI of \$28,538 and a low-to-moderate income (LMI) level of 60.0%. A copy of the cover letter, RD and CDBG compliant survey sent to the residents, the raw data collected, 2017 HUD income limits used and the email message from TSEP accepting the results of the income survey are included in Appendix O. Low income is defined as a family earning less than 50% of the median income for the county and moderate income is defined as 50% to 80% of the median income.

Regardless of income levels, it should be noted that the water system serves the entire community and any proposed improvements will impact residents equally. By replacing the dilapidated distribution system, the large amounts of rust, which contain excessive amounts of iron and manganese, will be removed. This will not only improve the condition of the drinking water which improves the overall health of the community, but also will help the City provide fire protection which improves the quality of life for all residents. Two structural fires completely destroyed

homes in July and August 2013, mainly because the water system could not provide adequate protection and rust chunks clogged filters in the fire trucks. Additionally, during a house fire in 2014, only one hydrant was within 1,000 feet and was connected to a 4" diameter cast iron main. The fire quickly spread to the two adjacent homes because of inadequate fire flow and in total, two of the three homes involved were completely destroyed.

Figure 2.5 shows one of the fires. Although the area in which the 2013 fires occurred has been updated, many other areas of Roundup remain in this condition and will be in the same situation if a fire event occurs in these neighborhoods.

Figure 2.5: Home Destroyed by Fire July 2013



2.3 Population Trends

Roundup typically holds nearly 40% of the population of Musselshell County. The City and County have both seen a general decrease in population from the 1920s, although there have been population growth and decline cycles mostly based on local energy resources, mainly coal and oil.

Table 2.3 gives a summary of the historical populations from 1920 to 2015 and population projections for the next twenty years for both Roundup and Musselshell County based on data published by the U.S. Census Bureau.

Table 2.3: Historic Population and Projected Population

Census	City of Roundup		Musselshell County	
	Population	% Annual Growth	Population ¹	% Annual Growth
1920	2,434	--	12,030	--
1930	2,577	0.57%	7,242	-4.95%
1940	2,644	0.26%	5,717	-2.34%
1950	2,856	0.77%	5,408	-0.55%
1960	2,842	-0.05%	4,888	-1.01%
1970	2,116	-2.91%	3,734	-2.66%
1980	2,119	0.01%	4,428	1.72%
1990	1,808	-1.57%	4,106	-0.75%
2000	1,931	0.66%	4,497	0.91%
2010	1,788	-0.77%	4,538	0.09%
2015	1,836	-0.34%	4,582	0.12%
2020	1,930	1.00%	4,816	1.00%
2030	2,132	1.00%	5,320	1.00%
2040	2,355	1.00%	5,876	1.00%
2045	2,475	1.00%	6,176	1.00%

¹ Projected 20-year population for Musselshell County based on eREMI projections.

Although a population decline has been the recent average for the City, there is optimism the City and the County will see an increase in population. The Signal Peak Coal Mine has been seeking expansion which will bring more jobs and population to the area. Although the population and economic impacts of this activity are hard to gauge, they must be accounted for in future population projections. Therefore, it is anticipated the City will see an annual 1.0% annual population increase with this industry expansion. In further chapters, each proposed alternative will assume a total population for year 2045 of 2,475 residents for evaluation purposes of each alternative. This design population will allow for future system expansion if the City experiences a population increase while limiting the cost to the current residents by not over sizing the system.

2.4 Community Engagement

In 2010 and again in 2016, the City completed community-wide Needs Assessments. Overwhelmingly, the residents' largest concern is the condition of the City water system. A copy of both of the Needs Assessments are located in Appendix M. The 2016 Needs Assessment was an online survey that was advertised in the paper, on the City's website and on Facebook. Additionally, the City completed two income surveys in 2015 and 2017. These income surveys were mailed to all water users.

A public hearing was held on March 6, 2018 to inform the public about availability of TSEP, CDBG and DNRC funds and to acquire input on what projects the City may be interested in applying for these funds. At the same time, a hearing on the updated Capital Improvements Plan (CIP) was held.

On April 3, 2018, a public hearing was held for the discussion of the environmental assessment (EA), and whether or not a full environmental impact survey would be necessary. It was determined there is no need for a full environmental assessment to be completed. Resolutions accepting the PER, the CIP, and the EA were signed by the Council along with the resolution for the City to apply for grant funding from TSEP, CDBG, and DNRC as well as committing City funds to the Phase 5 project. During both public hearings, discussions were held to advise the citizens of costs, service levels, the need for the project, and potential rate impacts.

These hearings were both advertised in the local paper, as well as on the City's Facebook page and the City's website. Copies of both the web pages and the affidavits are located in Appendix N.

Other hearings regarding the water system improvements were conducted with grant applications in 2010, 2012, 2014, 2015, 2016 and 2017. The City and the public were all as supportive of the project then as they are now, and strongly support the approach to phasing the improvements to maximize leverage of City funds and minimize debt to the City.

3.0 EXISTING FACILITIES

A large portion of the City of Roundup's water system was constructed in the early 1900's. Some of the original cast iron water mains are still in service from the original installation.

The current water source for the City is two wells located just south of the city on the southern bank of the Musselshell River. These wells are drilled into an abandoned mine shaft that has filled with water and are capable of producing over 1,100 gallons per minute (gpm) of water, which is adequate to supply the City. Until 2011, water from these wells would be pumped to a clearwell/infiltration gallery north of the river, where the water was chlorinated and released into the rest of the distribution system. When the City was flooded in 2011, the river washed out the transmission main from the wells to the clearwell, and the infiltration gallery was the only water source for the City. There was some speculation from DEQ whether or not the infiltration gallery was under the influence of surface water. In 2012, the City installed new transmission mains drilled into bedrock underneath the river and new pumps in the well house in order to bypass the infiltration gallery and clearwell in order to remove the concern related to the potential of surface water influence.

3.1 Location Map

Roundup's water system consists of source wells, a well house with booster pumps, transmission and distribution mains, hydrants, a large storage reservoir, water services and water meters. Distribution main sizes range from 4" to 12", and the types of pipe vary from cast iron, asbestos cement, PVC and ductile iron. A section of ductile iron main was installed in 2012 as part of the Phase 1 improvements project due to hydrocarbons found in the trench. Another section of ductile iron is planned for Phase 5 Improvements. A map of the existing system is shown in Figure 3.1.

3.2 History

In the 1920s Roundup's water supply system consisted of several sources, including two 7-inch diameter wells drilled 150 and 200 feet into the sandstone below the Roundup coal bed, two infiltration galleries in the alluvium soil along the Musselshell River, and a well measuring 16 feet by 8 feet that was 35 feet deep into the alluvium of the river.

In the 1970s the infiltration galleries were no longer used as the main water source due to low yield and production of rust and sediment. The infiltration gallery caisson continued to be used as a clear well and a backup source, which was utilized in 2011 as the flooding took out the well house and transmission main. The City intends to keep the infiltration gallery as a backup water source until the connection to the Central Montana Rural Water Authority is completed.

Today, the main source consists of two wells located south of the river. One of the wells was drilled in 1977, while the other does not have data stating when it was completed, but it is believed to have been completed at approximately the same time as the first well. All water sources used in the 1920s have since been abandoned.

Water storage was originally provided by a 1-million-gallon reservoir, which was built in the 1920s. In 1982, the City installed a 2-million-gallon reservoir and took the original 1-million-gallon reservoir out of service.

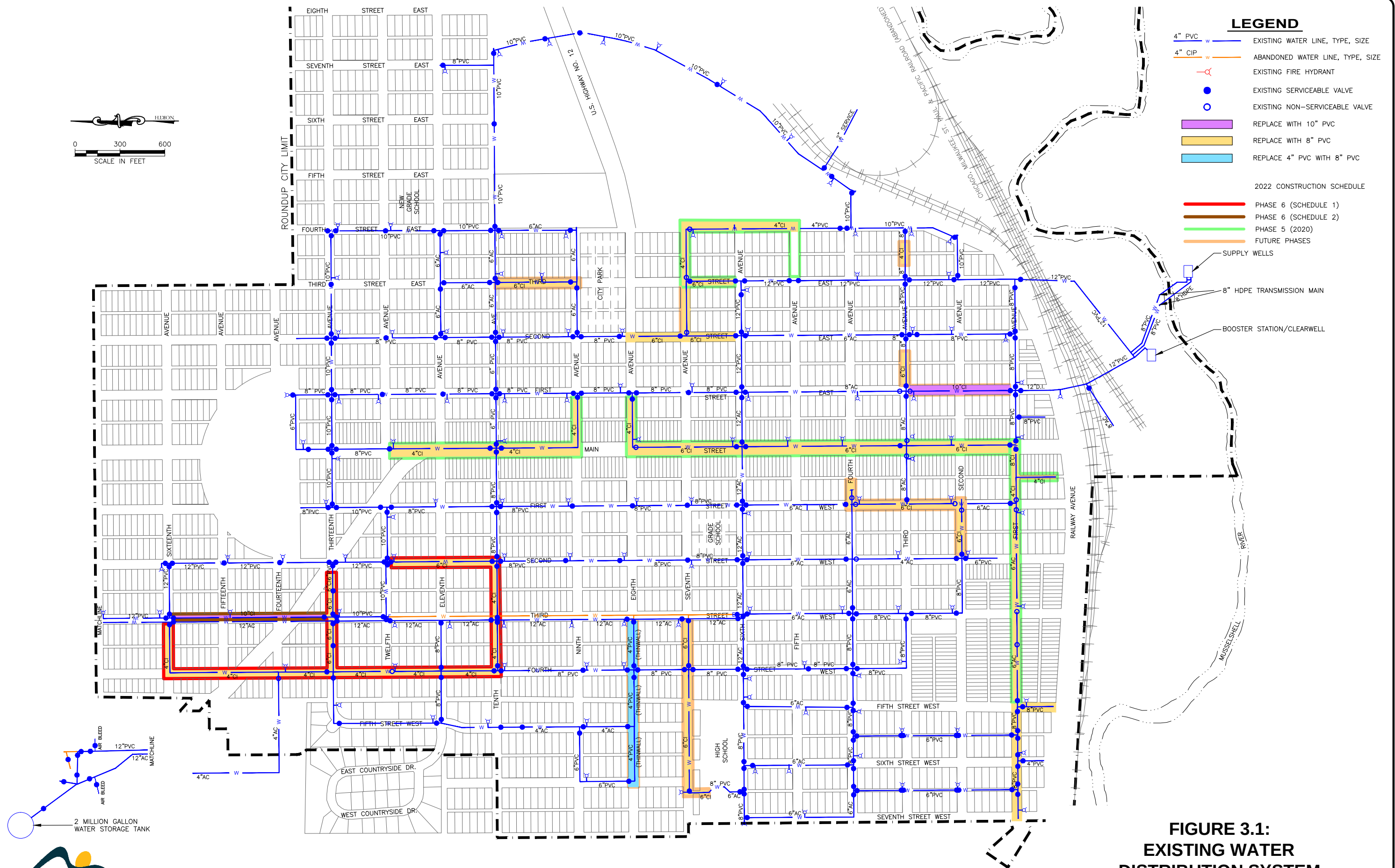
The first distribution mains were cast iron mains installed in 1915. Some of these mains, now over a century old, still make up over 13% of the overall system, which is 11,440 linear feet. Table 3.1 shows the estimated inventory of distribution system mains.

Table 3.1: Distribution System Inventory

Pipe Size	Length (ft)					Total (ft)
	AC	CI	PVC	HDPE	DI	
4"	4,340	4,400	1,880			10,620
6"	10,050	5,115	4,410			19,575
8"	2,200	105	29,405	535	700	32,945
10"		1,820	9,285			11,105
12"	6,990		7,290		480	14,760
Total	23,580	11,440	52,270	535	1,180	89,005

In recent years the old cast iron mains have required a significant number of repairs as they continue to age and deteriorate. Without grant funding, the City is only able to replace these mains at a rate of approximately 600 feet (approximately 2 blocks) every other year. With such a large quantity, complete replacement could take up to 60 years without additional funding.

The City has not had any violations of enforceable state or federal regulatory requirements on the water system.



**FIGURE 3.1:
EXISTING WATER
DISTRIBUTION SYSTEM**

CITY OF ROUNDUP
2020 WATER PER-PHASE 6

In 2012, the City began an aggressive program to replace the cast iron mains. The following describes the first four phases of improvements:

- **Phase 1 (2012):** Replacement of 3,220 lineal feet of 4-inch cast iron distribution main with 6-inch and 8-inch PVC water main and replacement of the original transmission main that was washed out during the 2011 flooding. The project also bypassed the existing clearwell/infiltration gallery, which was being used as a chlorine contact basin by installing new pumps in the existing well house. This infiltration gallery is still able to be used as a backup water source for the City should the need ever arise. Total project cost was \$1.22 million.
- **Phase 2 (2014):** Replacement of approximately 5,100 lineal feet of 4-inch cast iron main with new 8-inch PVC main, abandoning in place approximately 2,300 lineal feet of 4-inch cast iron water main and connecting the services to the parallel 12-inch AC main. Additionally, new water meters were installed on all connections in the City. The total project cost was \$1.93 million.
- **Phase 3 (2016):** Replacement of approximately 4,500 lineal feet of 4-inch cast iron main, 2,230 lineal feet of 6-inch cast iron main, 1,000 lineal feet of 8-inch cast iron main and 1,050 lineal feet of 10-inch cast iron main with 8-inch, 10-inch or 12-inch PVC. The total project cost was \$1.9 million.
- **Phase 4 (2018):** Replacement of approximately 400 lineal feet of 4-inch cast iron main and 2,800 lineal feet of 6-inch cast iron main with 8-inch PVC, as well as installation of 1,075 lineal feet of new 10" PVC to ensure the school has adequate fire flow. The total project cost was \$850,000.
- **Phase 5 (2020):** Replacement of approximately 3,520 lineal feet of 4-inch cast iron main, 2,930 lineal feet of 6-inch cast iron main, 215 lineal feet of 8-inch cast iron main and 1,360 lineal feet of 6-inch AC main with 8-inch PVC main. The project will be done in the spring and summer of 2020 and the anticipated cost is \$2,400,000.

3.3 Condition of Existing Facilities

The greatest challenge currently facing the City of Roundup is the physical condition of their distribution system. Approximately 13 percent of their water mains are cast iron pipe over 100 years of age. These pipes are rusted and deteriorated to the point they severely impact the City's water quality, impede fire flow capacity and pose a significant health risk.

3.3.1 Supply

Two groundwater wells on the south side of the Musselshell River serve as the City's primary water source. These wells were drilled into an abandoned mine shaft known as Republic No. 1. Although well log information for the two mine shaft wells is incomplete, it is known that both wells were drilled to a depth of 105-feet in 1977. The casing extends to 81-feet with the remaining 24-feet open. The second well is only used for backup. In 1999, the Montana Bureau of Mines and Geology (MBMG) determined the source is groundwater and is not being influenced by surface water. The two wells are considered by DEQ to be one source since they draw water from the same mine void and they are located only about 10-feet apart. Each well can pump up to 1,000 gpm and combined will pump up to 1,150 gpm.

As stated, the City also utilizes the clearwell and infiltration gallery as a backup water supply.

Water Quality:

Although there are no violations of EPA's enforceable maximum contaminant levels (MCLs), the water quality in Roundup is very poor. The amounts of total dissolved solids (TDS), iron, manganese and sulfate all far exceed the National Secondary Drinking Water Regulations (NSDWR). These values are shown in Table 3.2. NSDWR are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or adversely affect taste, odor and color. EPA recommends secondary standards to water systems but does not require systems to comply.

Table 3.2: Source Water Quality

Contaminant	NSDWR Recommended Limit (mg/L)	City of Roundup Water Supply (mg/L)	Percent of NSDWR
TDS	500	2900	580%
Iron	0.3	1.44	480%
Manganese	0.05	0.34	680%
Sulfate	250	1550	620%

Iron concentration 68 times as high as the Maximum Contaminant Level Goal specified in the National Secondary Drinking Water Quality Regulations (NSDWQR) have been observed under normal operating conditions. While most healthy individuals require a moderate ingestion of iron in their diet, the level of iron should be controlled. A consistent long-term overdose can be very harmful. Individuals with the greatest risk are those with a condition known as Hemochromatosis. Hemochromatosis is a genetic disease that affects the body's ability to discard surplus iron causing excess accumulation of iron in body tissue. Early symptoms of the disease include fatigue, weakness, weight loss, abdominal pain, joint pain, early menopause, impotence, loss of sex drive, hair loss and shortness of breath. As the disease progresses it can cause gray-colored or bronze-colored skin, abdominal pain that does not go away, arthritis, liver cancer, cirrhosis, high blood sugar, diabetes, irregular heartbeat, heart failure and even death. The degradation of water quality is primarily attributed to the cast iron pipes.

In response to the poor water quality, the City has investigated several alternative water sources, but none of the sources discovered would be cost effective to develop. The City is also actively pursuing the development of the Central Montana Rural Water Authority (CMRWA), which will provide water to communities from Judith Gap all the way to Melstone, including Roundup. This project is expected to begin construction of Phase 1 to Harlowton in 2020 and Phase 2 to Roundup in 2022.

The water quality issues presented in this section are based on water sampling straight from the source. As will be shown in section 3.3.5, the water quality in the City is actually much worse due to corrosion of the old cast iron pipes that make up a large portion of the distribution system.

Without replacement of the cast iron mains, the water quality will continue to be poor even after the CMRWA connection is established.

Figure 3.2: Well House



Water Quantity

A report entitled *City Water Supply Assessment for Roundup, Montana* prepared by the Montana Bureau of Mines and Geology presented pumping test data of the current City water supply wells. The data showed that the two wells are capable of pumping 1,150 gpm with minimal drawdown each. The vertical turbine pumps, installed in 2012 and another new one in 2017 in the well house, are each capable of pumping 1,000 gpm at 305-feet of head, which is adequate to supply the City with both the current and future maximum day demands.

DEQ Circular 1, Section 3.2.1.2 requires a minimum of two groundwater sources. The latest sanitary survey conducted by the DEQ dated February 16, 2017 indicates that both wells together are considered as one source since they draw from the same mine void and are located within only 10-feet of each other. However, the two wells do provide mechanical redundancy which is one of the main purposes for the standard. In case there is a problem with the supply, the City will be able to utilize the old infiltration gallery until repairs are completed.

DEQ Circular 1, Section 3.2.1.3 requires auxiliary power with an exemption for systems in which *fire protection is not diminished by power failure*. The well house is not equipped with auxiliary power, and there are no plans to add auxiliary power as part of the current improvements. However, Section 3.3.5 of this report will show that the existing two-million-gallon storage tank is adequately sized to provide fire flow during average day demands with no pumps operating. As a result, although required, auxiliary power is not considered an urgent need for the system.

Water Demand

The City of Roundup has kept excellent records of their water usage over the last several years and has provided both pumped water and metered water data. Water use from 2015 through 2019 is shown below in Table 3.3.

Maximum Day Demands

Maximum day demands are important to consider as water usage varies throughout the day in addition to the month and year. The water supply should be sufficient to meet the maximum day demands without using stored water (DEQ Circular 1, Section 3.1.1.a). A maximum day peaking factor is used to estimate the maximum day demands and is defined as the ratio of the maximum day demand to the average day demand.

Throughout the United States, maximum day peak factors range from 2 to 5. Studies done in Montana and the Dakotas indicate peak factors of 1.8 to 4. In general, the smaller the water system, the larger the peaking factor. Other system components, such as whether the system is metered, also have an effect on the peak factor. Based on the size of Roundup and that the system is metered, the maximum day peak factor is estimated to be 3.0, which is within the range shown in the various studies. Table 3.4 shows the current and projected maximum day demands.

Peak Hour Demands

Similar to the maximum day demand, the peak hour demand represents the hour with the highest usage. Peak hour demands typically occur in the mornings prior to work and school (when most people are taking showers or irrigating their lawns).

Peak hour factors typically range from 1.6 to 2.0 times the maximum day demand (or roughly 6 to 8 times the average day demand) for smaller communities. For the case of Roundup, a peak

hour factor of 2.0 will be used. This assumption is again due to the size of the City and the system is metered. This results in the current and projected demands below in Table 3.4.

Table 3.3: 2016-2019 Water Use Data

MONTH	2016				2017				2018				2019			
	PRODUCTION	SOLD	WATER LOSS/ NOT SOLD	% WATER LOSS/ NOT SOLD	PRODUCTION	SOLD	WATER LOSS/ NOT SOLD	% WATER LOSS/ NOT SOLD	PRODUCTION	SOLD	WATER LOSS/ NOT SOLD	% WATER LOSS/ NOT SOLD	PRODUCTION	SOLD	WATER LOSS/ NOT SOLD	% WATER LOSS/ NOT SOLD
January	4,995,000	4,741,250	253,750	5%	5,993,000	4,678,770	1,314,230	22%	5,967,000	3,892,360	2,074,640	35%	4,257,000	3,504,564	752,436	18%
February	5,105,000	3,778,165	1,326,835	26%	4,413,000	3,020,640	1,392,360	32%	4,830,000	3,826,830	1,003,170	21%	4,501,000	4,447,735	53,265	1%
March	4,667,000	3,313,460	1,353,540	29%	4,888,000	3,669,330	1,218,670	25%	4,712,000	3,758,854	953,146	20%	4,945,000	6,309,141	(1,364,141)	-28%
April	5,476,000	4,296,340	1,179,660	22%	4,753,000	3,759,490	993,510	21%	4,719,000	4,106,001	612,999	13%	5,050,000	4,081,814	968,186	19%
May	8,675,000	5,741,420	2,933,580	34%	9,423,000	6,044,350	3,378,650	36%	6,529,000	4,769,315	1,759,685	27%	6,044,000	5,354,785	689,215	11%
June	12,828,000	6,329,200	6,498,800	51%	18,807,000	11,822,870	6,984,130	37%	6,923,000	6,375,217	547,783	8%	8,601,000	7,391,512	1,209,488	14%
July	13,769,000	10,900,460	2,868,540	21%	24,160,000	16,841,128	7,318,872	30%	13,367,000	8,380,986	4,986,014	37%	13,512,000	10,876,206	2,635,794	20%
August	17,832,000	11,729,820	6,102,180	34%	21,404,000	15,581,935	5,822,065	27%	14,352,000	10,583,990	3,768,010	26%	15,770,000	12,169,523	3,600,477	23%
September	9,200,000	7,157,560	2,042,440	22%	12,074,000	14,780,822	(2,706,822)	-22%	9,071,000	8,971,783	99,217	1%	9,435,000	10,324,234	(889,234)	-9%
October	5,118,000	5,077,260	40,740	1%	5,223,000	4,144,486	1,078,514	21%	5,706,000	4,416,943	1,289,057	23%	4,923,000	4,545,968	377,032	8%
November	4,788,000	3,853,950	934,050	20%	4,738,000	3,562,590	1,175,410	25%	5,572,000	3,778,209	1,793,791	32%	4,428,000	3,950,264	477,736	11%
December	5,343,000	3,845,390	1,497,610	28%	4,499,000	4,087,905	411,095	9%	5,078,000	4,136,527	941,473	19%	5,086,000	3,221,554	1,864,446	37%
Average Monthly (gal/mo)	8,149,667	5,897,023	2,252,644	28%	10,031,250	7,666,193	2,365,057	24%	7,235,500	5,583,085	1,652,415	23%	7,212,667	6,348,108	864,558	12%
Average Monthly Lost (gal/mo)	1,783,669															
Average Yearly Lost (gal/yr)	21,404,024															
Average Yearly Sold (gal/yr)	76,483,226															
Average Monthly Sold (gal/mo)	6,373,602															
Average Daily Production (gpd)	210,698															
Population	1,930															
Average Water Usage (gpcd)	109															

Average water usage for the four-year period was found to be 117 gpcd. This will be rounded up to 120 gpcd for the purposes of this PER.

Table 3.4: Projected Water Demand

YEAR	POPULATION	AVERAGE PER CAPITA DEMAND	AVERAGE DAY DEMAND			MAX DAY PEAKING FACTOR	MAX DAY DEMAND		PEAK HOUR FACTOR	PEAK HOUR DEMAND
			gpd	gal/yr	gpm		gpd	gpm		
2020	1,930	120	231,600	84,534,000	160.8	3	694,800	482.5	2.0	965.0
2030	2,132	120	255,840	93,381,600	177.7	3	767,520	533.0	2.0	1,066.0
2045	2,475	120	297,000	108,405,000	206.3	3	891,000	618.8	2.0	1,237.5

Water Loss

Water use data was provided by the City for both the amount of water pumped from the source and the amount read by meters within the City. There was a substantial difference between the two; water losses were found to be 28% in 2016, 24% in 2017, 23% in 2018 and 12% for 2019. American Water Works Association (AWWA) industry standards recommend water losses be limited to 10% after treatment. Water loss within the system is mainly due to leaking cast iron mains. New water meters were installed in 2014, making the 2014 through 2017 readings much more accurate. With replacement of the cast iron mains, the amount of lost water will decline substantially and should be reduced to at or below the industry standard. The City loses an average of 1.8 million gallons per month or 21 million gallons per year. Eliminating the leaking mains will also result in conservation of 19 million gallons of water pumped and reduced pumping costs estimated to be \$128 per month (\$1,534 annually).

3.3.2 Treatment

The water supply is treated through the injection of chlorine gas. The system uses 150-pound gas chlorine cylinders with one cylinder on line at all times. Other cylinders are stored on site and used when the online cylinder runs empty. Switching over cylinders is done manually. Gas chlorine disinfection is provided by a booster pump that injects chlorine into the system inside the well house utilizing a mixing pump.

Figure 3.3: Chlorine Disinfection System

3.3.3 Storage

Roundup water storage consists of a partially above ground two-million-gallon concrete reservoir. The reservoir was inspected in October 2015 by Liquid Engineering Corporation and found to be generally in good condition. A copy of the report from the survey is included in Appendix K. The latest sanitary survey, conducted in February 2017, recommended fencing be installed to secure the tank site. The City is planning to complete the installation in 2020.

Figure 3.4: Ground Level Water Reservoir

The volume of the reservoir is evaluated in this report and found to be in compliance with Montana DEQ regulations. DEQ Circular 1, Section 7.0.1 gives the following two general requirements:

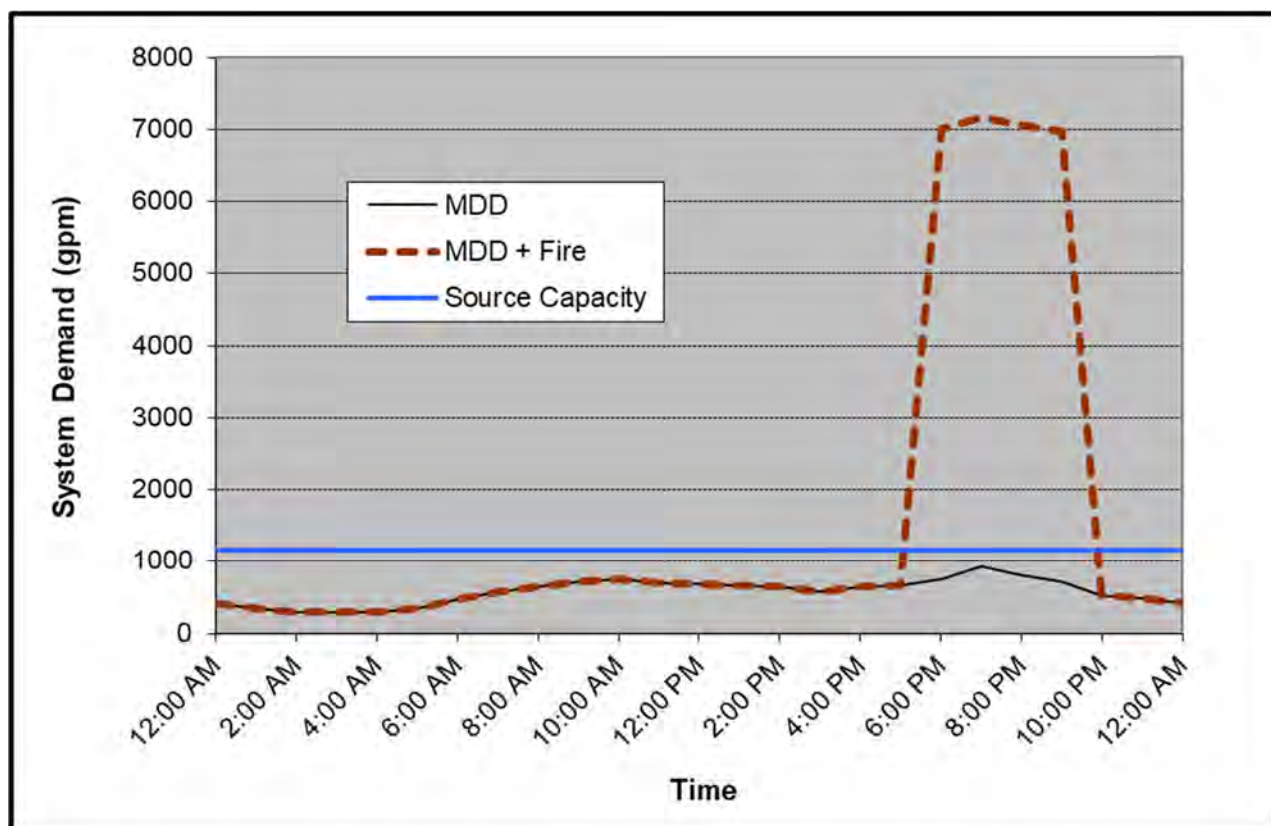
- 1) *The minimum allowable storage must be equal to the average daily demand for a 24-hour period plus fire flow demand where fire protection is provided.*
- 2) *Storage facility must be sufficient as determined from engineering studies, to supplement source capacity to satisfy all system demands occurring on the maximum day plus fire flow demands where fire protection is provided.*

The National Fire Protection Agency (NFPA) establishes minimum standard fire flow rates based on type of construction and building sizes. The largest building in Roundup is the high school (54,000 square feet). This building has recently added an addition which includes a fire suppression system, but the unsprinklered area remains the same and requires the minimum allowable fire flow to be 6,250 gallons per minute over a four-hour duration. From Table 3.4 the 2040 projected average day demand is 0.28 million gallons per day. Combining the 24-hour average day demand with the maximum fire flow gives a minimum allowable volume of just under two million gallons (shown in the following calculation).

$$\begin{aligned} &(6,250 \text{ gpm}) \times (4 \text{ hours}) \times (60 \text{ minutes / hour}) = 1,500,000 \text{ gallons} \\ &+ (2040 \text{ Average Day Demand}) = 283,000 \text{ gallons} \\ &= \text{Total Storage Needed} = 1,783,000 \text{ gallons} \end{aligned}$$

Therefore, the two-million-gallon tank is adequate for storage. Figure 3.5 shows the combination of source capacity and storage volume is adequate to satisfy the second criteria. The graph shows the maximum day demands (MDD) with the most critical fire flow scenario superimposed (6,250 gallons per minute over a four-hour duration). The MDD is based on a 20-year projection. The horizontal line represents the City's source capacity (conservatively 1,000 gallons per minute). The required storage volume is equal to the area between the "MDD + Fire" curve and the "Source Capacity" line. The total required storage volume in this scenario is 1.5-million gallons.

Figure 3.5: Graph for Analyzing Storage



3.3.4 Pumping Stations

New well pumps were installed in 2012 and 2017 inside the existing wellhouse. The new pumps each have a capacity of 1,100 gpm with 305 feet total dynamic head (TDH) and can be operated in parallel.

3.3.5 Distribution System

As previously stated, the City's greatest challenge is the age and condition of their distribution system. Approximately 13% of the system will still be composed of cast iron pipe approaching 100 years. Over the course of their life these pipes have experienced an extreme level of rust and deterioration.

Beginning in 2005, the City began replacing their cast iron water mains. However, without the assistance from state and federal grants, the City was only able to complete approximately two blocks every two years. In 2010, the City began working toward obtaining grant funding to assist with the replacement costs. To date, through four phases, the City has replaced approximately 23,000 feet of cast iron main. Phase 5 will be constructed in the summer of 2020 and will replace approximately 6,650 feet of cast iron main. Unfortunately, over 11,000 feet of dilapidated cast iron water mains still need to be replaced. Replacement of these mains is still the highest priority for the City.

Figure 3.6: Water Quality from Hydrant Flow in 2019

Four hydrant flow tests were performed on October 16, 2019. Figure 3.6 shows water flowing from one of the hydrants. The appearance of the water did not improve over the duration of the tests for 2 of the 4 hydrants. The dark brown colored water was from scouring of rust buildup on the inside of the pipes. Chunks of rust were also present in the flow. The photograph in Figure 3.7 from previous hydrant tests shows some of the material that was flushed from the pipes with a quarter used for scale. These chunks of scale appear any time the hydrants are used which clog the fire engines. The fire department developed a screen to protect the pumps on the trucks, but it must be emptied periodically during use.

Figure 3.7: Material Present in Flow from Cast Iron Water Mains

In February 2010 following the observations from hydrant tests, several water samples were taken to further investigate the water quality impacts from the aged distribution system (the lab results are included in Appendix C). The results of the water samples are shown in Table 3.5.

Table 3.5: Impacts on Water Quality from Cast Iron Mains

Water Sample Concentrations (mg/L)					
Nutrient	NSDWR	Water Supply	Clearwell	Distribution System prior to Hydrant Flush	Distribution System after Hydrant Flush
TDS	500	2,900	2,870	2,920	2,930
TSS	NA	ND	ND	40	10,700
Iron	0.3	1.44	1.32	20.4	3,470
Manganese	0.05	0.34	0.58	0.60	16.0

The increase in iron and manganese was very alarming. **The iron level was about 5 times as high as NSDWR recommended limit at the source, 68 times as high in the distribution system prior to the hydrant flush and over 11,000 times as high after the hydrant flush.**

The water sample taken from the distribution system prior to the hydrant flush gives the best representation of water quality at the tap under normal operating conditions. Even though the NSDWR limit on iron (0.3 mg/L) is not based on health-related concerns, the long term effects of consuming water 68 times as high as the standard does present serious health concerns, which are further discussed in Chapter 4.

In addition to the health concerns, the physical condition of the distribution system limits the City's ability to routinely flush the system and exercise their hydrants. Many of the pipe joints on the old cast iron mains are only sealed by rust and there are several locations where the water mains have been rusted through completely. Whenever a hydrant is flushed, scouring of the rust could cause further leaks or breaks and risks plugging up water meters and household plumbing with chunks of rust. Also, whenever a hydrant is flushed, residents call the City and have also called DEQ to complain of the rust color in the water.

Figure 3.8 shows a section of water main that was weakened and burst.

Figure 3.8: Section of Burst Cast Iron Water Main

The City has repaired 49 water main leaks in the last six years, 30 of which were on cast iron water mains. The frequency of repairs in the system is about 0.36 per year per mile of cast iron pipe. As a comparison, the frequency of repair from several cities and districts around Montana are shown in Table 3.6 below. Proportionately, the City of Roundup repairs over **two times** as many leaks as should be expected for a typical distribution system. The number of leaks is expected to increase as these mains continue to age.

Table 3.6: Average Water Breaks for Cities in Montana

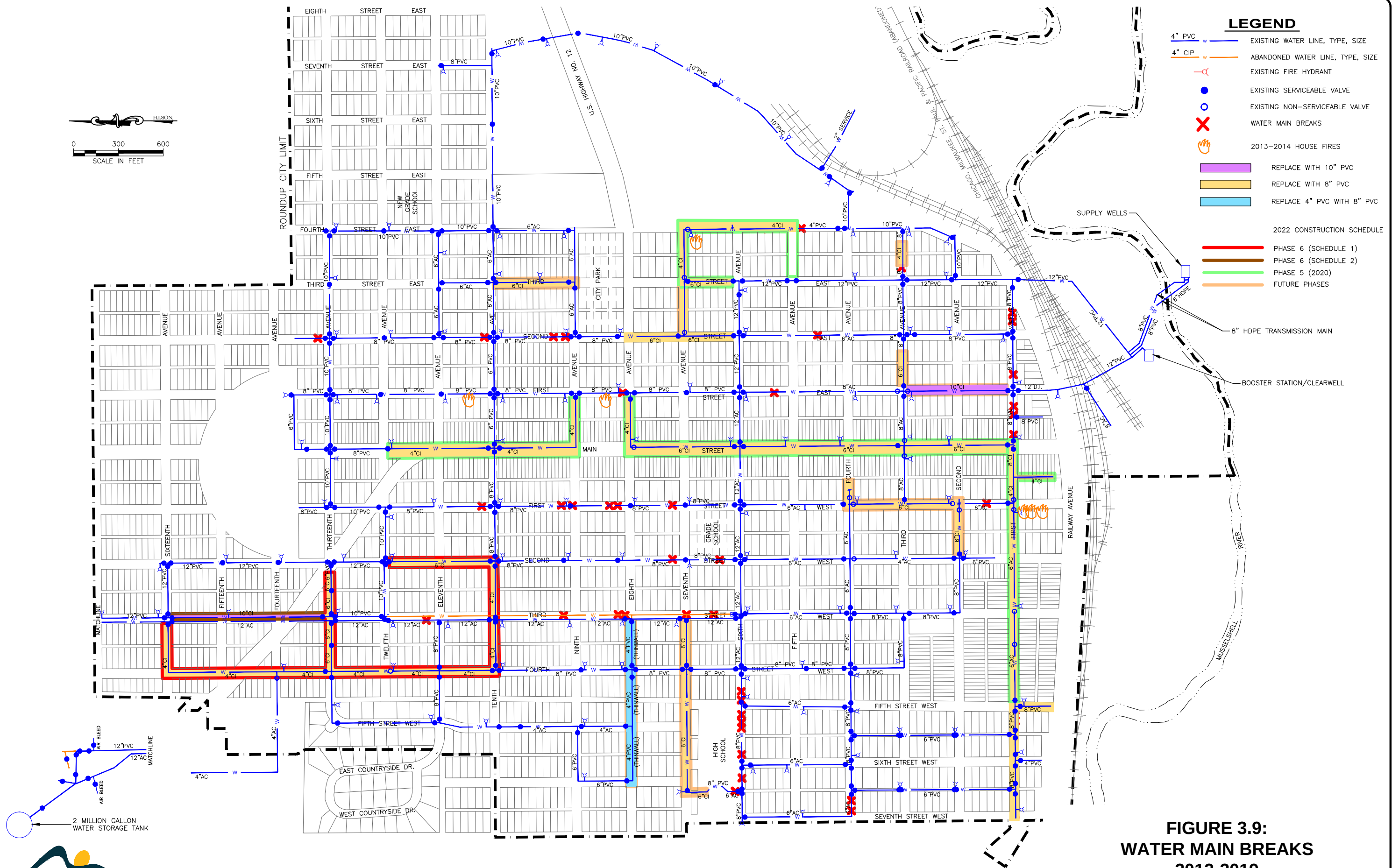
CITY	WATER MAIN LENGTH (MILES)	AVG. BREAKS/YR	BREAKS/MILE/YEAR*
Roundup	16.6	6	0.36
Miles City	63.5	7	0.11
Kalispell	145	12	0.08
Missoula	320	30	0.09
Bozeman	276	6	0.02
Wolf Point	20	2	0.10
*AWWA Standard is 0.15 leaks per mile per year			

Table 3.7 is a list of the breaks and identifies the size and type of pipe at the locations of water main breaks for 2014 through 2019 and Figure 3.9 is a map of these water main breaks. The City loses an average of 21 million gallons per year or approximately 2.4 million gallons for every water break. In November 2015, it took over three days to find a water main break as the water followed a nearby sewer main and emerged several blocks from the actual broken water main.

Table 3.7: Water Main Breaks 2014-2019

Water Main Breaks (2014-2019)		
Jan-14	100 Block 3rd Ave E	8" AC
May-14	200 Block 1st Ave W	8" AC
Jun-14	500 Block 6th Ave W	6" AC
Jul-14	500 Block 6th Ave W	6" AC
Aug-14	100 Block 3rd Ave E	6" AC
Sep-14	400 Block Main	4" CIP
Leaks in 2014		6
May-15	2nd St East & 9th Ave	6" CIP
May-15	1st St West & 8th Ave	4" CIP
Jul-15	1st Ave West & 3rd St	6" AC
Jul-15	1st Ave East & 1st St East	8" CIP
Jul-15	900 Block 1st St West	4" CIP
Aug-15	1st Ave East & 1st St East	8" CIP
Sep-15	400 Block Main Street	6" CIP
Nov-15	400 Block Main Street	6" CIP
Dec-15	4th Ave West & 6th St West	6" AC
Dec-15	6th Ave West & 6th St	6" AC
Dec-15	4th Ave West & 6th St West	6" AC
Leaks in 2015		11
Jan-16	6th Ave West & 5th St	6" AC
Feb-16	6th Ave West & 6th St	6" AC
Feb-16	1st Ave E & 2nd St	8" CIP
May-16	4th St West & 6th Ave	12" CIP
May-16	1st Av West & 7th St	4" CIP
May-16	6th Ave West & 5th St	6" AC
May-16	1st Ave E & 2nd St	8" CIP
Jun-16	100 Block 1st Av E	8" CIP
Jun-16	400 Block 6th Ave West	6" AC
Jul-16	1st St West & 10th Ave	4" CIP
Aug-16	600 Block 2nd St East	6" CIP
Sep-16	Main & 3rd Ave	6" CIP
Leaks in 2016		12
Jan-17	500 Block 1st Ave West	6" CIP
Jan-17	5th St West & 1st Ave	6" CIP
Jan-17	5th St West & 1st Ave	6" CIP
Feb-17	7th Ave East & 3rd St	4" CIP
Jun-17	3rd St West & 10th Ave	10" CIP
Jun-17	4th St West & 12th Ave	4" CIP
Leaks in 2017		6
Jan-18	8th Ave East & 1st St East	4" CIP
Feb-18	4th St West & 13th Ave	6" CIP
Apr-18	1300 Block 3rd Ave W	10" CIP
Jul-18	500 Block 1st Ave E	8" AC
Sep-18	1100 Block 4th Ave East	4" CIP
Dec-18	400 Block 3rd Ave East	4" CIP
Leaks in 2018		6
Feb-19	1000 Block 4th Ave West	4" CIP
Jun-19	900 Block Main	4" CIP
Dec-19	700 Block 4th Ave East	4" CIP
Leaks in 2019		3
Jan-20	3rd St & 3rd Ave E	12" PVC
Feb-20	200 Block 1st Ave	6" AC
Apr-20	400 Block of 2nd St E	4" CIP
Leaks in 2020		3
Average Leaks per Year		6
Average Monthly Water Loss (gal/mo)		1,783,669

J:\2-13125 - Roundup On-Call 2013\TO-22 Phase 6 Water\CADD 2-13125\Exhibits\2-13125-TO22-PER-Figure 3-9.dwg



**FIGURE 3.9:
WATER MAIN BREAKS
2012-2019**

CITY OF ROUNDUP
2020 WATER PER-PHASE 6



Hydraulic Analysis:

The water distribution system was analyzed using Bentley WaterCAD software. Four hydrant flow tests were conducted in 2019 in the field to calibrate the model to represent the real physical conditions of the system.

With the calibration of the computer model, it was discovered the hydraulic capacity of the distribution system is restricted by the buildup of a thick rust layer on the inside wall of the cast iron mains. Figure 3.10 shows a photograph of a section of pipe that was removed during Phase 3 water main replacement. The buildup of rust is approximately 1" thick around the interior of the main, reducing the hydraulic capacity of the 4" main down to a 2" main. Based on the adjustments that were required to calibrate the computer model, it is believed that this photo is representative of all cast iron mains within the system. City maintenance crews have also stated this is typical of other pipes they have had to repair.

Figure 3.10: Typical Cast Iron Pipe Section



After calibrating the computer model, the system was analyzed for its ability to provide required flows. In accordance with DEQ Circular 1, Section 8.2.1 the system was analyzed for two scenarios:

- 1) Peak Hour Demand,

2) Maximum Day Demand plus Fire Flow.

The results of the modeling scenarios are described below and shown in Appendix I.

Peak Hour Demand Scenario:

DEQ's standards specify a minimum pressure throughout the system of 35 pounds per square inch (psi) during normal operating conditions. The water model revealed one isolated area within the system at 28 psi under this scenario. This area is in on 2nd and 3rd Street West in between sixteenth and Fifteenth Avenue. The rest of the system is within compliance of this requirement.

Maximum Day Demand plus Fire Flow Scenario:

Under the maximum day and fire flow scenario, the water model showed the system lacking adequate pressure and flow in numerous locations throughout the system.

Based on the NFPA standards, 1,000 gallons per minute (gpm) for a two-hour sustained period is the minimum required fire flow for one and two-family dwelling units with areas less than 3,600 square feet. All other buildings with areas more than 3,600 square feet require a fire flow of 1,500 gpm for two hours. The 1,000 gpm and 1,500 gpm requirements are applicable to the majority of the buildings in Roundup. The new elementary school will require approximately 1,500 gpm plus 650 gpm in the sprinkler system. Larger buildings have greater required flows, durations and are handled on a case by case basis.

The water model revealed that 8 of the 123 nodes (intersections), or 7% percent of the City's water system would not satisfy these minimum requirements. In fact, the model shows 8 of the 123 nodes, or percent 7% of the distribution system could not even provide fire flows of 1,000 gpm. These areas are shown in Figure 3.11 below.

The most problematic locations within the system were the areas that contain the 4" and 6" diameter cast iron mains. As stated above, rust buildup on the inside of the mains reduced the effective diameter and increased the roughness along the inside surface, with some 4" mains having a hydraulic capacity similar to a 2" main and 6" mains having a capacity similar to a 4" main. This, along with inadequately sized mains severely restricts fire flow.

DEQ Circular 1, Section 8.2.2 specifies 6" as the minimum size for a water main providing fire protection. DEQ Circular 1, Section 8.2.3 further states, "*water mains not designed to carry fire-flows may not have fire hydrants connected to them.*" With an estimated almost 9,500 feet of 4" and 6" cast iron main, with a much smaller effective diameter due to the thick layer of rust buildup, these mains fall far short of DEQ's standards. The water model reflects this. Additionally, in running the model with proposed improvements to the system, it was found that replacement of these mains with 8" diameter PVC mains will provide adequate fire flows meeting NFPA and DEQ requirements, but 4" PVC mains do not improve the flows enough to meet basic fire flows for residential structures.

In addition to the lack of hydraulic capacity, the City Fire Chief has expressed concern about the impact on equipment from the chunks of rust present in the hydrant flow. About ten years ago the City worked to develop a filter valve to go on the intake of their pumper trucks. This filter is not something manufactured since this problem is unique to Roundup. However, even with the filter, nozzles on the fire trucks are still getting plugged from rust chunks in the water as was the case with the two fires in 2013 on 1st Street East. During the fires in July and August 2013, the water mains were unable to carry sufficient flow and fire trucks had to stop to clean plugged screens in order to deliver what little water they had. Both homes were completely lost. In 2014, during a fire on South 1st Street West, the water mains were unable to carry sufficient flow and with only one fire hydrant within 1,000 feet, the fire quickly spread to the two surrounding homes. Two homes were complete losses, while the third sustained heavy damage. If the City is faced with a major incident that requires mutual aid from other departments, these other departments are not equipped with these filters and would be unable to assist.

Water Meters

In 2014, the City installed new meters on all connections along with a radio-read system. The meters are expected to have a 20-year life.

Energy Consumption:

The existing system pumps from the two wells to the system and storage tank using two 125 hp pumps with a design flow of 1,000 gpm. Using electrical bill from the past year, the booster station requires approximately 17,200 kW-hr/yr, the tank telemetry uses approximately 1,200 kW-hr/yr and the well house uses approximately 144,000 kW-hr/yr to pump 87 million gallons/yr for a total energy consumption of approximately 162,000 kW-hr/yr. The City's electrical cost per kW-hr is \$0.10 so the City paid approximately \$16,200 for energy consumption on the water system in 2019.

3.3.6 Operational and Management Practices and Capabilities

The City of Roundup Public Works staff does an exceptional job of operating and managing their water system given the limited amount of resources they have and the challenges related to operating a nearly 100-year old system. Some of the operational challenges that were discussed in previous sections include the following:

1. Repairing an excessive number of leaks.
2. Dealing with inadequate valve spacing combined with many of the valves being inoperable, making it difficult to isolate portions of the system when breaks occur.
3. Inability to operate or flush fire hydrants without risk of causing leaks or pipe failures.
4. Inoperable and inadequately spaced hydrants limiting the City's ability to put out fires.

The City's Public Works Department has worked hard to keep up with repairing the leaks in the cast iron mains. However, as the cast iron mains continue to age, the rate of repairs is expected to increase. There will also be an ever-increasing likelihood of a catastrophic pipe failure.

The City has taken all possible steps to rehabilitate their system. Historically, water main replacement projects were completed on an average two-year cycle, with the City saving two years of surplus revenue and replacing a few blocks of main. The most recent projects were in 2007 and 2010. Larger projects were completed in 2012, 2014, 2016 and 2018. In 2007, the project involved replacement of four blocks of water main in 4th Street West from 6th Avenue to 10th Avenue and about a half of a block of main in 10th Avenue at Main Street. In 2010, two blocks of main were replaced near the school. In 2012, six blocks were replaced in the alleys between

5th Street West and 7th Street West along with approximately three and a half blocks of main on 4th Avenue West from 3rd Street West to 7th Street West, in addition to the new transmission mains and supply line up to 1st Street East and 1st Avenue East. In 2014, the City completed thirteen blocks of main replacement and abandoned six blocks. In the spring of 2016, the City completed replacement of almost 10,000 feet of water main. In the summer of 2018, the city replaced 12 blocks or almost 4,500 feet. Another project under design and scheduled for construction in the summer of 2020 will replace up to 22 blocks or almost 7,700 feet.

Since 2000, the City has paid \$2.3 million dollars for water main replacement from reserves and taken over \$1.6 million dollars in DWSRF loans. In addition, the City has spent over \$260,000 in reserves for planning documents since 2010. With all of the City's capital planning and projects already completed, the deficiencies found in the system are clearly not a matter of neglect. They are simply a result of the system being over 100 years old and the City having limited financial resources to consistently rehabilitate it.

3.4 Financial Status of any Existing Facilities

Income and expenditures for the water system, including operation and maintenance, are included in the Water Enterprise Fund under the City's accounting system. The operating expenses for the last three fiscal years have averaged \$222,459 and the revenues have averaged \$493,073. The City has a loan from State Revolving Fund (SRF) for Phase 2 construction for \$1,392,000 that is scheduled to be paid off by 2034, a SRF Loan for Phase 3 construction of \$239,000 that is scheduled to be paid off in 2036 and a SRF Loan for Phase 5 construction of \$409,000 that is scheduled to be paid off in 2040. A summary of the expenditures and revenue is included in Table 3.8. Financial information for the last five fiscal years can be found in Appendix J.

The increase in revenue in 2015 was due to an increase in user rates in anticipation of the SRF loan. The fiscal year 2017 shows the full debt service and coverage requirements for the 2014 and 2016 loans, and the proposed fiscal year 2020 shows the full debt service and coverage for all three loans.

Historically, the City has used surplus revenue from their water enterprise fund to finance water system rehabilitation projects on an average two-year cycle.

Table 3.8: Summary of Income and Expenses

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	PROJECTED 2020 BUDGET
OPERATING REVENUE	-----	-----	-----	-----	-----	-----
Metered Water Sales	\$414,422	\$416,013	\$427,321	\$445,124	\$455,453	\$430,000
Unmetered Water Sales	\$0	\$0	\$0	\$0	\$136,935	\$144,000
Water Installation Charges	\$2,967	\$130	\$106	\$1,050	\$618	\$1,000
Misc Water Revenue	\$5,535	\$1,425	\$1,475	\$1,950	\$3,100	\$0
Investment Earnings	\$483	\$500	\$0	\$0	\$0	\$0
Interest Earnings	\$282	\$467	\$988	\$2,408	\$2,692	\$500
TOTAL INCOME	\$423,689	\$418,535	\$429,890	\$450,532	\$598,798	\$575,500
OPERATING EXPENSES	-----	-----	-----	-----	-----	-----
Personal Services	\$106,229	\$110,569	\$116,433	\$113,879	\$130,329	\$140,000
Supplies	\$52,232	\$73,335	\$68,491	\$62,792	\$58,506	\$105,000
Office Supplies	\$932	\$0	\$1,488	\$0	\$0	\$2,000
Purchased Services	\$32,952	\$63,211	\$46,914	\$29,477	\$26,352	\$40,000
Fixed Charges	\$3,459	\$3,600	\$3,477	\$4,909	\$4,332	\$10,000
Other Activities	\$19,005	\$17,026	\$0	\$0	\$0	\$0
TOTAL OPERATING EXPENSES	\$214,809	\$267,741	\$236,803	\$211,057	\$219,518	\$297,000
SUBTOTAL INCOME-EXPENSES	\$208,880	\$150,794	\$193,087	\$239,475	\$379,279	\$278,500
Debt Service Payments	\$0	\$86,617	\$102,088	\$104,649	\$103,950	\$117,343
Debt Service Reserve	\$43,137	\$33	\$0	\$0	\$0	\$0
NET PROFIT (LOSS)	\$165,743	\$64,144	\$90,999	\$134,826	\$275,329	\$161,157

3.4.1 Existing User Rates

Also, important to the financial status of the City is the City's ability to meet the "target rate." The target rate is a user rate that is established by the Montana Department of Commerce (MDOC) for each municipality across the state. The rate is used to determine whether or not a municipality is paying its "fair share" of a project's cost. In order to apply for grant funding from the MDOC, the user rates after completion of the project must meet or exceed the established target rates. The Montana Department of Commerce (MDOC) has determined, based on surveying communities that have undergone recent upgrades to their water and/or wastewater system, the

target rate should be approximately 0.9 percent of the MHI for wastewater alone, 1.4 percent of the Median Household Income (MHI) for water only, or 2.3 percent of the MHI for water and wastewater combined.

According to the 2015 Census, American Community Survey estimates the City of Roundup's median household income to be \$35,000. However, an income survey conducted in May 2017 shows the City with a median household income of \$28,538 and a Low to Moderate Income percentage (LMI) of 60.0%. Thus, the final target rates are calculated as follows:

Table 3.9: Target Rate for Roundup

SYSTEM	MHI	%	TARGET RATE		CURRENT RATE		%TARGET RATE
			ANNUAL	MONTHLY	ANNUAL	MONTHLY	
MDOC: Water Only	\$28,538	1.40%	\$399.53	\$33.29	\$748.80	\$62.40	168.3%
MDOC: Wastewater Only	\$28,538	0.90%	\$256.84	\$21.40	\$355.92	\$29.66	
MDOC: Combined Target Rate	\$28,538	2.30%	\$656.37	\$54.69	\$1,104.72	\$92.06	

Since target rates are based upon equivalent dwelling units (EDUs), it is important to calculate the City's rates based upon EDUs. An EDU rate system charge is based on the area of the service size. A ¾ inch water service is a typical residential water service and is considered to be 1 EDU. The EDUs for each service line are then calculated based on the area of the service size divided by the area of the ¾ inch service. Table 3.10 presents a summary of those EDUs.

Table 3.10: Existing EDUs for Roundup

Size of Service Connection (inches)	EDUs per Connection	RESIDENTIAL		NON-RESIDENTIAL		TOTAL	
		Number of Hookups	Total EDUs	Number of Hookups	Total EDUs	Number of Hookups	Total EDUs
3/4	1.00	592	592	75	75	667	667
1	1.79	95	170	29	52	124	222
1 1/2	4.00	1	4	14	56	15	60
2	7.14	0	0	6	43	6	43
3	16.00	0	0	1	16	1	16
4	28.57	0	0	2	57	2	57
TOTAL		688	766	127	299	815	1,065

It is also important to note the MDOC considers both the water and wastewater rates combined for systems that have both. The average water usage for the City is 7,000 gallons based on water

records. All residential services currently pay \$28.50 plus \$2.70 per every 1,000 gallons used, plus a \$15 capital improvements surcharge. Therefore, the current average residential water rates IS considered \$62.40/resident/month. The wastewater rates are established at \$22.14 per month, plus \$1.88 per 1,000 gallons over 3,000 gallons. This equates to an average sewer rate of \$29.66/EDU/month. Thus, the average combined water and wastewater rate for a residential household (or per EDU) is \$92.06 (\$62.40 + \$29.66). The City's rates are 168.3% of target rate. Information regarding the existing user rates and EDUs is located with the financial information in Appendix J. Additionally, at this time, the City does not bill on an EDU basis, but on a residential versus commercial scale plus usage, thus they are only billing 722 hookups instead of the 801 EDU's.

Historically, the City has used surplus revenue from their water enterprise fund to finance water system rehabilitation projects on an average two-year cycle. Unfortunately, as the City has raised rates to increase their surplus, operating expenses have also continued to increase. This is due to increased maintenance, electricity costs, leak repairs, and other unavoidable expenses. To correct all identified deficiencies in the system an estimated \$5.2 million is needed, but by only saving approximately \$175,000 annually, it would take the City almost 30 years to fund all the main replacements. Therefore, the City must utilize grant money to get these improvements completed.

3.5 Water/Energy/Waste Audits

Water audits have been completed as part of the last three of five Water System PERs. These have been used to determine the average water lost due to water main breaks and are being used as a planning tool for the City to address these losses. At this time, energy or waste audits have not been completed on the City's water system.

4.0 NEED FOR PROJECT

In addition to identifying deficiencies within a public utility system and developing alternatives to correct those deficiencies, a PER must also address the relevant need for the project to help communities prioritize capital improvement projects and manage limited resources and budgets. The following subsections will provide an overview of the system needs.

4.1 Health, Sanitation and Security

Health and safety of the public is by far the largest concern for any municipal water system. Several health and safety concerns were identified in Chapter 3 of this report. These concerns are summarized below.

4.1.1 Lead in Drinking Water

According to the Centers for Disease Control and Prevention (CDC) website, elevated blood lead levels are associated with learning deficiencies and hyperactivity in children, suppressed immunity, decreased reproductivity, and even death. In 2013, an article was published in the American Water Works Association Journal which detailed how tuberculated cast iron mains exacerbated the lead released from lead service lines, high lead brass fittings or lead soldered joints delivering the water. In July 2016, an article from the American Chemical Society published another article detailing how the tuberculated iron acts as a cathode corroding service lines, fittings, and soldering and the lead dissolves into the water. It was determined through the study that the lead in drinking water increased by $96 \mu\text{g L}^{-1}$ when water was delivered to these services through corroded iron pipe when compared to PVC. These studies are both located in Appendix L of this report. Although the City has removed most of the lead services, lead and copper testing has shown minor lead hits below the MCL in four of the ten testing locations.

4.1.2 Suspended Iron in Drinking Water

It was shown in Section 3.3.5 the poor water quality in the City of Roundup is attributed to leaching and scouring of iron into the water from the old cast iron water mains. Water sampling from hydrants and taps revealed iron concentrations of 20.4 mg/L during normal operating conditions and 3,470 mg/L during operation of a fire hydrant. This equates to 68 and 11,000 times the maximum contaminant level allowed in the Safe Drinking Water Act (SDWA). Although the

standard Maximum Contaminant Level for iron (0.3 mg/L) is not enforceable, there are concerns when iron concentrations are at these high levels.

While most healthy individuals require a moderate ingestion of iron in their diet, the level of iron should be controlled. A consistent long-term overdose can be very harmful. Individuals with the greatest risk are those with a condition known as Hemochromatosis. The Federal Department of Health and Human Services, Centers for Disease Control and Prevention (CDC) publishes a wealth of information regarding this condition. Hemochromatosis is a genetic disease that affects the body's ability to discard surplus iron causing excess accumulation of iron in body tissue. Early symptoms of the disease include fatigue, weakness, weight loss, abdominal pain, joint pain, early menopause, impotence, loss of sex drive, hair loss and shortness of breath. As the disease progresses it can cause gray-colored or bronze-colored skin, abdominal pain that does not go away, arthritis, liver cancer, cirrhosis, high blood sugar, diabetes, irregular heartbeat, heart failure and even death.

Many people that have this condition are not diagnosed until the liver and heart have already been damaged. CDC states, *"if you already have organ damage, treatment can stop additional damage, but it cannot reverse damage that has already started."* Currently there are no known cures for this disease. Treatment involves a process called Phlebotomy which most patients go through a few times per year for their entire life. The process involves removing blood with high iron from the body about once or twice a week until iron concentrations are dropped to a safe level. The process is followed by management of dietary ingestion of iron.

CDC publications from 2003 state that about 1,000,000 people in the United States suffer from the symptoms of Hemochromatosis (See Appendix L). This is equivalent to about 1 in every 300 people. **With a given population of about 1,836 in the City of Roundup, as many as six people would be expected to suffer from this condition.** CDC recommends against taking iron supplements or excessive dietary ingestion for any person with Hemochromatosis. For citizens of Roundup this would include avoiding ingestion of drinking water which has iron concentrations 68 times as high as the NSDWR recommended maximum contaminant level. Unfortunately, water users in the City of Roundup that have this condition may not yet be aware of it, and their condition is worsening by ingesting the tap water.

4.1.3 Fire Protection

The *National Fire Protection Agency's Uniform Fire Code* (UFC) establishes minimum fire flow requirements to protect buildings in public water systems. The requirements are based on building occupancy, size and type of construction.

As discussed in Section 3.3.5, Roundup's ability to provide fire protection and meet the minimum NFPA standards is inadequate. For most of the City, minimum required fire flows are 1,000 gpm in residential areas and 1,500 gpm in commercial areas. The high school building requires 6,250 gpm (See Appendix I for fire scenario computer modeling results). The new elementary school requires 2,150 gpm since it is a sprinkled building. The high fire flow requirements at the existing school is due to the fact the building is not equipped with fire suppression systems in combination with the sizes of buildings and use of wood frame construction.

The computer analysis conducted in this study revealed that approximately 7% of the City's area would not satisfy these minimum standards. Fire flow capacity at the high school was found to be 1,840 gpm at the northwest hydrant, 2,320 gpm at the southwest hydrant, and 3,870 at the southeast hydrant. Fire flow at the new elementary school was found to be only 3,780 gpm at the northwest hydrant an improvement of 2,200 gpm after phase 4 was completed in 2018.

The most problematic locations within the system were the areas where 4-inch and 6-inch CIP mains are located, as was shown in Figure 3.11. As stated in Chapter 3, fire flow capacity in these areas is restricted due to the combination of a 1" layer of rust buildup on the inside of the mains and that the mains were inadequately sized by today's standards when originally installed nearly 100 years ago. Figure 4.1 shows the reduced capacity of the cast iron water mains and the repulsive layer of rust the water must traverse to get to the customers.

After replacing all cast iron water mains, the lowest available fire flow would be 840 gallons per minute in the area of 9th Avenue and 6th Street West. This falls slightly short of the minimum allowable flow of 1,000 gpm given in the NFPA standards. Flow to this area is provided through a 4" diameter PVC pipe in 8th Avenue and a 4" diameter asbestos cement pipe in 5th Street West. Available fire flow to this area would be increased to about 1,400 gpm by replacing the 4" water main in 8th Avenue with an 8" PVC water main. This would involve replacement of three blocks.

Figure 4.1: Typical 4-Inch Cast Iron Main Removed Due to Break

In addition to the lack of hydraulic capacity, the chunks of rust present in hydrant flow have caused damage to pumping equipment on the City fire trucks. The Roundup Fire Department has developed a filter that can be used on their pumper trucks to reduce these impacts. Even with the filter, some rust still gets through and into their equipment, which then plugs the nozzles. This problem also limits the ability to receive aid from other communities in the event of a major fire incident, since trucks from other fire departments are not equipped with these filters. The crippling effect of the reduced effectiveness of the fire department due to plugged equipment and inoperable fire hydrants could be seen in July and August 2013, as two homes were completely destroyed by fires approximately two weeks apart and within a block of each other. Although this area of distribution system has been replaced, many other areas still have these dilapidated mains and would be just as devastated during a fire event. For example, in August 2014 three homes were destroyed on First Street West due to having only one hydrant in the vicinity and the small diameter pipes restricting fire flow. A fire that started in one home quickly spread to the homes on either side and two were total losses. Newspaper articles detailing the fires are included in Appendix G. Figure 4.2 shows the rust particles that plug the fire department's equipment.

4.1.4 Water Problems Associated with Low Pressure Created from Water Main Breaks

When a water main break occurs, the whole distribution system loses pressure. This creates the potential for zero or negative pressures in the pipe. Low pressure events increase the ability for biofilms to produce and grow. Biofilms shield the microbes from disinfection, allowing microbes to grow and reproduce. Table 8: Some Pathways Through Which Pathogens Can Enter the Distribution System in the EPA document, “Health Risks from Microbial Growth and Biofilms in Drinking Water Distribution Systems”, labels the risk level of water main repairs/breaks as high. The EPA document is in Appendix I.

Some of the organisms associated with biofilm growth are primary pathogens, which can cause disease in healthy individuals and others are opportunistic pathogens which can cause disease in humans with underlying illnesses. Primary pathogens having the potential to attach to biofilm include *Shigella*, *Salmonella*, *Yersinia enterocolitica*, *Campylobacter jejuni*, *Legionella pneumophila* and *Escherichia coli*. *Shigella* causes bacillary dysentery; *Salmonella* causes typhoid fever, paratyphoid fever, and gastroenteritis; *Yersinia enterocolitica* causes gastroenteritis; *Campylobacter jejuni* causes dysentery; *Legionella pneumophila* causes a type of pneumonia called Legionnaires disease; and *Escherichia coli* causes gastroenteritis.

There are many opportunistic pathogens having the capability growing in biofilms in distribution systems, although it has been demonstrated high doses are required to cause detrimental effects. One of these pathogens includes the common *Moraxella* pathogen which causes pneumonia^{xiv}.

Figure 4.2: Rust Particles in Fire Department Screen

4.2 Aging Infrastructure

The aged water distribution system has posed high maintenance demands on the City. In recent years an excessive amount of time has been required to repair water leaks on the cast iron mains. Approximately 17% of the water valves in the old cast iron portions of the system have been rusted into the open position. This makes it very difficult for the City to isolate portions of their system to make repairs. The City is also hesitant to open fire hydrants for fear that they will plug up with chunks of rust and not re-seal when they are closed. Potential failure of a pipe is also a concern when opening hydrants.

4.2.1 Water Mains

As stated in Section 3.3.5, approximately 13% of the system is still composed of cast iron pipe approaching 100 years of age. Over the course of their life these pipes have experienced an extreme level of rust and deterioration.

As previously discussed, over the last three years the City has repaired leaks at an average rate of 0.36 per year per mile of pipe. This rate is nearly five times as high as Miles City and Wolf

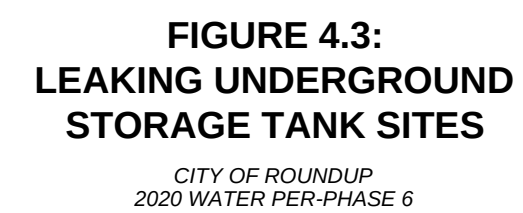
Point, as well as almost eight times higher than Kalispell and Missoula. Many of the leaks within the last six years were on cast iron mains. Roundup water mains require a disproportionately high amount of maintenance which will continue to deteriorate as the system ages even further.

Additionally, when a water leak occurs, there are several negative impacts to the system. The system loses pressure, which not only decreases the level of service to area homes and business, but also can allow for contaminants access into the system. There are a high number of deteriorating water mains located in areas with heavily contaminated soils. Potential sources of contamination include 13 identified leaking underground tank sites within the City limits, which are contaminated with hydrocarbons as shown in Figure 4.3.

4.2.2 Water Valves:

DEQ Circular 1, Section 8.3 requires, *“sufficient valves must be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves should be located at not more than 500-foot intervals in commercial districts and at no more than one block or 800-foot intervals in other districts.”* This standard limits the size of an area exposed to the potential for negative water pressure to one block. Isolated repairs at some locations in Roundup’s system have required shutting off water to 7 or 8 city blocks or repairing leaks without having mains completely shut down.

The location of each valve is shown in Figure 3.1. As shown in the cast iron pipe sections, valve spacing typically exceeds this standard by more than double the recommended length, meaning there are only half as many valves installed as are necessary.



4.2.3 Inoperable Gate Valves

A similar concern involves the lack of valves combined with a high number of inoperable gate valves throughout the cast iron portions of the distribution system. There are 15 known valves within the system that are inoperable, 2 of which are proposed to be replaced as part of Phase 6, and 14 valves will be added that do not currently exist. Currently, the City must shut down an area of 8 city blocks to maintenance one area of town due to inoperable or missing valves.

4.2.4 Fire Hydrants:

There are three issues with fire hydrants within the system:

- Circular DEQ 1, Section 8.2.2 requires all mains and hydrants leads to be a minimum diameter of 6". Within the older portions of the distribution system and within the cast iron mains, the mains are only 4" diameter and the fire hydrant leads are only 4" diameter.
- The space between fire hydrants is much larger than both DEQ and fire code requirements allow.
- Hydrant spacing requirements are determined from the NFPA Uniform Fire Code and vary from 250-feet to 500-feet depending on the required fire flow. Although some additional hydrants have been installed, spacing on the older cast iron mains averages over 1,000 feet. DEQ Circular 1, Section 8.4.1 further requires fire hydrants to be installed at each intersection. Twenty-four of the intersections in the City don't have fire hydrants.

4.2.5 Inoperable Fire Hydrants

Most of the inoperable hydrants within the system were the areas on the east and west edges of the City. As stated in Chapter 3, the City is reluctant to operate fire hydrants as the water flowing from the hydrants is dark brown in color and full of large chunks of rust and iron. Due to the degradation of the water quality and fear of causing leaks, the City is reluctant to operate hydrants. Thus, many of the fire hydrants in these areas have become inoperable over the years.

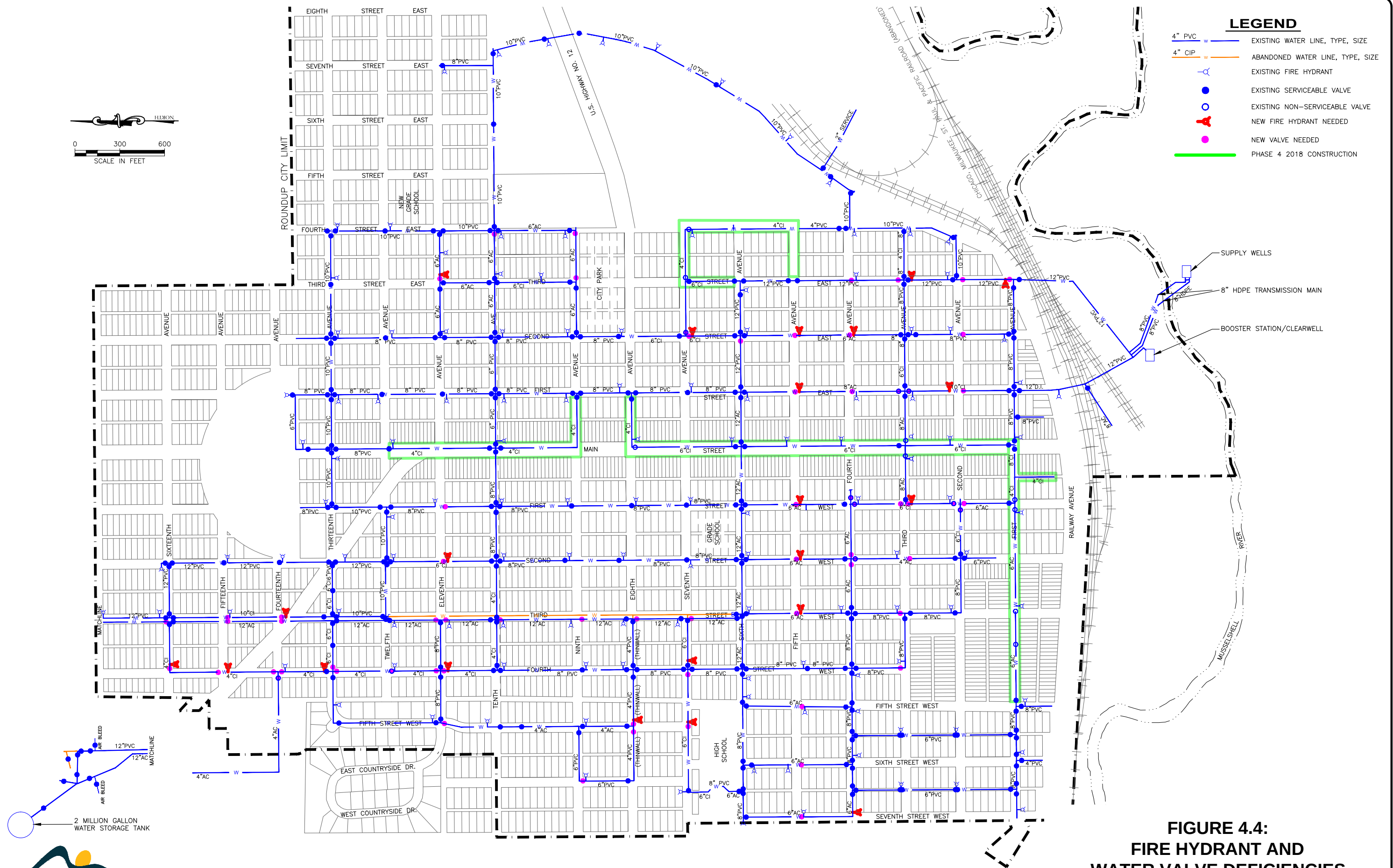
Even when the fire hydrants are operable, as stated in Chapter 3, fire flow capacity in these areas is restricted due to the combination of buildup on the inside of the pipes and many of the fire hydrants are installed on undersized water mains.

Figure 4.4 shows locations of additional fire hydrants and water valves needed.

4.3 Reasonable Growth

Population forecasts were discussed in Chapter 2.3. Although the City and County are optimistic about the expansion of the Signal Peak Coal Mine, the population growth has been minimal within Roundup. So, for design purposes, a 1% growth rate for the next 25 years is anticipated. This amount of growth will not have any sudden impacts to the water system. Therefore, the projected population of 2,475 appears reasonable.

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**FIGURE 4.4:
FIRE HYDRANT AND
WATER VALVE DEFICIENCIES**

CITY OF ROUNDUP
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5.0 ALTERNATIVES CONSIDERED

Numerous alternatives exist which would address the identified deficiencies within the City's water system. Because several of the alternatives may not be viable for various reasons, the alternative screening process will be used to discuss the available alternatives and determine which ones are viable for detailed consideration in the alternative analysis in the next chapter.

With the Phase 1, 2, 3 and 4 improvements completed, and Phase 5 construction planned for spring 2020, the City is focusing on improvements to their distribution system. Storage, source and meter improvements are no longer needed.

5.1 Alternative Screening

5.1.1 Supply Alternatives

No supply deficiencies were identified with the City's water system. Therefore, no other alternatives are necessary.

5.1.2 Treatment Alternatives

No treatment deficiencies were identified with the City's water system. Therefore, no other alternatives are necessary.

5.1.3 Storage Alternatives

No storage deficiencies were identified with the City's water system. Therefore, no other alternatives are necessary.

5.1.4 Pumping Station Alternatives

No pumping station deficiencies were identified with the City's water system. Therefore, no other alternatives are necessary.

5.1.5 Distribution System Alternatives

In Chapter 4 the old cast iron water mains, which make up about 13% of Roundup's water distribution system, were identified as the most critical concern for the City. As previously

discussed, these old water mains cause significant health risks and severely limit fire protection. They also limit the City's ability to properly maintain the system. Specifically, the old cast iron mains have created the following issues:

- Corrosion of the mains has led to high levels of iron, manganese, sulphur, and Total Dissolved Solids (TDS) in the water. There are potential health risks for residents due to the high levels of iron that will be discussed later in this report.
- The system has a very high number of leaking mains and in the last two years has lost an average of 12% of their pumped water out of leaking mains.
- 21 of the gate valves are rusted into the open position, making isolating portions of the system difficult. Another 71 valves need to be added to make the system more efficient to operate.
- Hydraulics of the system is limited by a 1"-thick layer of rust that has built up inside the walls of the cast iron mains, reducing the amount of water available for fire flow and domestic demands.
- Chunks of rust in the mains have clogged the City's firefighting equipment, resulting in the City needing to install special screens in their equipment and eliminating the possibility for mutual aid to help the City in a large fire event.
- Water main leaks in leaking underground storage tank (LUST) sites can create backflow and contaminate the mains with hydrocarbons.
- An additional 32 hydrants need to be added to meet DEQ and fire code regulations.

The following five alternatives have been identified as possible solutions:

- Alternative D-1:** Replace all cast iron water mains within the system with PVC water mains of the same size.
- Alternative D-2:** Replace all cast iron water mains within the system with PVC water mains with a minimum diameter of 8".
- Alternative D-3:** Complete all the improvements in Alternative D-2, plus replace three blocks of existing 4" PVC main in 8th Avenue with 8" PVC.
- Alternative D-4:** Complete all improvements in Alternative D-2 and D-3, plus replace remaining existing 4" main with new 8" PVC main, and add hydrants.

Alternative D-5: No action.

5.1.6 Alternative D-1: Replace all Cast Iron Water Mains with PVC Mains of the Same Size

This alternative simply replaces the cast iron mains, many of which are undersized, with PVC mains of the same diameter. The advantage of this alternative is the cost savings involved with installing smaller mains.

With this alternative, the cost of water main materials would be cheaper, and the hydraulics would improve slightly, since the rusted lines will be removed. However, this alternative will not bring the system into compliance with Circular DEQ 1 for minimum main size, fire protection and fire flow requirements in some areas of the City. Therefore, this alternative does not solve the problems presented in previous chapters and will not be considered further.

5.1.7 Alternative D-2: Replace all Cast Iron Water Mains with Minimum 8" Diameter PVC Mains

Upgrading all existing 4" and some 6" diameter cast iron mains to 8" PVC mains will bring the system into compliance with DEQ regulations, will increase the hydraulic capacity of the mains, will allow for adequate fire flow, and will eliminate the majority of the leaking cast iron sections.

Although Circular DEQ 1 requires that systems have a minimum main size of 6", there are measurable hydraulic benefits when installing water mains from 6" to 8" diameter. An 8" main has nearly 80% more capacity than a 6" main, which results in reduced head loss at higher flows through the mains. There is a minimal cost difference between the 6" and 8" mains, so the benefits typically outweigh the costs. As part of the actual design, although 8" is preferred, in some areas where a 6" main provides the same hydraulic benefits, the 6" main may be installed to save money. However, a substantial majority of the new mains are expected to be 8".

As stated in previous chapters, the cast iron main sections within the City do not meet DEQ requirements for main size, valve spacing and hydrant spacing. In addition to increasing the main size, this alternative will include the installation of gate valves at every intersection or a maximum of every 500 feet in commercial areas and 800 feet in residential areas. Gate valves will also be installed at every tee and cross, with a valve on each line running from the fitting.

New fire hydrants will also be installed, both to replace existing hydrants that are inoperable and to decrease the distance between hydrants to include a hydrant at every intersection, as required by the DEQ Circular 1. Hydrant leads will be increased to 6" diameter and each lead will be equipped with an auxiliary valve. Overall, the City's ability to provide fire protection will increase significantly with the new mains, new hydrants, and the absence of the rust blocks clogging the pump trucks.

As part of design, methods of installation will be reviewed, such as comparing open cut trenching to pipe bursting. Pipe bursting can save time and money since it will have a limited amount of surface repairs. In previous projects, pipe bursting was not utilized because the existing mains are not at the required 6.5 feet depth to prevent freezing. The depth and type of mains will dictate whether or not pipe bursting would be an acceptable method of main replacement.

Since this alternative will solve the problems identified in previous chapters, it will be considered further.

5.1.8 Alternative D-3: Complete all Improvements in Alternative D-2, Replace Three Blocks of Existing 4" PVC Main in 8th Avenue with 8" PVC

This alternative simply takes Alternative D-2 and adds an additional three blocks of 8" main replacing 4" PVC installed in 8th Avenue. The 8" main is necessary to provide better hydraulics and improve fire flow to the area on the west side of the City. Since this alternative addresses all the system deficiencies identified in previous chapters, it will be considered further.

5.1.9 Alternative D-4: Complete all Improvements in Alternative D-2 & D-3, Replace all remaining 4" Mains with 8" PVC and Add Hydrants

This alternative takes Alternatives D-2 and D-3 and adds an additional 10 blocks of 4" PVC and AC main replacement with 8" PVC and installing hydrants where necessary. The 8" main is necessary to provide better hydraulics and improve fire flow to these areas of the City. Since this alternative will address all the system deficiencies identified in previous chapters, it will be considered further.

5.1.10 Alternative D-5: No Action

The “No Action” Alternative is sometimes an attractive alternative for communities since there are no capital costs associated with it, and water use rates could be kept down. However, in this case, by not completing these improvements, public health and safety will be continually at risk due to lack of fire flow capacity and the residents exposed to high iron in the water. The City would still need to continue to repair the high number of cast iron main leaks which are draining their resources and exposing the system to various contaminants. By not making any improvements, the system will continue to operate in its current state and deteriorate further. Therefore, the no action alternative is not considered viable and will not be considered further.

5.2 Supply Alternatives

No deficiencies were identified with the City water supply quantity. The City will continue to pursue connection to the Central Montana Regional Water System to improve quality. Therefore, no other alternatives are necessary.

5.3 Treatment Alternatives

No deficiencies were identified with the City’s water treatment system. Therefore, no other alternatives are necessary.

5.4 Storage Alternatives

No storage deficiencies were identified with the City’s water system. Therefore, no other alternatives are necessary.

5.5 Pumping Station Alternatives

No pumping station deficiencies were identified as they were corrected in Phase 1. Therefore, no pumping station alternatives are necessary.

5.6 Distribution System Alternatives

Five distribution system alternatives were identified in the Alternative Analysis to address health concerns related to the aging cast iron water mains, lack of fire protection and operation and

maintenance concerns. Two of the alternatives were not considered feasible, leaving the following alternatives to be evaluated in greater detail:

Alternative D-2: Replace all cast iron water mains with minimum 8" diameter PVC mains.

Alternative D-3: Complete all of the improvements in Alternative D-2, plus replace three blocks of existing 4" diameter PVC in 8th Avenue with 8" diameter PVC.

Alternative D-4: Complete all of the improvements in Alternative D-2 and D-3 plus replace remaining 4" mains with 8" diameter PVC and add hydrants.

All three alternatives described above would equally address all health risk and operation and maintenance concerns associated with the cast iron water mains. Alternative D-2 would address almost all fire protection deficiencies with only a few remaining at isolated locations. Alternative D-3 would address fire protection deficiencies near the high school and west side of the City. No identified fire protection deficiencies would remain with Alternative D-4. The costs and benefits of these three alternatives are further evaluated in the following sections.

5.6.1 Alt. D-2: Replace all Cast Iron Water Mains with Minimum 8" Diameter PVC Mains

Design Criteria

There is approximately 11,400 feet of cast iron main which still needs to be replaced after all of Phase 5 is completed. All 4" and 6" diameter mains will be upgraded to a minimum 8" diameter, and the cast iron mains would be replaced with PVC. **It should be noted that some mains will be 10" or 12" diameter to provide adequate fire flow where necessary.**

Also included with all the water main improvements will be the replacement of all existing hydrants, hydrant lead lines with auxiliary valves, and replacement of all existing gate valves. Additional fire hydrants and valves will also be installed to bring the system into compliance with DEQ and NFPA requirements.

It should be noted there is the possibility of needing to install ductile iron main with nitrile gaskets instead of PVC in areas where hydrocarbon contamination is an issue. PVC mains do not hold up well against hydrocarbons. There are several known areas around the City with leaking underground storage tanks, particularly within Main Street. The leaking underground storage tank sites are shown in Figure 4.3 and a map of these locations is located in Appendix B. It is estimated

200 feet of water main will be ductile iron instead of PVC. Other steps will also be taken to remove and replace any contaminated soil with imported backfill.

Also, during design of the water main improvements, the main sizes will be analyzed to ensure the City is getting the most value for the size of main being installed. In a few areas, mainly in the southwest area of the City, any 6" main may provide the same benefits as an 8" main. If this is indeed the case, the 6" main will be installed to save money.

This alternative would correct all the non-compliance issues with DEQ, which were listed in Chapter 3. Additionally, by eliminating the old cast iron water mains, the concentration of iron in the water would be reduced by about 93% under normal operating conditions. Although this would not bring it into full compliance with EPA's Secondary Drinking Water Quality Regulations (SDWQR), it would be much closer. The water will still comply with all of EPA's water quality enforceable standards.

Permitting would involve obtaining DEQ approval of the project plans and specifications. If the project disturbs an area greater than one acre, it would fall under the requirements of the "*General Permit for Storm Water Discharges Associated with Construction Activity*", which is required by the *Federal Water Pollution Control Act* and enforced by DEQ. These permits need to be obtained for any sizeable construction project.

Other permits could include occupancy permits from the Montana Department of Transportation for all work within State right-of-way and a Montana Floodway Management Act (Floodplain Development) Permit for construction within the flood plain in the southeast portion of the City. This permit is administered by the Roundup City Floodplain Coordinator.

These are all routine permits for water main replacements and obtaining them is not a significant concern.

Map

The map in Figure 5.1 shows the layout of the proposed distribution system improvements and the various main sizes throughout the network.

Environmental Impacts

Since construction will take place within improved City streets and alleys, there are no anticipated negative environmental impacts associated with this alternative. No wetlands or environmentally sensitive areas will be disturbed during construction. The CDBG 8-Step Process notifying the public of affecting floodplains will be followed and the City will obtain a floodplain permit. In areas where hydrocarbon contamination is known or discovered, the contaminated soil will be removed within the trench and hauled to a land farm to be treated. The trench will then be backfilled with a suitable imported backfill.

Land Requirements

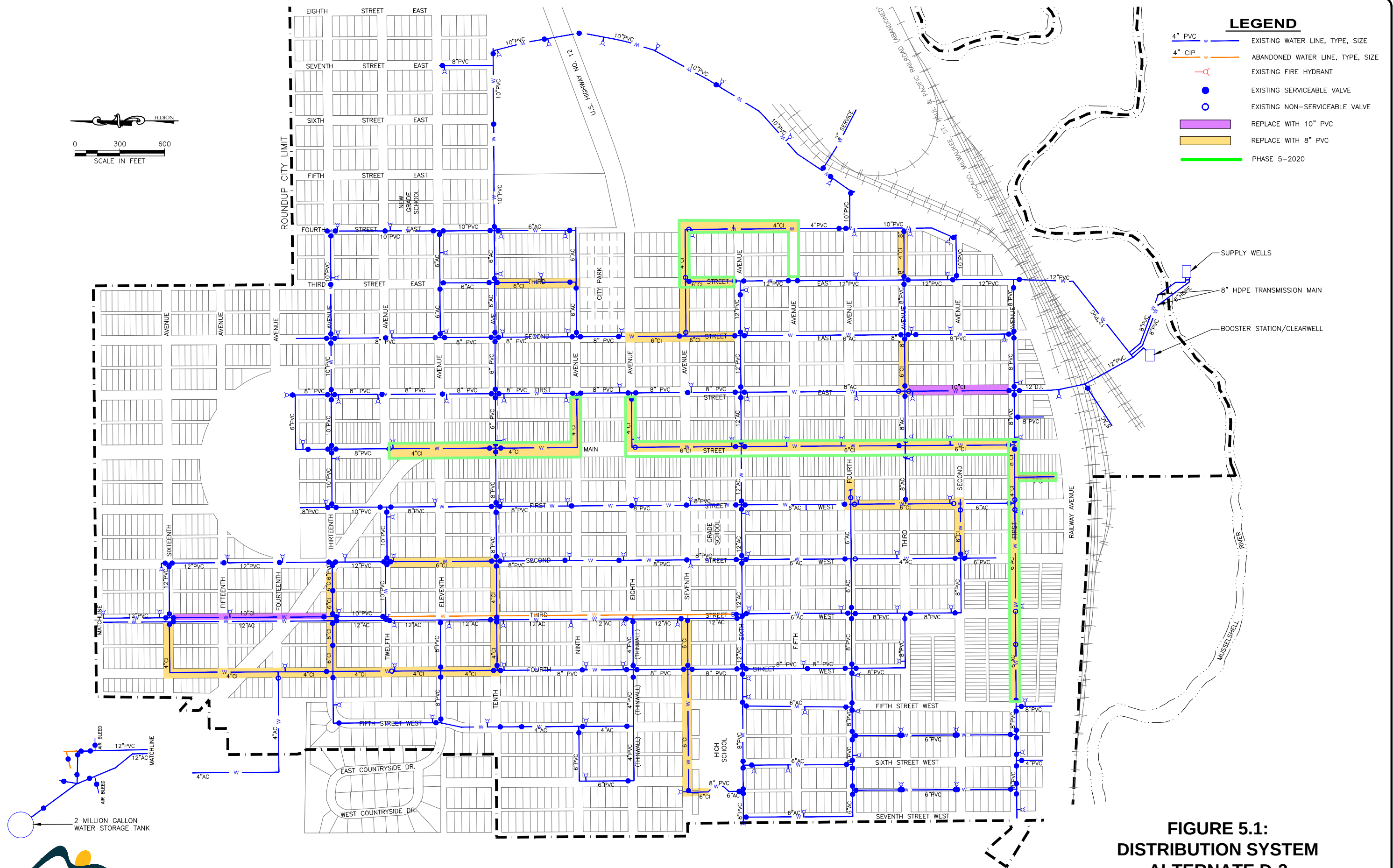
All work in this alternative would be completed within existing city and state rights-of-way. No land or easement acquisitions would be required.

Potential Construction Problems

Although this project replaces existing mains, there are still several challenges that will need to be addressed during construction. Temporary water will need to be installed to each of the homes and businesses affected by the main replacement. Isolation of the mains due to non-working valves will create areas that have to be live tapped. Some of the mains are installed in alleys, where a narrow right-of-way is available to work in and the adjacent property owners have structures installed up to their property line. Other obstructions in the alleys include other utilities, such as power, sewer mains, phone and gas lines, and overhead utility poles will need to be braced appropriately.

As stated, hydrocarbon contamination within the soil is known to exist at several locations. Where contamination is found, the soil must be removed and taken to a certified land farm, where it is to be treated. The location of the nearest land farm is the Billings Landfill which is approximately 55 miles from Roundup, and all contaminated soil would need to be dropped at the land farm. This could slow the project down considerably and add significant cost.

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**FIGURE 5.1:
DISTRIBUTION SYSTEM
ALTERNATE D-2**

CITY OF ROUNDUP
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Sustainability Considerations

The existing distribution system is severely undersized, severely corroded, and has an excessive number of water main breaks every year. By rehabilitating the existing distribution system, the City will be conserving approximately 90% of the lost water to bring it in line with national standards, reducing energy usage from well pumps, and eliminating approximately 93% of the high iron levels in the distributed water. This not only improves the water quality for consumption, but also improves the health and safety of the public through the proper fire protection for a more sustainable utility.

Water and Energy Efficiency

Since the new mains would not have nearly the number of leaks compared to the existing mains, they would require fewer repairs and maintenance. Consequently, less energy would be needed for running heavy equipment, transporting materials and flushing the water system. Also, with fewer leaks in the new system, less water would be lost which would result in slightly lower energy demands for pumping. As discussed in Section 3 above, reducing the water lost to the industry standard, will save approximately 19 million gallons of water per year.

The existing system pumps from the two wells to the system and storage tank using two 125 hp pumps with a design flow of 1,000 gpm. Using the 2019 energy bills as an average, the City uses approximately 162,000 kW-hr per year for pumping the water from the wells to the distribution system and tank.

The existing system is serviced by Northwestern Energy, and their average commercial rate is approximately \$0.10 per kW-hr. Estimating 20% is energy used to pump water currently lost (32,500 kw-hr) and reducing it by 90% to be at the industry standard, thus a 90% reduction in lost power used for the pumps, would mean a savings of 29,200 kW-hr/yr in energy usage and an annual estimated \$3,000 cost savings per year for the City.

Green Infrastructure

This alternative would reduce amount of groundwater pumped and the amount of energy consumed by the City, thus reducing the City's use of natural resources.

Other

By decreasing the amount of water leaks, the City will also spend less on O&M costs due to decreases in City personnel time, operating heavy equipment costs, and surface repair costs to repair the leaks and repair parts, making the system easier to operate.

Cost Estimates

Project Costs:

Total capital costs for this alternative are presented in Table 5.1, which includes costs for construction, engineering, and construction administration for all priorities. Since the City is considering using grant funding the project is anticipated to be completed in 2022 and project costs have been adjusted accordingly.

Annual O&M Costs:

In addition to the energy savings, it takes a two-man crew approximately five hours to dig up and fix a water main break, or approximately \$300 in labor, \$500 in parts, \$650 in equipment cost, and \$650 in surface repair. Estimating the system will come down to industry standard of 2 leaks per year, instead of the current average of about 6 leaks on the cast iron mains, for a total savings of \$8,400 annually. The O&M costs are shown in Table 5.2.

Table 5.1: Alternative D-2 Construction Cost Estimate

Item #	Description	QTY	UNITS	UNIT PRICE ¹	TOTAL
1	8" Dia. PVC Water Main	9,850	LF	\$ 49.00	\$ 482,650
2	10" Dia. PVC Water Main	1,820	LF	\$ 55.00	\$ 100,100
3	8" Gate Valves	61	EA	\$ 1,800.00	\$ 109,800
4	10" Gate Valves	4	EA	\$ 2,100.00	\$ 8,400
5	8" Dia. DI Water Main	120	LF	\$ 80.00	\$ 9,600
6	10" Dia. DI Water Main	80	LF	\$ 100.00	\$ 8,000
7	Fire Hydrants	16	EA	\$ 6,300.00	\$ 100,800
8	DI 90-deg Elbows	2	EA	\$ 840.00	\$ 1,680
9	DI Tees	8	EA	\$ 1,550.00	\$ 12,400
10	DI Crosses	6	EA	\$ 1,850.00	\$ 11,100
11	Connect to Existing Main	34	EA	\$ 1,900.00	\$ 64,600
12	1" Water Service Corp and Curb Stop	110	EA	\$ 900.00	\$ 99,000
13	1" Water Service Line	3,300	LF	\$ 60.00	\$ 198,000
14	AC Pipe Disposal	200	LF	\$ 15.00	\$ 3,000
15	Landfarm Hydrocarbon Soil	2,740	CY	\$ 25.00	\$ 68,500
16	Imported Backfill	200	CY	\$ 30.00	\$ 6,000
17	Pavement Surface Restoration	15,000	LF	\$ 50.00	\$ 750,000
18	Underground Utility Crossings	50	EA	\$ 500.00	\$ 25,000
19	Flowable Fill	400	CY	\$ 160.00	\$ 64,000
20	Curb & Gutter Remove & Replace	1,100	LF	\$ 35.00	\$ 38,500
21	Concrete Replacement	2,000	SF	\$ 25.00	\$ 50,000
22	Bore & Jack Highway Crossings	400	LF	\$ 360.00	\$ 144,000
Subtotal: 2020 Direct Construction Cost					\$ 2,356,000
	Mobilization		10.0%		\$ 235,600
	Traffic Control		1%		\$ 23,600
Subtotal: 2020 Construction Cost					\$ 2,616,000
	2022 Construction Cost ²		3.0%	annually	\$ 2,775,000
	Contingency		10%		\$ 278,000
Subtotal: 2022 Construction Cost					\$ 3,053,000
	Geotechnical Investigation				\$ 30,000
	Engineering		18%		\$ 550,000
	Legal & Administrative		3%		\$ 92,000
TOTAL: 2022 CAPITAL COST					\$ 3,725,000

¹ Estimated unit costs are based upon estimates from suppliers and bid tabs for similar projects throughout Montana.

² The ENR 20 year average Construction Cost Index is +3.09% (as of 2017). Capital improvement costs are projected to 2020 using 3.0% factor.

Table 5.2: Alternative D-2, D-3 & D-4 O&M Cost Estimate

TABLE 5-2 ESTIMATE INCREASE/DECREASE IN O&M COSTS				
ALTERNATIVE D-2, D-3 & D-4				
O&M Item	Estimated Cost	Recurrence Interval	Equivalent Annual O&M ¹	Present Worth ²
Distribution System				
Reduced Energy	(\$3,000)	1	(\$3,000)	(\$56,962)
Reduced Maintenance	(\$8,400)	1	(\$8,400)	(\$159,494)
Total			(\$11,400)	(\$216,457)
¹ Calculation based on 20-year real discount rate (0.5%) from Appendix C of OMB Circular A-94				
² Present worth based upon a 20 year life cycle using calculated discount rate.				

5.6.2 Alt. D-3: Complete all Improvements in Alternative D-2, Replace Three Blocks of Existing 4" PVC Main in 8th Avenue with 8" PVC

Design Criteria

This alternative includes all the main replacements proposed in Alternative D-2 and adds an additional three blocks of thin walled 4" PVC which is very fragile being upgraded to 8" PVC between 3rd and 6th Street West in 8th Avenue. The exact locations of the main replacements are shown in Figure 5.2.

Similar to Alternative D-2, this alternative also includes the replacement of existing fire hydrants and valves along with the installation of new valves and hydrants to bring the system into compliance with DEQ and NFPA requirements.

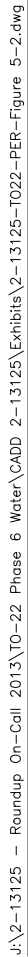
Map

The map in Figure 5.2 shows the layout of the proposed distribution system improvements and the various main sizes throughout the network.

Environmental Impacts

Since construction will take place within improved City streets and alleys, there are no anticipated negative environmental impacts associated with this alternative. No wetlands or environmentally sensitive areas will be disturbed during construction. The CDBG 8-Step Process notifying the

public of affecting floodplains will be followed and the City will obtain a floodplain permit. In areas where hydrocarbon contamination is known or discovered, the contaminated soil will be removed



within the trench and hauled to a land farm to be treated. The trench will then be backfilled with a suitable imported backfill.

Land Requirements

All work in this alternative would be completed within existing city and state rights-of-way. No land or easement acquisitions would be required.

Potential Construction Problems

Although this project replaces existing mains, there are still several challenges that will need to be addressed during construction. Temporary water will need to be installed to each of the homes and businesses affected by the main replacement. Some of the mains are installed in alleys, where a narrow right of way is available to work in and the adjacent property owners have structures installed up to their property line. Other obstructions in the alleys include other utilities, such as power, sewer mains, phone and gas lines, and overhead utility poles will need to be braced appropriately.

As stated, hydrocarbon contamination within the soil is known to exist in several locations. Where contamination is found, the soil must be removed and taken to a certified land farm. The location of the nearest land farm is Billings Landfill approximately 55 miles from Roundup, and all contaminated soil would need to be dropped at the land farm. This could slow the project down considerably and add significant cost.

Sustainability Considerations

The existing distribution system is severely undersized, severely corroded, and has an excessive number of water main breaks every year. By rehabilitating the existing distribution system, the City will be conserving approximately 90% of the lost water to bring it in line with national standards, reducing energy usage from well pumps, and eliminating approximately 93% of the high iron levels in the distributed water. This not only improves the water quality for consumption, but also improves the health and safety of the public through the proper fire protection for a more sustainable utility.

Water and Energy Efficiency

Since the new mains would not have nearly the number of leaks compared to the existing mains, they would require fewer repairs and maintenance. Consequently, less energy would be needed for running heavy equipment, transporting materials and flushing the water system. Also, with fewer leaks in the new system, less water would be lost which would result in slightly lower energy demands for pumping. As discussed in Section 3 above, reducing the water lost to the industry standard, will save approximately 19 million gallons of water per year.

The existing system pumps from the two wells to the system and storage tank using two 125 hp pumps with a design flow of 1,000 gpm. Using the 2017 energy bills as an average, the City uses approximately 170,000 kW-hr per year for pumping the water from the wells to the distribution system and tank.

The existing system is serviced by Northwestern Energy, and their average commercial rate is approximately \$0.10 per kW-hr. Estimating 20% is energy used to pump water currently lost (32,500 kw-hr) and reducing it by 90% to be at the industry standard, thus a 90% reduction in lost power used for the pumps, would mean a savings of 29,200 kW-hr/yr in energy usage and an annual estimated \$3,000 cost savings per year for the City.

Green Infrastructure

This alternative would reduce amount of groundwater pumped and the amount of energy consumed by the City, thus reducing the City's use of natural resources.

Other

By decreasing the amount of water leaks, the City will also spend less on O&M costs due to decreases in City personnel time, operating heavy equipment costs, and surface repair costs to repair the leaks and repair parts, making the system easier to operate.

Cost Estimates

Project Costs:

Total capital costs for this alternative are presented in Table 5.3, which includes costs for construction, engineering, and construction administration for all priorities. Since the City is

considering using grant funding the project is anticipated to be completed in 2022 and project costs have been adjusted accordingly.

Annual O&M Costs:

In addition to the energy savings, it takes a two-man crew approximately five hours to dig up and fix a water main break, or approximately \$300 in labor, \$500 in parts, \$650 in equipment cost, and \$650 in surface repair. Estimating and that the system will come down to industry standard of 2 leaks per year, instead of the current average of about 6 leaks on the cast iron mains, for a total savings of \$8,400 annually. The O&M costs are shown above in Table 5.2.

Table 5.3: Alternative D-3 Construction Cost Estimate

Item #	Description	QTY	UNITS	UNIT PRICE ¹	TOTAL
1	8" Dia. PVC Water Main	10,950	LF	\$ 49.00	\$ 536,550
2	10" Dia. PVC Water Main	1,820	LF	\$ 55.00	\$ 100,100
3	8" Gate Valves	69	EA	\$ 1,800.00	\$ 124,200
4	10" Gate Valves	4	EA	\$ 2,100.00	\$ 8,400
5	8" Dia. DI Water Main	120	LF	\$ 80.00	\$ 9,600
6	Fire Hydrants	18	EA	\$ 6,300.00	\$ 113,400
7	DI 90-deg Elbows	3	EA	\$ 840.00	\$ 2,520
8	DI Tees	9	EA	\$ 1,550.00	\$ 13,950
9	DI Crosses	7	EA	\$ 1,850.00	\$ 12,950
10	Connect to Existing Main	39	EA	\$ 1,900.00	\$ 74,100
11	1" Water Service Corp and Curb Stop	120	EA	\$ 900.00	\$ 108,000
12	1" Water Service Line	3,600	LF	\$ 60.00	\$ 216,000
13	AC Pipe Disposal	200	LF	\$ 15.00	\$ 3,000
14	Landfarm Hydrocarbon Soil	2,740	CY	\$ 25.00	\$ 68,500
15	Imported Backfill	200	CY	\$ 30.00	\$ 6,000
16	Pavement Surface Restoration	16,100	LF	\$ 50.00	\$ 805,000
17	Underground Utility Crossings	55	EA	\$ 500.00	\$ 27,500
18	Flowable Fill	400	CY	\$ 160.00	\$ 64,000
19	Curb & Gutter Remove & Replace	1,150	LF	\$ 35.00	\$ 40,250
20	Concrete Replacement	2,000	SF	\$ 25.00	\$ 50,000
21	Bore & Jack Highway Crossings	400	LF	\$ 360.00	\$ 144,000
Subtotal: 2020 Direct Construction Cost					\$ 2,529,000
	Mobilization		10.0%		\$ 252,900
	Traffic Control		1%		\$ 25,300
Subtotal: 2020 Construction Cost					\$ 2,808,000
	2022 Construction Cost ²		3.0%	annually	\$ 2,979,000
	Contingency		10%		\$ 298,000
Subtotal: 2022 Construction Cost					\$ 3,277,000
	Geotechnical Investigation				\$ 30,000
	Engineering		18%		\$ 590,000
	Legal & Administrative		3%		\$ 99,000
TOTAL: 2022 CAPITAL COST					\$ 3,996,000

¹ Estimated unit costs are based upon estimates from suppliers and bid tabs for similar projects throughout Montana.

² The ENR 20 year average Construction Cost Index is +3.09% (as of Dec 2017). Capital improvement costs are projected to 2020 using 3.0% factor.

5.6.3 Alt. D-4: Complete all Improvements in Alternative D-2 & D-3, Replace all remaining 4" Mains with 8" PVC and Add Hydrants

Design Criteria

This alternative includes all the main replacements proposed in Alternative D-2 and D-3 and adds an additional ten blocks of 4" PVC and AC mains being upgraded to 8" PVC. Also added is the replacement of broken hydrants and additional hydrants where needed. The exact locations of the main replacements are shown in Figure 5.3.

Similar to Alternative D-2, this alternative also includes the replacement of existing fire hydrants and valves along with the installation of new valves and hydrants to bring the system into compliance with DEQ and NFPA requirements.

Map

The map in Figure 5.3 shows the layout of the proposed distribution system improvements and the various main sizes throughout the network.

Environmental Impacts

Since construction will take place within improved City streets and alleys, there are no anticipated negative environmental impacts associated with this alternative. No wetlands or environmentally sensitive areas will be disturbed during construction. The CDBG 8-Step Process notifying the public of affecting floodplains will be followed and the City will obtain a floodplain permit. In areas where hydrocarbon contamination is known or discovered, the contaminated soil will be removed within the trench and hauled to a land farm to be treated. The trench will then be backfilled with a suitable imported backfill.

Land Requirements

All work in this alternative would be completed within existing city and state right-of-way. No land or easement acquisitions would be required.

Potential Construction Problems

Although this project replaces existing mains, there are still several challenges that will need to be addressed during construction. Temporary water will need to be installed to each of the homes

and businesses affected by the main replacement. Some of the mains are installed in alleys, where a narrow right of way is available to work in and the adjacent property owners have structures installed up to their property line. Other obstructions in the alleys include other utilities, such as power, sewer mains, phone and gas lines, and overhead utility poles will need to be braced appropriately.

As stated, hydrocarbon contamination within the soil is known to exist in several locations. Where contamination is found, the soil must be removed and taken to a certified land farm. The location of the nearest land farm is Billings Landfill approximately 55 miles from Roundup, and all contaminated soil would need to be dropped at the land farm. This could slow the project down considerably and add significant cost.

Additionally, the AC main will have to be bagged and transported to the Billings Landfill for proper disposal as well.

Sustainability Considerations

The existing distribution system is severely undersized, severely corroded, and has an excessive number of water main breaks every year. By rehabilitating the existing distribution system, the City will be conserving approximately 90% of the lost water to bring it in line with national standards, reducing energy usage from well pumps, and eliminating approximately 93% of the high iron levels in the distributed water. This not only improves the water quality for consumption, but also improves the health and safety of the public through the proper fire protection for a more sustainable utility.

Water and Energy Efficiency

Since the new mains would not have nearly the number of leaks compared to the existing mains, they would require fewer repairs and maintenance. Consequently, less energy would be needed for running heavy equipment, transporting materials and flushing the water system. Also, with fewer leaks in the new system, less water would be lost which would result in slightly lower energy demands for pumping. within the trench and hauled to a land farm to be treated. The trench will then be backfilled with a suitable imported backfill.

The existing system pumps from the two wells to the system and storage tank using two 125 hp pumps with a design flow of 1,000 gpm. Using the 2019 energy bills as an average, the City uses approximately 162,000 kW-hr per year for pumping the water from the wells to the distribution system and tank.

The existing system is serviced by Northwestern Energy, and their average commercial rate is approximately \$0.10 per kW-hr. Estimating 20% is energy used to pump water currently lost (32,500 kw-hr) and reducing it by 90% to be at the industry standard, thus a 90% reduction in lost power used for the pumps, would mean a savings of 29,200 kW-hr/yr in energy usage and an annual estimated \$3,000 cost savings per year for the City.

Green Infrastructure

This alternative would reduce amount of groundwater pumped and the amount of energy consumed by the City, thus reducing the City's use of natural resources.

Other

By decreasing the amount of water leaks, the City will also spend less on O&M costs due to decreases in City personnel time, operating heavy equipment costs, and surface repair costs to repair the leaks and repair parts, making the system easier to operate.

Cost Estimates

Project Costs:

Total capital costs for this alternative are presented in Table 5.4, which includes costs for construction, engineering, and construction administration for all priorities. Since the City is

considering using grant funding the project is anticipated to be completed in 2022 and project costs have been adjusted accordingly.

Annual O&M Costs:

In addition to the energy savings, it takes a two-man crew approximately five hours to dig up and fix a water main break, or approximately \$300 in labor, \$500 in parts, \$650 in equipment cost, and \$650 in surface repair. Estimating the system will come down to industry standard of 2 leaks per year, instead of the current average of about 6 leaks, for a total savings of \$8,400 annually.

Table 5.4: Alternative D-4 Construction Cost Estimate

Item #	Description	QTY	UNITS	UNIT PRICE ¹	TOTAL
1	8" Dia. PVC Water Main	13,300	LF	\$ 49.00	\$ 651,700
2	10" Dia. PVC Water Main	1,820	LF	\$ 55.00	\$ 100,100
3	8" Gate Valves	81	EA	\$ 1,800.00	\$ 145,800
4	10" Gate Valves	4	EA	\$ 2,100.00	\$ 8,400
5	8" Dia. DI Water Main	120	LF	\$ 80.00	\$ 9,600
6	Fire Hydrants	24	EA	\$ 6,300.00	\$ 151,200
7	DI 90-deg Elbows	4	EA	\$ 840.00	\$ 3,360
8	DI Tees	10	EA	\$ 1,550.00	\$ 15,500
9	DI Crosses	8	EA	\$ 1,850.00	\$ 14,800
10	Connect to Existing Main	47	EA	\$ 1,900.00	\$ 89,300
11	1" Water Service Corp and Curb Stop	178	EA	\$ 900.00	\$ 160,200
12	1" Water Service Line	5,300	LF	\$ 60.00	\$ 318,000
13	AC Pipe Disposal	200	LF	\$ 15.00	\$ 3,000
14	Landfarm Hydrocarbon Soil	2,740	CY	\$ 25.00	\$ 68,500
15	Imported Backfill	200	CY	\$ 30.00	\$ 6,000
16	Pavement Surface Restoration	18,760	LF	\$ 50.00	\$ 938,000
17	Underground Utility Crossings	65	EA	\$ 500.00	\$ 32,500
18	Flowable Fill	400	CY	\$ 160.00	\$ 64,000
19	Curb & Gutter Remove & Replace	1,400	LF	\$ 35.00	\$ 49,000
20	Concrete Replacement	2,025	SF	\$ 25.00	\$ 50,625
21	Bore & Jack Highway Crossings	400	LF	\$ 360.00	\$ 144,000
Subtotal: 2020 Direct Construction Cost					\$ 3,024,000
	Mobilization		10.0%		\$ 302,400
	Traffic Control		1%		\$ 30,300
Subtotal: 2020 Construction Cost					\$ 3,357,000
	2022 Construction Cost ²		3.0% annually		\$ 3,561,000
	Contingency		10%		\$ 357,000
Subtotal: 2022 Construction Cost					\$ 3,918,000
	Geotechnical Investigation				\$ 30,000
	Engineering		18%		\$ 706,000
	Legal & Administrative		3%		\$ 118,000
TOTAL: 2022 CAPITAL COST					\$ 4,772,000

¹ Estimated unit costs are based upon estimates from suppliers and bid tabs for similar projects throughout Montana.

² The ENR 20 year average Construction Cost Index is +3.09% (as of Dec 2017). Capital improvement costs are projected to 2020 using 3.0% factor.

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6.0 SELECTION OF AN ALTERNATIVE

Each of the technically feasible alternatives considered meet the design criteria and applicable regulations identified in the alternative description. This section will examine advantages and disadvantages of each in terms of life cycle costs, and non-monetary factors including operation and maintenance considerations, permitting concerns, social impacts, community support, environmental impacts such as greenhouse gas reductions, wetland relocation, etc., and other non-monetary considerations.

6.1 Life Cycle Cost Analysis

The cost of extensive capital improvements to meet minimum health and safety requirements, applicable regulations, and environmental impacts is a great concern to small communities with limited budgets and resources. At the same time, some alternatives may have a low capital costs but high O&M costs that will put a continual burden on the community. A life cycle cost analysis provides a method to compare the costs of each alternative to one another.

To complete the life cycle cost analysis, the anticipated annual increase or decrease to O&M costs and estimated salvage value of any improvements based upon straight line depreciation are converted to present day dollars using the “real” discount rate from Appendix C of Office of Management and Budget (OMB) Circular A-94. The net present value is then calculated for each alternative by adding the estimated capital cost and present worth of the increased O&M and then subtracting the present worth of the calculated salvage value.

Table 6.1 summarizes the life cycle cost analysis for all of the alternatives.

Table 6.1: Life Cycle Cost Analysis

Alternative	Capital Cost	Annual Increase to O&M	Present Worth of O&M Increase	20 year Salvage Value	Present Worth of Salvage	Net Present Value	Criteria Score
D-2	\$ 3,725,000	(\$11,400)	(\$216,457)	\$ 541,000	\$ 489,600	\$3,018,943	6.1
D-3	\$ 3,996,000	(\$11,400)	(\$216,457)	\$ 662,000	\$ 599,200	\$3,180,343	5.6
D-4	\$ 4,772,000	(\$11,400)	(\$216,457)	\$ 810,000	\$ 733,100	\$3,822,443	3.9

6.2 Ranking Criteria

A matrix to compare each alternative objectively against the other will be developed to select the preferred alternative. Each alternative will be given a score ranging from 0 to 10 for a number of criteria, with 0 representing a negative impact and 10 representing the maximum benefit to the community. The alternatives will begin with a score of 5 for each criterion, and then the score will be adjusted up or down relative to the benefit of the particular alternative in relation to the other alternatives.

In addition to scoring each alternative, the criteria themselves will be weighted in relation to one another. Weighting factors ranging from 1 to 10 will be used to give greater importance to items such as cost. This is appropriate, as often times higher investments are made to overcome many other problems such as reliability or to mitigate problems with technical feasibility or environmental concerns.

6.2.1 Life Cycle Costs

The cost of extensive capital improvements to meet minimum health and safety requirements, applicable regulations, and environmental impacts is a great concern to small communities with limited budgets and resources. Life cycle costs also include anticipated increases to ongoing O&M costs.

Accordingly, this criterion will be provided with the maximum weighting factor of 10. This represents 20% of the total weighting, and Public Opinion is closely tied to cost also, giving the cost for each alternative even more weight.

In addition to providing the maximum emphasis on costs, a method must be utilized to provide an objective comparison of costs for each alternative relative to one another and not just an overall comparison. Given a range of costs for various alternatives, the relative cost of any alternative can be determined using the lowest cost and the highest cost from the range of costs and the following equation:

$$5 \times [(Lowest\ Cost) / (Cost) + (Highest\ Cost - Cost) / (Highest\ Cost)]$$

For example, if a number of alternatives were compared having costs of \$500,000, \$1,000,000, and \$2,000,000, the above equation would provide scores of 8.8, 5.0, and 1.3. The utilization of

a formula to score the 20-year life cycle costs in the matrix eliminates any subjectivity and provides a consistent, relative comparison of costs.

6.2.2 Non-Monetary Factors

6.2.2.1 Operational and Maintenance Considerations

Operation and maintenance is an important issue when considering any large capital improvements within a small community. The costs for O&M associated with the alternatives is included in the 20-year life cycle costs compared under the financial feasibility, but there are other considerations that must be weighed for the O&M associated with each alternative.

The City has limited resources and manpower, and some alternatives may have O&M requirements that drastically tax those limited resources creating deficiencies in other areas. City personnel also have a much more intrinsic knowledge of the system than the average resident or even Council members. Priorities identified by the operators to facilitate the efficient operation of the system must be given some weight.

This criterion will be provided with a weighting factor of 7.

6.2.2.2 Permitting Issues

Some alternatives may encounter permitting issues that would significantly delay the project and/or result in additional expenses for the community. Consideration for these concerns will be given under this criterion.

This criterion will be provided with a weighting factor of 5.

6.2.2.3 Social Impacts

Social impacts will be considered in the final alternative selection as a project poorly supported by the community will have a limited chance of success. Efforts such as public hearings, Needs Assessments, and Social Media comments are ways to identify public opinion and perceptions. Costs are always a concern with consumers, but the health and safety of their families is just as important.

This criterion will be provided with a weighting factor of 7.

6.2.2.4 Environmental Impacts

Environmental impacts for each alternative, whether detrimental or beneficial, need to be considered in the final selection of a preferred alternative including any wetland relocation and greenhouse gas effects.

This criterion will be provided with a weighting factor of 5.

6.2.2.5 Sustainability Considerations

Sustainable utility management practices can greatly benefit a community and result in cost savings. Consideration will be given to alternatives benefitting the sustainability of the utility.

Since sustainability benefits are nearly equal between all alternatives, this criterion will be provided with a weighting factor of 4.

6.2.2.6 Land Acquisition

Issues with land acquisition often supersede the black-and-white world of engineering. This ranking category will include the feasibility of acquiring sufficient land in terms of lease, right-of-way, and/or land purchases. Although these are not strict engineering issues, problems with land acquisition can greatly impact a project's overall feasibility and require that land issues be given a very serious consideration.

Since all improvements are within City right-of-way, land acquisition is a minor concern. This criterion will be provided with a weighting factor of 5.

6.2.2.7 Public Health and Safety

Alternatives that do not meet the public health and safety requirements as required by the state and federal governments were eliminated during the Alternative Analysis. The alternatives retained for the Alternative Analysis are designed to meet public health and safety laws, so the scoring for each alternative under this criterion would be expected to be fairly high.

This criterion will be provided with a weighting factor of 10.

6.3 Scoring of Distribution System Alternatives

Three Distribution System Alternatives were discussed in detail in Chapter 5. The alternatives were as follows:

- Alternative D-2:** Replace all Cast Iron Water Mains with Minimum 8" Diameter PVC Mains
- Alternative D-3:** Complete all of the Improvements in Alternative D-2, plus Replace Three Blocks of Existing 4" Diameter PVC in 8th Avenue with 8" Diameter PVC.
- Alternative D-4:** Complete all of the Improvements in Alternative D-2 and D-3 plus Replace Remaining 4" Mains with 8" Diameter PVC, and Adding Additional Hydrants Where Needed.

6.3.1 Life Cycle Costs

The estimated cost for Alternatives D-2, D-3 and D-4 are \$3.7 million, \$4.0 million and \$4.8 million (See Tables 5.1, 5.3, and 5.4). Using the life cycle cost equation, Alternatives D-2 receives a financial feasibility scores of 5.9, D-3 receives a 5.7 and D-4 receives a 4.1 for each alternative as is shown in Table 6.1 above.

6.3.2 Non-Monetary Scoring

6.3.2.1 Operational and Maintenance Considerations

As previously discussed the City currently has difficulty maintaining their system due to the number of leaks from the old cast iron water mains and all of the inoperable gate valves within the system. All three alternatives would equally address these concerns and would actually improve operation and maintenance of the system. However, since Alternative D-3 increases the ability to adequately fight a fire, it receives a score of 8, D-4 further increases the ability to fight fire due to increased fire capacity in the areas where 4" water main will be replaced by 8" and so receives a score of 9, while D-2 receives a score of 7.

6.3.2.2 Permitting Issues

All three distribution alternatives will require Montana Department of Transportation (MDT) permits for highway crossings. However, as this is a fairly typical permit, all three alternatives will be given a score of 7 for this criterion.

6.3.2.3 Social Impacts

A Community Needs Assessment was completed in 2010 and again in 2016. Overwhelmingly the City residents identified the water and water quality as the biggest concern they had with living in the City. Also, a public meeting was held on March 3, 2020 to present the PER and to gather public comment. Those in attendance also stated support for the project and that improving water quality should be a top priority for the City. However, with the cost of Alternative D-3 being higher, residents generally supported the lower cost alternative. Therefore, Alternative D-2 receives a score of 9, Alternative D-3 receives a score of 8 and Alternative D-4 receives a score of 7.

6.3.2.4 Environmental Impacts

All three alternatives are anticipated to have minimal negative environmental impacts since no wetlands or environmentally sensitive areas will be disturbed during construction and changes in greenhouse gas emissions are negligible. It could be argued there will be improvements to the area since some of the hydrocarbon contaminated soils will be removed and replaced where mains are installed and decreases in energy usage for both the pumps and repair equipment will have minute decrease in the greenhouse gas, but they are immeasurable. Although some of the work will take place in the 100-year floodplain to replace the existing water mains, the surface will be restored to its previous elevation, so no negative impacts are anticipated. Therefore, all three alternatives will receive a score of 10.

6.3.2.5 Sustainability Considerations

All three alternatives are anticipated to create a more sustainable utility through replacement of the undersized and severely corroded water mains. Both alternatives will not only increase energy savings, but also reduce water lost due to water main breaks. However, Alternative D-4 increases fire flow to all the low flow areas so it will be given a score of 10, Alternative D-3 increases fire flow near the high school and to the west side of the City so it will be given a score of 9, and D-2 will be given a score of 9 since its overall benefits are similar to D-3.

6.3.2.6 Land Acquisition

None of the alternatives require the acquisition of new land; therefore, all three will be given a median score of 5.

6.3.2.7 Public Health and Safety

All three alternatives provide substantial improvements to public health and safety by addressing all health and safety concerns related to the cast iron mains within the City. However, Alternative D-2 does not completely resolve the fire deficiencies in the system as does Alternative D-3 and D-4. Therefore, Alternative D-3 and D-4 receive scores of 9 while Alternative D-2 receives a score of 7.

6.4 Decision Matrix and Selection of Preferred Alternative

The scores and the weighted scores for each alternative were compiled to provide a comparison using a decision matrix as shown in Table 6.2. Based upon the decision matrix, the preferred alternative for the distribution system is **Alternative D-3: Complete all of the improvements in alternative D-2, plus replace three blocks of existing 4" diameter PVC in 8th Avenue with 8" diameter PVC.**

Table 6.2: Decision Matrix for Preferred Alternative

Alternative	Life Cycle Cost		Operation and Maintenance		Permitting Issues		Social Impacts		Environmental Impacts		Sustainability		Land Acquisition		Public Health & Safety		Total
	Weight:	10	Weight:	7	Weight:	5	Weight:	7	Weight:	5	Weight:	4	Weight:	5	Weight:	10	
	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	
Distribution System Alternatives																	
D-2	6	60	7	49	7	35	9	63	10	50	9	36	5	25	7	70	388
D-3	5.5	55	8	56	7	35	8	56	10	50	9	36	5	25	9	90	403
D-4	4	40	9	63	7	35	7	49	10	50	10	40	5	25	9	90	392

7.0 PROPOSED PROJECT

The recommended improvements to the Roundup Water System consist of:

- Alternative D-3: Replace all cast iron water mains within the system with PVC main with a minimum main size of 8", replace AC mains in the highway and replace three blocks of 4" PVC main in 8th Avenue.

It is likely the City will not be able to address all of the improvements in a single phase due to the size of the project, costs and the resulting financial burdens it would have on the rate payers. Therefore, the City will need to determine the highest priority improvements within the alternatives and complete construction in phases, as they have been doing on the previous five phases.

7.1 Preliminary Project Design

Chapter 3 included a detailed analysis of the need for improvements. Without a doubt, the highest priority is the replacement of the cast iron mains due to their negative health and safety effects on the public and their impact on poor water quality.

The improvements to the distribution system will be completed in accordance with *Circular DEQ 1, Standards for Water Works, Chapter 8*. Specifically, the following sections will be addressed:

Section 8.3: Sufficient valves must be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves should be located at not more than 500-foot intervals in commercial districts and at no more than one block or 800-foot intervals in other districts.

Section 8.4.3: Hydrant leads must be a minimum of 6" in diameter.

Section 8.2.2: The minimum size for a water main providing fire protection is 6".

Section 8.2.3: Water mains not designed to carry fire-flows may not have fire hydrants connected to them.

Section 8.4.1: Hydrants should be provided at each street intersection.

7.1.1 Distribution System

All distribution system reconstruction would be located within existing City, County or State right-of-way throughout the City. The existing mains are located within streets and alleys.

Several additional items that are incidental to the water main reconstruction include replacement of inoperable gate valves throughout the system, installation of additional gate valves, replacement of old fire hydrants, installation of additional fire hydrants, and replacement of water service lines from the water main to the curb stops. All of these incidental improvements will be limited to the areas served by the water mains being replaced. In the future, installation of additional valves and fire hydrants may also be desired along the existing PVC and AC water mains where more valves and hydrants are needed.

7.1.1.1 Hydraulic Calculations

A hydraulic computer model was developed as part of the PER to represent the City's water system. Several potential alternatives were modeled prior to the selection of the preferred alternative. Modeling and the results are discussed in Section 3.3.5. Initial modeling identified many areas that do not deliver adequate fire flow as shown in Figure 3.11. The model shows in general the fire flow capacity is restricted in these areas because of the under-sized water mains.

Hydraulic calculations for the recommended distribution system improvements are provided in Appendix I. Circular DEQ 1, Section 8.2.1 states a water system must have ... *a minimum system pressure of 20-psi during fire flow*. The fire flow scenario calculations show the maximum flow that can be drawn individually from each hydrant while maintaining a minimum system pressure of 20-psi.

The *NFPA Uniform Fire Code* - Sections H 5.1 & H 5.2 establishes minimum fire flow standards. The minimum fire flow requirements are based on building occupancy, size and type of construction. As shown in Section 3.3.5, Roundup's existing water system falls far short of providing minimum required fire flows. The required flows are 1,000 gpm for most of the residential buildings and 1,500 gpm for most of the commercial buildings.

The majority of the fire protection deficiencies will be corrected by replacing all of the cast iron water mains with new PVC water mains and upsizing all 4" and 6" cast iron pipes to at least 8"

diameter PVC. The increased hydraulic capacity would be magnified by the fact that many of the cast iron mains have a one-inch-thick layer of rust built up on their inside wall.

Replacing cast iron water mains alone would not address all fire flow deficiencies. The high school requires fire flows of 6,250 gpm and the new elementary school requires fire flow of 2,150 gpm as determined from the NFPA standards based on building size. After replacing all cast iron water mains, fire flow to both schools would be approximately 3,800 gpm. The limiting factor is a low pressure area at the north end of the City. The low pressure is a result of higher elevation at the north end of the City and head loss from the tank leading into the distribution system.

7.2 Project Schedule

PER final findings were presented to the City on March 3, 2020 at a public hearing. The PER will then be used to apply for grant funding in May and June 2020 and April 2021. Funding from TSEP and DNRC grants and loans will be available in June 2021 upon approval of the state legislature, and funding from CDBG will be available in September 2021. Section 8 of this report contains a more formal breakdown of the anticipated project dates.

Table 7.1: Preliminary Project Schedule

TSEP & DNRC Grant Startup	August 2021
CDBG Startup	September 2021
Design	October-November 2021
Submit to DEQ	November 2021
Apply for Permits	January 2022
Advertisement & Bidding	February 2022
Award of Project	March 2022
Construction	April – June 2022
Closeout	August 2022

7.3 Permit Requirements

Improvements to the distribution system in MDT right-of-way will require an MDT utility occupancy and location permit. Additionally, all work in the 100-year floodplain will require a floodplain permit and following the CDBG early public notice for work in the floodplain. These permits will be obtained before the project is bid during the final design phase.

7.4 Sustainability Considerations

The existing collection system is severely undersized and severely corroded. By rehabilitating the existing distribution system, the City will be eliminating approximately 93% of the high iron levels in the distributed water, not only improving the water quality for consumption, but also improving the health and safety of the public through the proper fire protection for a more sustainable utility.

7.4.1 Water and Energy Efficiency

Since the new mains would not have nearly the amount of leaks compared to the existing mains, they would require fewer repairs and maintenance. Consequently, less energy would be needed for running heavy equipment, transporting materials and flushing the water system. Also, with fewer leaks in the new system, less water would be lost which would result in lower energy demands for pumping. Although the benefit to not having to repair the leaking lines is difficult to quantify, the estimated energy savings by eliminating the water loss will save the City \$3,000 per year and will conserve up to 19 million gallons annually, which is 90% of their annual water loss.

7.4.2 Green Infrastructure

The proposed improvements to the distribution system will conserve, manage, and preserve natural resources by eliminating leaking water from deteriorated cast iron pipes and significantly reducing the energy required for pumping. The proposed improvements will also preserve natural resources by protecting groundwater from chlorinated water by reducing leaks. Approximately 21 million gallons or 20% of the City's annual pumped water is lost due to leaks.

7.4.3 Other

The replacement of the existing dilapidated portions of the distribution system will reduce operator time spent digging up and repairing leaks. By adding additional working valves and fire hydrants, the system will meet current DEQ standards, will simplify operation along with adding additional longevity to the existing system. Additional working fire hydrants will protect the health, welfare, and safety of the public in case of fire events such as those that occurred in 2013 and 2014.

7.5 Total Project Cost Estimate

The following sections discuss the estimated cost of the recommended alternatives.

Table 7.2 provides the overall cost estimate of the water system improvements shown in Figure 7.1.

Table 7.2: Capital Cost of Alternative D-3

Item #	Description	QTY	UNITS	UNIT PRICE ¹	TOTAL
1	8" Dia. PVC Water Main	10,950	LF	\$ 49.00	\$ 536,550
2	10" Dia. PVC Water Main	1,820	LF	\$ 55.00	\$ 100,100
3	8" Gate Valves	69	EA	\$ 1,800.00	\$ 124,200
4	10" Gate Valves	4	EA	\$ 2,100.00	\$ 8,400
5	8" Dia. DI Water Main	120	LF	\$ 80.00	\$ 9,600
6	Fire Hydrants	18	EA	\$ 6,300.00	\$ 113,400
7	DI 90-deg Elbows	3	EA	\$ 840.00	\$ 2,520
8	DI Tees	9	EA	\$ 1,550.00	\$ 13,950
9	DI Crosses	7	EA	\$ 1,850.00	\$ 12,950
10	Connect to Existing Main	39	EA	\$ 1,900.00	\$ 74,100
11	1" Water Service Corp and Curb Stop	120	EA	\$ 900.00	\$ 108,000
12	1" Water Service Line	3,600	LF	\$ 60.00	\$ 216,000
13	AC Pipe Disposal	200	LF	\$ 15.00	\$ 3,000
14	Landfarm Hydrocarbon Soil	2,740	CY	\$ 25.00	\$ 68,500
15	Imported Backfill	200	CY	\$ 30.00	\$ 6,000
16	Pavement Surface Restoration	16,100	LF	\$ 50.00	\$ 805,000
17	Underground Utility Crossings	55	EA	\$ 500.00	\$ 27,500
18	Flowable Fill	400	CY	\$ 160.00	\$ 64,000
19	Curb & Gutter Remove & Replace	1,150	LF	\$ 35.00	\$ 40,250
20	Concrete Replacement	2,000	SF	\$ 25.00	\$ 50,000
21	Bore & Jack Highway Crossings	400	LF	\$ 360.00	\$ 144,000
Subtotal: 2020 Direct Construction Cost					\$ 2,529,000
	Mobilization		10.0%		\$ 252,900
	Traffic Control		1%		\$ 25,300
Subtotal: 2020 Construction Cost					\$ 2,808,000
	2022 Construction Cost ²		3.0% annually		\$ 2,979,000
	Contingency		10%		\$ 298,000
Subtotal: 2022 Construction Cost					\$ 3,277,000
	Geotechnical Investigation				\$ 30,000
	Engineering		18%		\$ 590,000
	Legal & Administrative		3%		\$ 99,000
TOTAL: 2022 CAPITAL COST					\$ 3,996,000

¹ Estimated unit costs are based upon estimates from suppliers and bid tabs for similar projects throughout Montana.

² The ENR 20 year average Construction Cost Index is +3.09% (as of Dec 2017). Capital improvement costs are projected to 2020 using 3.0% factor.

As stated, the City will not be able to fund the entire \$4.0 million in one project. Instead, as has been the case, the improvements will be phased with a main replacement project scheduled every two years. The amount of main replaced is dependent on the amount of grant and loan money obtained to cover the project costs. Assuming every two years the City can obtain grant funds in the amount of \$1.625 million, they can replace up to 5,200 feet of water main with each project without taking out more loans. However, with Phase 6 the city feels that the cast iron in the northwest corner of town should be replaced in its entirety, therefore the city will provide more funds from their reserve. The next phase for main replacement was determined based upon the mains that have required the most leak repairs and maintenance, and is generally described below:

Phase 6:

Schedule 1: Fourth Street East from 16th Avenue to 10th Avenue, 16th Avenue North from Fourth Street East to Third Street East, 13th Avenue from Fourth Street East to Second Street East, and 10th Avenue from Fourth Street East to Second Street East.

Schedule 2: Third Street East from 16th Avenue to 13th Avenue.

The actual phasing of the improvements may vary some between projects, depending on funding and maintenance needs. Phasing for the remainder of the water main replacements will be determined based on the concentration of leaking mains, the size of the main and proximity to residents and businesses. See cost estimates shown in Table 7.3-7.5 for Schedule 1 and 2. Figure 7.1 shows a map of Phase 6 water system improvements.

Table 7.3: Capital Cost of Phase 6-Schedule 1

Item #	Description	QTY	UNITS	UNIT PRICE ¹	TOTAL
1	8" Dia. PVC Water Main	4,700	LF	\$ 49.00	\$ 230,300
2	8" Dia. DI Water Main	100	LF	\$ 80.00	\$ 8,000
3	10" Dia. PVC Water Main	30	LF	\$ 55.00	\$ 1,650
4	12" Dia. PVC Water Main	20	LF	\$ 60.00	\$ 1,200
5	6" Dia. PVC Water Main	20	LF	\$ 45.00	\$ 900
6	8" Gate Valves	33	EA	\$ 1,800.00	\$ 59,400
7	8" Tee	5	EA	\$ 1,550.00	\$ 7,750
8	8" Cross	4	EA	\$ 1,850.00	\$ 7,400
9	8" 90	1	EA	\$ 840.00	\$ 840
10	8" x 12" Reducer	7	EA	\$ 680.00	\$ 4,760
11	8" x 10" Reducer	3	EA	\$ 670.00	\$ 2,010
12	8" x 6" Reducer	1	EA	\$ 660.00	\$ 660
13	8" x 4" Reducer	1	EA	\$ 650.00	\$ 650
14	Connect to Existing Mains	14	EA	\$ 1,000.00	\$ 14,000
15	Fire Hydrants	8	EA	\$ 6,300.00	\$ 50,400
16	Exploratory Excavation	10	HR	\$ 220.00	\$ 2,200
17	1" Water Service Corp	40	EA	\$ 450.00	\$ 18,000
18	1" Water Service Curb	40	EA	\$ 450.00	\$ 18,000
19	1" Water Service Line	1,100	LF	\$ 60.00	\$ 66,000
20	Landfarm Hydrocarbon Soil	200	CY	\$ 25.00	\$ 5,000
21	Underground Utility Crossings	8	EA	\$ 500.00	\$ 4,000
22	Curb and Gutter Replacement	260	LF	\$ 35.00	\$ 9,100
23	Concrete Replacement	410	SF	\$ 25.00	\$ 10,250
24	Gravel Surface Restoration	750	LF	\$ 20.00	\$ 15,000
25	Pavement Surface Restoration	5,150	LF	\$ 50.00	\$ 257,500
26	Bore and Jack Highway Crossing	200	LF	\$ 360.00	\$ 72,000
Subtotal: 2020 Direct Construction Cost					\$ 867,000
	Mobilization		10.0%		\$ 86,700
	Traffic Control		3%		\$ 26,100
Subtotal: 2020 Construction Cost					\$ 980,000
	2022 Construction Cost ²		3.0% annually		\$ 1,039,000
	Contingency		10%		\$ 104,000
Subtotal: 2022 Construction Cost					\$ 1,143,000
	Geotechnical Investigation				\$ 4,000
	Engineering		18%		\$ 206,000
	Legal & Administrative		3%		\$ 34,000
TOTAL: 2022 CAPITAL COST					\$ 1,387,000

Table 7.4: Capital Cost of Phase 6-Schedule 2

Item #	Description	QTY	UNITS	UNIT PRICE ¹	TOTAL
1	10" Dia. PVC Water Main	1,010	LF	\$ 55.00	\$ 55,550
2	12" Dia. PVC Water Main	10	LF	\$ 60.00	\$ 600
3	10" Gate Valves	4	EA	\$ 1,800.00	\$ 7,200
4	Connect to Existing Mains	1	EA	\$ 1,000.00	\$ 1,000
5	Fire Hydrants	2	EA	\$ 6,300.00	\$ 12,600
6	Exploratory Excavation	5	HR	\$ 220.00	\$ 1,100
7	1" Water Service Corp	10	EA	\$ 450.00	\$ 4,500
8	1" Water Service Curb	10	EA	\$ 450.00	\$ 4,500
9	1" Water Service Line	200	LF	\$ 60.00	\$ 12,000
10	Underground Utility Crossings	2	EA	\$ 500.00	\$ 1,000
11	Curb and Gutter Replacement	90	LF	\$ 35.00	\$ 3,150
12	Concrete Replacement	140	SF	\$ 25.00	\$ 3,500
13	Pavement Surface Restoration	1,200	LF	\$ 50.00	\$ 60,000
14	Bore and Jack Highway Crossing	200	LF	\$ 360.00	\$ 72,000
Subtotal: 2020 Direct Construction Cost					\$ 239,000
	Mobilization		10.0%		\$ 23,900
	Traffic Control		3%		\$ 7,200
Subtotal: 2020 Construction Cost					\$ 271,000
	2022 Construction Cost ²		3.0%	annually	\$ 287,000
	Contingency		10%		\$ 29,000
Subtotal: 2022 Construction Cost					\$ 316,000
	Geotechnical Investigation				\$ 1,000
	Engineering		18%		\$ 57,000
	Legal & Administrative		3%		\$ 9,000
TOTAL: 2022 CAPITAL COST					\$ 383,000

7.6 Annual Operating Budget

The financial status of the City was discussed in detail in Section 3.5. Current water rates were established in 2018. The water rates are approximately \$62.40 for average water service connections.

7.6.1 Income

Table 3.8 presented in Section 3.5 provided a summary of income over the last five years as well as a projected budget. For the last five fiscal years, the rate charges resulted in an average revenue of \$464,289. Projected revenues for 2020 are estimated at \$575,500 using the 2018 average rates.

7.6.2 Annual O&M Costs

Average O&M expenses for the last five fiscal years as well as projected O&M expenses were presented in Table 3.8 in Section 3.5. Average O&M expenses for the last five years were found to be \$229,986. Phase 6 is estimated to reduce energy and maintenance costs approximately \$5,700 annually.

7.6.3 Debt Repayments

The funding strategy for the City will be discussed in detail in the next chapter, which will provide a summary of each proposed source of funding. Where loan funds are used, increases in annual costs for both debt repayment and coverage requirements will be considered in addition to project costs.

Currently, the City has a loan for Phase 2 from May 2014 and Phase 3 from May 2016. The current debt service and coverage have been shown in Table 3.8 and is projected to be \$89,338 plus \$16,150 for a total of \$105,488 annually.

7.6.4 Reserves

Reserve requirements for any future loan funds are considered as part of the funding strategies presented in the next chapter.

Debt Service Reserve

The City closed a loan for Phase 2 and raised rates accordingly in May 2014. Additionally, the City closed a loan in May 2016 for Phase 3 and again raised rates. The debt reserve has been included in the total debt calculation for the debt service and coverage.

Where loan funds are used, increases in annual costs for both debt repayment and coverage requirements will be considered in addition to project costs.

Short-Lived Asset Reserve

Short Lived asset reserves required for annual budgeting is shown below in Table 7.6 and will be included in funding strategies presented in the next chapter.

Table 7.5: Short Lived Asset Reserves for Preferred Alternative

SHORT-LIVED ASSET RESERVES City of Roundup Water PER	
	ANNUAL CONTRIBUTIONS
1 - 5 YEARS	
Billing Software Updates (prorated since shared with wastewater)	
Tank Inspection and Cleaning	
Total	\$1,700
5 - 10 YEARS	
Pumps	
Computer for Billing (prorated since shared with wastewater)	
Total	\$1,575
10 - 15 YEARS	
Chlorinator	
Water Meters	
Control System Upgrades	
Total	\$11,725
Total Annual Contribution for Short Lived-Assets	\$15,000

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8.0 CONCLUSIONS AND RECOMMENDATIONS

The following sections will develop a proposed funding plan and implementation schedule for the preferred alternative and subsequent phasing.

8.1 Funding

8.1.1 Funding Sources

The following sections provide a brief description of the potential funding sources and whether or not the City of Roundup would be eligible for those funds.

Treasure State Endowment Program (TSEP)

TSEP is a state funded grant program, which is administered by the Montana Department of Commerce (MDOC). TSEP provides financial assistance to local governments for infrastructure improvements. Grants can be obtained from TSEP for up to \$500,000 if the projected user rates are less than 125% of the target rate, for up to \$625,000 if projected user rates are between 125% and 150% of the target rate, and for up to \$750,000 if the projected user rates are over 150% of the target rate. TSEP grant recipients are required to match the grant dollar for dollar, but the match may come from a variety of sources including other grants, loans, or cash contributions.

The median household income for the City of Roundup is \$28,538 (2017 Income Survey). The combined water and wastewater target rate for this level of income is \$54.70/month. The City residents are paying approximately 168.3% of the target rate starting July 1, 2018. Therefore, Roundup would be eligible for a \$750,000 TSEP grant.

Renewable Resource Grant and Loan Program (RRGL)

RRGL is a state program that is funded through interest accrued on the Resource Indemnity Trust Fund and the sale of Coal Severance Tax Bonds and is administered by the Montana Department of Natural Resources and Conservation (DNRC). The primary purpose of the RRGL is to enhance Montana's renewable resources. For public facilities projects that conserve, manage, develop, or protect renewable resources, grants of up to \$125,000 are available.

The proposed improvements to the distribution system will conserve, manage, and preserve natural resources by eliminating leaking water from deteriorated cast iron pipes and significantly reducing the energy required for pumping. The proposed improvements will also preserve natural resources by protecting groundwater from chlorinated water by reducing leaks. Therefore, the City of Roundup are eligible to apply for a DNRC-RRGL grant.

Community Development Block Grant (CDBG)

CDBG is a federally funded program that is also administered by the Montana Department of Commerce (MDOC). The primary purpose of CDBG funds is to benefit low to moderate income (LMI) families. Hence, a municipality must have an LMI of 51% or greater. This is usually determined by the current Census. However, under certain circumstances, the MDOC may allow an income survey to be completed (such as there have been major economic changes since the Census or if a community is only slightly under the required LMI percentage).

The CDBG grant funds can be applied for in an amount of up to \$450,000 with a limit of \$15,000 per LMI household, so a community needs 30 LMI households to apply for the maximum grant funds. The use of CDBG funds requires a 25% local match that can be provided through cash funds, loans, grants, or a combination thereof.

Based on the most recent income survey, 60.0% of the population in the City of Roundup is in the low to moderate income bracket and current user rates are well above the target rate. Therefore, Roundup is eligible to apply for a CDBG grant.

State Revolving Fund (SRF)

SRF provides low-interest loan funds for both water and wastewater projects through the Drinking Water State Revolving Fund (DWSRF) and the Water Pollution Control State Revolving Fund (WPCSRF). The SRF program is administered by the Montana Department of Environmental Quality. Current loan terms include an interest rate of 2.5% for a 20-year period and may include some forgiveness funds.

SRF loans are available for projects that involve upgrading and replacing infrastructure and facilitate compliance with the national primary and secondary drinking water regulations - such as the improvements proposed with this report. Therefore, the City of Roundup is eligible for a DWSRF loan.

USDA Rural Development (RD)

RD provides grant and loan funding to municipalities for water and wastewater projects that improve the quality of life and promote economic development in Rural America. Municipalities with a population of less than 10,000 are eligible to apply, though, priority is given to those with a population of less than 5,500.

Grant eligibility and loan interest rates are based on the community's median household income (MHI) and user rates. If the area to be served has a MHI of \$38,205 or lower and the project is necessary to alleviate a health and/or sanitation concern, up to 75% of the project costs are grant eligible. Up to 45% of the project costs are grant eligible if the planning area has an MHI between \$38,205 and \$47,757.

The MHI for the City of Roundup is \$28,538 so the City is eligible to apply for a 75% grant and 25% loan, but a 75/25 grant to loan ratio would be unlikely. A 25/75 grant to loan ratio would be much more realistic.

Montana Coal Board

The Coal Board provides grant funding to municipalities to adequately provide for the expansion of public services or facilities needed as a direct consequence of coal development activities. There is no maximum limit to the amount the Coal Board can fund, but available funding is very limited so it can be difficult to receive any funds from the Coal Board, especially large sums.

Not only does the City of Roundup fall within the designated Coal Impact Area, the area also does fit the criteria of experiencing impacts from coal development. About eight percent of the work force within the City is employed in the coal industry. Coal Board has provided funding for three phases thus far and has been a good source of funding for the City for other improvements. The Coal Board may be a promising source to consider for future phases.

Economic Development Administration (EDA)

EDA provides grant funding for projects that are demonstrated to be needed for the placement of a new business. The amount of grant is dependent on the number of jobs created.

For this grant it would be difficult to estimate an exact number of jobs created or maintained with the water system improvements. It is known that the City's water system is considered a water

source for oil exploration and development within the area. Oil wells require huge amounts of water during the hydraulic fracturing process, in some cases over 2 million gallons per well. Drilling companies could purchase their water in Roundup rather than traveling all the way to Billings, Forsyth or Lewistown. However, as the direct impact on new businesses and jobs created cannot be quantified, the City would not be eligible to receive grant funding from EDA for this project.

INTERCAP

INTERCAP provides loan funds at a low cost, variable interest rate to local governments. INTERCAP is administered by the Montana Board of Investments and is very flexible in the variety of funding which would include both water and wastewater projects. There is no funding cycle (funds are always available), however, the maximum loan term is 15 years, or the useful life of the project.

Due to the relatively large amount of financing required, an INTERCAP loan with the shorter loan term would cause extremely high user rates for the residents and is not recommended for long-term financing. Should the City be in need of interim financing at any point during the project, INTERCAP would be an excellent source.

8.1.2 Funding Strategy

The recommended funding sources that are considered to have the best potential for the proposed improvements in Phase 6 are TSEP, DNRC, CDBG and City funds. Table 8.1 shows the Schedule 1 & 2 costs.

The City does realize that obtaining grants is very competitive, and they may not be awarded a grant from one or more agencies. Should grant funds from one of the agencies above not be awarded, the City will either reduce the scope of the improvements or dip into reserves to cover the difference. Table 8.2 presents the alternative funding scenarios showing the amount of grant and loan payments required depending on the various funding scenarios.

If all funds were to be procured by the City, the funding strategy appears to be feasible as the project funds match the project costs. However, it is also very important to consider the impact that this will have on the individual users. Table 8.2 provides an analysis of the costs to the local water system users (shown as cost/user/EDU) for various scenarios of successful grant

applications and percentages of SRF loan package. The scenarios highlight the need for grant funding to keep user rates reasonable, as even the most favorable scenario (1) estimates the combined user rate to be 168.3% of the target rate. Table 8.3 provides a budget for the project if all grant applications are successful. As previously stated, the City will have a substantial rate increase (approximately \$35/edu) when the CMRWA connection is made, bringing rates to as high as 232% of the target rate.

Table 8.1: Summarized Phase 6 Project Costs

Description	Base Project	Additive Alternates	Total Project
	Schedule 1	Schedule 2	
Linear Feet Replaced	4,840	1,110	5,950
2022 Construction Cost	\$ 1,039,000	\$ 287,000	\$ 1,326,000
Contingency	\$ 104,000	\$ 29,000	\$ 133,000
Total Construction Cost	\$ 1,143,000	\$ 316,000	\$ 1,459,000
Engineering	\$ 210,000	\$ 58,000	\$ 268,000
Legal and Administrative	\$ 34,000	\$ 9,000	\$ 43,000
Total Project Costs	\$ 1,387,000	\$ 383,000	\$ 1,770,000

Table 8.2: Funding Scenarios for Phase 6

City of Roundup FUNDING OPTIONS FOR Phase 6 Water System Improvements		
ITEM	SCENARIO #1	SCENARIO #2
	TSEP, DNRC, CDBG w/Town Reserves & SRF Loan	TSEP and CDBG w/Town Reserves & SRF Loan
Phase 6 Water System Improvements	\$1,770,000	\$1,770,000
Rounded Total	\$1,770,000	\$1,770,000
TSEP	\$750,000	\$750,000
DNRC	\$125,000	\$0
CDBG	\$450,000	\$450,000
City of Roundup	\$445,000	\$445,000
Total Project Funds	\$1,770,000	\$1,645,000
SRF Bond Reserve (1/2 year payment)	\$0	\$0
Total Loan Amount	\$0	\$0
Annual Loan Payment	\$0	\$0
Total Loan Payments Over Life of Loan	\$0	\$0
Total Interest Paid Over Life of Loan	\$0	\$0
Annual Loan Coverage	\$0	\$0
TOTAL ANNUAL CAPITAL DEBT SERVICE COST	\$0	\$0
User Capital Cost/Month	\$0.00	\$0.00
Current Annual O&M ¹	\$229,986	\$229,986
Current Annual Debt Service	\$138,313	\$138,313
Short Lived Assets	\$15,000	\$15,000
Reserves for Emergency Repairs	\$100,000	\$100,000
Reserves for Future Improvements	\$127,000	\$127,000
TOTAL ANNUAL O&M COSTS	\$610,299	\$610,299
User O&M Cost/Month	\$62.40	\$62.40
USER COST/MONTH FOR PROJECT²	\$62.40	\$62.40
Existing Average User Cost/Month	\$62.40	\$62.40
COST/MONTH INCREASE/EDU	\$0.00	\$0.00
Existing Other System Cost/Month	\$29.66	\$29.66
Total Proposed Water & Sewer Cost/Month	\$92.06	\$92.06
Combined Systems Target Rate	\$54.70	\$54.70
PERCENT OF COMBINED TARGET RATE	168.3%	168.3%

¹ Based average O&M for last five fiscal years.² Table is based on an estimated 815 water users.

Table 8.3: Summarized Budget for Water System Improvements

	SOURCE: TSEP	SOURCE: CDBG	SOURCE: DNRC	SOURCE: City	TOTAL
ADMINISTRATIVE/FINANCIAL COSTS:					
Personnel Costs				\$2,000	\$2,000
Office Costs				\$3,000	\$3,000
Grant Administration Services				\$30,000	\$30,000
Legal Costs				\$3,000	\$3,000
Audit Fees				\$3,000	\$3,000
Travel & Training				\$2,000	\$2,000
Loan Reserves					\$0
Interim Interest					\$0
Bond Counsel and Related Costs					\$0
TOTAL ADMINISTRATIVE/FINANCIAL COSTS	\$0	\$0	\$0	\$43,000	\$43,000
ACTIVITY COSTS:					
Engineering-Geotech				\$5,000	\$5,000
Engineering Design				\$73,640	\$73,640
Construction Engineering Services				\$57,860	\$57,860
RPR				\$131,500	\$131,500
Construction	\$681,600	\$409,000	\$113,600	\$121,800	\$1,326,000
Contingency	\$68,400	\$41,000	\$11,400	\$12,200	\$133,000
TOTAL ACTIVITY COSTS	\$750,000	\$450,000	\$125,000	\$402,000	\$1,727,000
TOTAL PROJECT COSTS	\$750,000	\$450,000	\$125,000	\$445,000	\$1,770,000

8.2 Implementation

Before the project can be implemented, the funding must first be in place. As noted earlier, the best funding strategy of the City would be to utilize TSEP, DNRC, and CDBG grant funds and City funds as match. The grant application for TSEP and DNRC are due in June 2020 and the application for CDBG is due in September 2020.

With TSEP and DNRC, the City will likely know the preliminary rankings in November 2020 with actual grant funding will not be secured until May 2021. With the CDBG grant program, the City will likely not know ranking until September of 2021.

Upon securing all funding, the project start-up for the grant program is expected to be about a two-month process. The engineering could begin once a contract is completed between the grant agencies and the City, likely in October of 2021.

Design is anticipated to be completed in November 2021, with the anticipation of bidding the project in February 2022. Actual construction would not be expected to begin until April of 2022, which allows the Contractor ample time to coordinate startup. Table 8.4 provides a summary of the implementation schedule.

Table 8.4: Implementation Schedule

ACTION	DATE	FUNDING	NOTES
Submit TSEP and DNRC grant apps	June 2020	City Funds	
Apply to CDBG grant	September 2020	City Funds	
Results of TSEP and DNRC grants known	May 2021		If insufficient funding, re-apply or phase project to meet available project funding
Results of CDBG grant known	September 2021		If insufficient funding, re-apply or phase project to meet available project funding
Startup	October 2021		
Begin Design Phase	October 2021	City Funds	
DEQ Review	November 2021-January 2022		Allows 2 full months for review
Apply for Permits	December 2021	City Funds	
Advertise and Bid Project	February 2022	City	
Construction	April-June 2022	TSEP, DNRC, CDBG, City	
Final Walk-Through	July 2022		
Close-out	August 2022		
Audit	Jan 2023	City Funds	Need special single act - audit due to high amount of state and federal funds
11 month Walk-Through	May 2023		

9.0 References

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<http://www.epa.gov/safewater/contaminants/index.html>

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Natural Resources Conservation Service, Web Soil Survey,

websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Natural Heritage Program, <http://mtnhp.org/SpeciesOfConcern/>

FEMA Map Service Center, <https://hazards.fema.gov/wps/portal/mapviewer>

Montana Register of Historic Places, <http://www.nps.gov/history/nr/shpolist.htm>

U.S. Census Bureau's Decennial Census, <http://www.census.gov/>

Disease Control and Prevention (CDC), <http://www.cdc.gov/>

Draft Source Water Delineation & Assessment Report, DEQ, January 2005,

<http://nris.state.mt.us/wis/swap/swapquery.asp>

National Wetlands Inventory, U.S. Fish & Wildlife Service,

<http://www.fws.gov/wetlands/data/index.html>

City Water Supply Assessment for Roundup, Montana, John Wheaton, Hydrogeologist, Montana Bureau of Mines and Geology, February, 1994

Report for Roundup City Water Supply Assessment Project, John Wheaton, Hydrogeologist, Montana Bureau of Mines and Geology, October, 1993

Hydrogeologic Assessment of the Roundup, Montana Public Water Supply for Ground Water Under the Direct Influence of Surface Water, John Wheaton, Hydrogeologist, Montana Bureau of Mines and Geology, January 1999

Sanitary Survey, Montana Department of Environmental Quality, February 2017

Safe Drinking Water Act, American Water Works Association (AWWA)

Role of the water main in lead service line replacement: a utility case study, Eliman Camara, et. al., Journal AWWA, August 2013, <http://dx.doi.org/10.5942/jawwa.2013.10530102>

Understanding the Role of Particulate Iron in Lead Release to Drinking Water, Trueman, Benjamin et. al, American Chemical Society, July 2016, <http://pubs.acs.org/doi/10.1021/acs.est.6b01153>

Water/Wastewater ▪ Transportation ▪ Grant Services ▪ Solid Waste ▪
Structural ▪ Bridges ▪ Natural Resources ▪ Planning



BILLINGS

6780 Trade Center Avenue
Billings, MT 59101
PHONE 406.652.5000

BOISE

3050 N. Lakeharbor Lane,
Suite 201
Boise, ID 83703
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GREAT FALLS

702 2nd Street South #2
Great Falls, MT 59405
PHONE 406.952.1109

HELENA

PO Box 4817
2501 Belt View Drive
Helena, MT 59604
PHONE 406.449.8627
FAX 406.449.8631

SPOKANE

9221 N. Division St.,
Suite F
Spokane, WA 99218
PHONE 509.413.1430

Appendix A:

Uniform Environmental Checklist and Environmental Correspondence

UNIFORM ENVIRONMENTAL CHECKLIST

As the engineer that prepared the preliminary engineering report, I Greg Lukasik, PE, have reviewed (print name of engineer) the information presented in this checklist and believe that it accurately identifies the environmental resources in the area and the potential impacts that the project could have on those resources. In addition, the required state and federal agencies were provided with the required information about the project and requested to provide comments on the proposed public facility project. Their comments have been incorporated into and attached to the Preliminary Engineering Report.

Engineer's Signature: Greg Lukasik

Date: 11-2-2010



Key Letter: N – No Impact/Not Applicable B – Potentially Beneficial A – Potentially Adverse
P – Approval/Permits Required M – Mitigation Required

PHYSICAL ENVIRONMENT

Key <u>N</u>	1. Soil Suitability, Topographic and/or Geologic Constraints (e.g., soil slump, steep slopes, subsidence, seismic activity) <i>Comments and Source of Information:</i> Information on the area soils was gathered from the Web Soil Survey. All of the soils within the Corporate limits of the City of Roundup are considered Urban Land and therefore are not are not classified by slope or drainage. All areas impacted by the project will occur in the general vicinity of the existing water mains, therefore, no soil suitability, topographic or geologic constraints are anticipated for the proposed improvements. (PER, Engineer)
Key <u>M</u>	2. Hazardous Facilities (e.g., power lines, EPA hazardous waste sites, acceptable distance from explosive and flammable hazards including chemical/petrochemical storage tanks, underground fuel storage tanks, and related facilities such as natural gas storage facilities & propane storage tanks) <i>Comments and Source of Information:</i> Several Leaking Underground Storage Tanks have been identified within the vicinity of the proposed improvements. Groundwater depths in the area were measured to be 10 feet deep at the highest level, while contaminated soil was measured at 15 feet deep. Although the contamination level is deeper than the maximum water main depth, in order to mitigate any potential hydrocarbon effects on the water main, the new main will be designed to DEQ standards including ductile iron pipes with nitrile gaskets. Provisions will be made to remove any contaminated soil encountered and replace with imported backfill during the project construction. If encountered, the DEQ Petroleum Technical Section will be notified for testing and determination of disposal. Utility locates will be requested from One-Call during preliminary design and also prior to construction activities. Design of improvements will be completed to avoid conflicts. (PER, Engineer)
Key <u>M</u>	3. Effects of Project on Surrounding Air Quality or Any Kind of Effects of Existing Air Quality on Project (e.g., dust, odors, emissions) <i>Comments and Source of Information:</i> There may be some temporary dust associated with the construction; however, dust control will be required as a part of the construction. There will be no long-term impacts in regard to the surrounding air quality as a result of the project. (PER, Engineer)

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Key B	4. Groundwater Resources & Aquifers (e.g., quantity, quality, distribution, depth to groundwater, sole source aquifers) <i>Comments and Source of Information:</i> The improvements will enable the City to conserve and manage the quantity of groundwater it uses as it will reduce the treated water lost to leaks. The City is expected to conserve approximately 10 million gallons per year by replacing the leaking water mains. There are no sole source aquifers within the vicinity of the project. (HUD Website, Engineer)
Key N	5. Surface Water/Water Quality, Quantity & Distribution (e.g., streams, lakes, storm runoff, irrigation systems, canals) <i>Comments and Source of Information:</i> The project is not anticipated to impact the quantity, quality or distribution of any surface waters. (PER, Engineer)
Key P	6. Floodplains & Floodplain Management (Identify any floodplains within one mile of the boundary of the project.) <i>Comments and Source of Information:</i> The floodplain maps are included in the PER. Most of the City is classified as Zone C, which is defined as being outside the 100-year floodplain. However, areas in the southwest region of the City is located in a Zone AE floodplain or within the 100-year floodplain. These floodplains were very well identified in 2011 when the Musselshell River flooded and severely damaged low lying areas of the City. Schedule 2 of Phase 5 lies in the 100-year floodplain, therefore a floodplain occupancy permit will be required and the 8-Step process of public notification will be followed for reviewing alternatives. Best Management practices will be implemented during construction to minimize the potential for erosion and sedimentation from construction activities. (PER, Engineer, DNRC)
Key N	7. Wetlands Protection (Identify any wetlands within one mile of the boundary of the project.) <i>Comments and Source of Information:</i> The National Wetlands Inventory shows wetlands located adjacent to the Musselshell River, to the east of the City near the sewer lagoons, and one area to southwest of the highway. However, none of the recommended system improvements will be completed in that area, so a wetlands delineation is not necessary. Although an unnamed tributary was identified to the northwest of the high school by the Army Corp of Engineers in 2010, the proposed project will replace existing distribution system in previously disturbed areas and is not anticipated to have any impact on wetlands. (PER, Engineer)
Key N	8. Agricultural Lands, Production, & Farmland Protection (e.g., grazing, forestry, cropland, prime or unique agricultural lands) (Identify any prime or important farm ground or forest lands within one mile of the boundary of the project.) <i>Comments and Source of Information:</i> The prime farmland map is included in the PER. Although some areas within the City are considered farmland of statewide importance, all proposed work will be located in existing disturbed areas such as roadways and alleyways. The proposed project is not anticipated to change the existing land use and so is unlikely that this project will have a negative impact on the existing land use. (Engineer, PER)

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Key N	9. Vegetation & Wildlife Species & Habitats, Including Fish (e.g., terrestrial, avian and aquatic life and habitats) <i>Comments and Source of Information:</i> The proposed improvements should not impact vegetation or wildlife species or habitats. The US Fish and Wildlife Service stated "Given the proposed project features as described in your letter and accompanying materials, we do not anticipate adverse effects to the threatened, endangered, or candidate species or critical habitat to result from proposed project implementation within the designated Project Area." Montana Fish, Wildlife, & Parks stated that they have no comments regarding the project. The Sage Grouse Habitat Conservation Program was contacted and stated that "the project is not located within two miles of an active sage-grouse lek. You are authorized to complete the project or proposed activity." (PER,USF&WS, FWP, SGHCP)
Key N	10. Unique, Endangered, Fragile, or Limited Environmental Resources, Including Endangered Species (e.g., plants, fish, sage grouse or other wildlife) <i>Comments and Source of Information:</i> There are several species of concern listed for the Township 8N, Range 25E. However, as the project is located within previously disturbed areas, the proposed project is not anticipated to impact the habitat and/or breeding ground for any of the species of concern. The US Fish and Wildlife Service (US FWS), Montana Sage Grouse Habitat Conservation Program, as well as the Montana Department of Fish, Wildlife, and Parks (Montana FWP) were asked to comment on the proposed project. The US Fish and Wildlife Service stated "we do not anticipate adverse effects to threatened, endangered, or candidate species or critical habitat to result from the proposed project implementation within the designated Project Area." FWP stated that they had no specific comments regarding the project. The sage grouse habitat website shows that inside the City limits is not considered sage grouse habitat. (USF&WS, FWP, PER, SGHCP, Engineer)
Key N	11. Unique Natural Features (e.g., geologic features) <i>Comments and Source of Information:</i> There are no known unique natural features that are anticipated to be impacted as a result of the proposed project. The State Historic Preservation Office (SHPO) and Local Historical Society were contacted and asked to comment on the proposed project. SHPO noted that "there is a low likelihood cultural properties will be impacted. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time." Musselshell County Historical Society replied that they had no specific concerns with the project. (SHPO, Musselshell Historical)
Key N	12. Access to, and Quality of, Recreational & Wilderness Activities, Public Lands and Waterways (including Federally Designated Wild & Scenic Rivers), and Public Open Space <i>Comments and Source of Information:</i> There are no anticipated impacts to the access or quality of recreational and wilderness activities, public lands and waterways, or public open spaces as a result of the proposed project. The project is not located near a designated wild and scenic river and the National Park Service stated they had no concerns with the project. All work will be within existing disturbed areas within City owned right-of-way. (PER, NPS)

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HUMAN POPULATION	
Key N	1. Visual Quality – Coherence, Diversity, Compatibility of Use and Scale, Aesthetics <i>Comments and Source of Information:</i> No negative impacts are anticipated on visual quality of the existing area as all areas are previously developed and within City limits. (PER)
Key M	2. Nuisances (e.g., glare, fumes) <i>Comments and Source of Information:</i> Temporary nuisances such as dust and exhaust fumes may occur during construction. Efforts will be made to minimize nuisances as they occur. (PER)
Key M	3. Noise -- suitable separation between noise sensitive activities (such as residential areas) and major noise sources (aircraft, highways & railroads) <i>Comments and Source of Information:</i> There may be some temporary noise during construction of the proposed project. However, construction operation hours will be limited to 7:00 AM to 7:00 PM. No other long term impacts to noise are anticipated upon completion of the project. (PER)
Key N	4. Historic Properties, Cultural, and Archaeological Resources <i>Comments and Source of Information:</i> The State Historic Preservation Office (SHPO) and three Tribal Historic Preservation Offices (THPO) were contacted and asked to comment on the proposed project. SHPO noted that "there is a low likelihood cultural properties will be impacted. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time." The Crow THPO office and the local historical office responded that they had no specific concerns with the project. (SHPO, THPO, Musselshell County Historical Society)
Key N	5. Changes in Demographic (population) Characteristics (e.g., quantity, distribution, density) <i>Comments and Source of Information:</i> The proposed project is not anticipated to impact demographic characteristics. (Engineer)
Key N	6. Environmental Justice – (Does the project avoid placing lower income households in areas where environmental degradation has occurred, such as adjacent to brownfield sites?) <i>Comments and Source of Information:</i> The proposed project is not anticipated to impact areas where environmental degradation has occurred and will not cause environmental degradation of the existing area. (Engineer)
Key N	7. General Housing Conditions - Quality, Quantity, Affordability <i>Comments and Source of Information:</i> The proposed project is not anticipated to impact general housing conditions. (Engineer)

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Key N	8. Displacement or Relocation of Businesses or Residents <i>Comments and Source of Information:</i> The proposed project will not require displacement or relocation of businesses and/or residents. (PER)
Key B	9. Public Health and Safety <i>Comments and Source of Information:</i> The existing facilities present several health and safety threats, which the proposed project will eliminate. The primary purpose of the recommended improvements is to improve the quality of the water, conserve quantity of water pumped and improve fire protection. (PER)
Key M	10. Lead Based Paint and/or Asbestos <i>Comments and Source of Information:</i> The proposed project is not anticipated to involve the handling of any lead based paint. Asbestos Cement (AC) water main will be abandoned in place in order to mitigate potential impacts of contact with humans. Any sections that must be removed will either be removed in whole, unbroken pieces or DEQ asbestos mitigation procedures will be followed for removal and disposal. (Engineer, DEQ, PER)
Key N	11. Local Employment & Income Patterns - Quantity and Distribution of Employment, Economic Impact <i>Comments and Source of Information:</i> There are no anticipated impacts to local employment or income patterns directly attributed to the proposed project. (PER)
Key N	12. Local & State Tax Base & Revenues <i>Comments and Source of Information:</i> There are no anticipated impacts to the local and state tax base and revenues directly attributed as a result of the proposed project. (Engineer)
Key B	13. Educational Facilities - Schools, Colleges, Universities <i>Comments and Source of Information:</i> The poor water quality in Roundup affects all water users, including the schools. The recommended improvements will benefit both water quality and fire protection at the schools. (Engineer)
Key B	14. Commercial and Industrial Facilities - Production & Activity, Growth or Decline <i>Comments and Source of Information:</i> There is no anticipated impact to the commercial and industrial facilities as a direct result of the proposed project. (Engineer)

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Key B	15. Health Care – Medical Services <i>Comments and Source of Information:</i> The existing water quality is very poor and Roundup Memorial Healthcare has many problems because of the corrosion in the water. The facility purchased a Reverse Osmosis system to provide drinking water to patients and employees. Eliminating the sources of corrosion will help the healthcare facility keep costs low. (Engineer)
Key N	16. Social Services – Governmental Services (e.g., demand on) <i>Comments and Source of Information:</i> There is no anticipated impact to social services as a direct result of the proposed project. (Engineer)
Key N	17. Social Structures & Mores (Standards of Social Conduct/Social Conventions) <i>Comments and Source of Information:</i> All work on the proposed project will be paid proportionately by all residents. (PER)
Key N	18. Land Use Compatibility (e.g., growth, land use change, development activity, adjacent land uses and potential conflicts) <i>Comments and Source of Information:</i> All improvements will be completed within existing right-of-way areas and will not require a change in land use. (PER)
Key B	19. Energy Resources - Consumption and Conservation <i>Comments and Source of Information:</i> There will be a reduction in friction losses to the water that is pumped. The water system pumps must work more frequently to overcome the friction loss due to the existing corrosion in the water mains. Replacing the corroded mains will decrease the City's energy usage by the City by approximately \$1,700 per year. (PER)
Key N	20. Solid Waste Management <i>Comments and Source of Information:</i> There are no anticipated impacts to solid waste management as a result of the proposed project. (Engineer)
Key N	21. Wastewater Treatment - Sewage System <i>Comments and Source of Information:</i> There are no anticipated impacts to the wastewater treatment system as a result of the proposed project. (PER)
Key N	22. Storm Water – Surface Drainage <i>Comments and Source of Information:</i> There are no anticipated impacts to storm water as a result of the proposed project. (Engineer)

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Key B	23. Community Water Supply <i>Comments and Source of Information:</i> The proposed project will be improving the water facilities. The replacement of the remaining severely corroded cast iron mains will reduce a significant source of the high iron contaminant of the water, will reduce the amount of water lost from water main breaks, will increase fire protection, and increase fire flow for the whole system. The improvements will be designed to bring the water system into compliance with current state and federal regulations. (PER)
Key N	24. Public Safety – Police <i>Comments and Source of Information:</i> There are no anticipated impacts to police as a result of the proposed project. (Engineer)
Key B	25. Fire Protection – Hazards <i>Comments and Source of Information:</i> The proposed project should help reduce problems to fire equipment caused by the large chunks of rust breaking loose and will increase fire flow due to the larger diameter pipes and less friction loss. Additionally, the number of hydrants will be increased so it will be easier for the fire department to connect multiple trucks to the system to fight fires quickly. (PER, Engineer)
Key N	26. Emergency Medical Services <i>Comments and Source of Information:</i> There are no anticipated impacts to emergency medical services as a result of the proposed project. (Engineer)
Key N	27. Parks, Playgrounds, & Open Space <i>Comments and Source of Information:</i> There are no anticipated impacts to parks, playgrounds, and open spaces as a result of the proposed project. (Engineer)
Key N	28. Cultural Facilities, Cultural Uniqueness & Diversity <i>Comments and Source of Information:</i> The State Historic Preservation Office (SHPO) and three Tribal Historic Preservation Offices (THPO) were contacted and asked to comment on the proposed project. SHPO noted that "there is a low likelihood cultural properties will be impacted. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time." The Crow THPO office and the local historical office responded that they had no specific concerns with the project. (SHPO, THPO)
Key P	29. Transportation Networks and Traffic Flow Conflicts (e.g., rail; auto including local traffic; airport runway clear zones - avoidance of incompatible land use in airport runway clear zones) <i>Comments and Source of Information:</i> There are no anticipated long term impacts to transportation as a result of the proposed project. There may be temporary traffic disturbances during construction that will be mitigated using traffic control. The proposed project is not located within 2,500 feet of the end of a civil runway or within 15,000 feet of the end of a military runway. A utility occupancy permit from MDT is required during

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	construction. (Engineer, MDT)
Key B	30. Consistency with Local Ordinances, Resolutions, or Plans (e.g., conformance with local comprehensive plans, zoning, or capital improvement plans)
	<i>Comments and Source of Information:</i> The proposed project is consistent with all local ordinances, resolutions, and plans. (PER, CIP, Growth Policy, Needs Assessment, SMDC-CEDS, Engineer, City)
Key N	31. Is There a Regulatory Action on Private Property Rights as a Result of this Project? (consider options that reduce, minimize, or eliminate the regulation of private property rights.)
	<i>Comments and Source of Information:</i> No action on Private Property Rights is anticipated as a result of this project. (PER, Engineer)

February 27, 2020

U.S. Army Corps of Engineers
Helena Regulatory Office
10 W 15th Street, Suite 2200
Helena, MT 59626

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

- Replacement of over two miles of dilapidated and undersized cast iron water main.

Enclosed you will find a map showing the locations of the proposed water main replacements. All proposed improvements are in Sections 12, 13 and 14 within Township 8N, Range 25E.

Please review the proposed improvements and return to us any comments you may have regarding the potential environmental impacts of the project, if any, within 30 days. A written response from your program is required by the funding agencies that will be utilized on this project. If you have no comment on this project, please check the box below and countersign the end of this letter and return to us at the address listed above.

If you need further information or have any questions regarding the project, please feel free to contact me at (406) 652-5000 or blehenbauer@greatwesteng.com. Thank you.

Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The U.S. Army Corps of Engineers Helena Regulatory Office has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Bureau of Indian Affairs
2021 4th Avenue North
Billings, MT 59101

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

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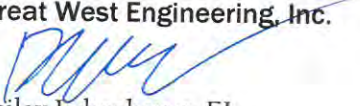
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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

[] The Bureau of Indian Affairs has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Bureau of Land Management
5001 Southgate Drive
Billings, MT 59101

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

[] The Bureau of Land Management has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Montana Department of Environmental Quality
Permitting and Compliance Division
PO Box 200901
Helena, MT 59620-0901

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The Montana Department of Environmental Quality Permitting and Compliance Division has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Montana Department of Natural Resources and Conservation
Water Resources
613 NE Main, Ste E
Lewistown, MT 59457-2020

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The Montana Department of Natural Resources and Conservation Water Resources has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Montana Department of Labor and Industry
PO Box 1728
Helena, MT 59624

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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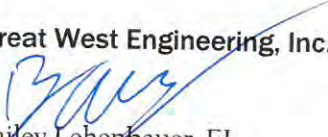
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Project Engineer

Enclosure: Site Map

- [] The Montana Department of Labor and Industry has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

U.S. Environmental Protection Agency
Montana Office
10 W 15th Street, Suite 3200
Helena, MT 59625

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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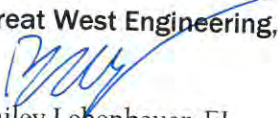
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If you need further information or have any questions regarding the project, please feel free to contact me at (406) 652-5000 or blehenbauer@greatwesteng.com. Thank you.

Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The U.S. Environmental Protection Agency Montana Office has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Federal Aviation Administration
2725 Skyway Dr.
Helena, MT 59602

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

[] The Federal Aviation Administration has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Montana Department of Fish, Wildlife, and Parks
Resource Assessment Unit
1420 E. 6th
Helena, MT 59620

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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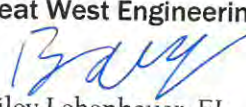
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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The Montana Department of Fish, Wildlife, and Parks Resource Assessment Unit has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

U.S. Fish and Wildlife Service
Ecological Services
585 Shepherd Way
Helena, MT 59601

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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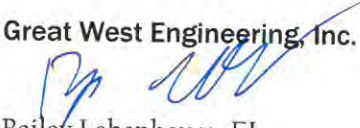
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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The U.S. Fish and Wildlife Service Ecological Services has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Montana Department of Transportation
PO Box 201001
Helena, MT 59620

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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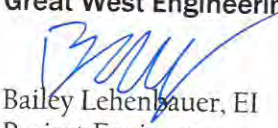
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Sincerely,

Great West Engineering, Inc.



Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The Montana Department of Transportation has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Natural Resource Conservation Service
109 Railroad Avenue East
Roundup, MT 59072-2930

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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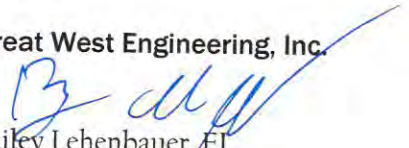
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Sincerely,

Great West Engineering, Inc.



Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

[] The Natural Resource Conservation Service has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

National Park Service
P.O. Box 25287
Denver, CO 80225-0287

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The National Park Service has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

State Historic Preservation Office
Montana Historical Society
PO Box 201202
Helena, MT 59620

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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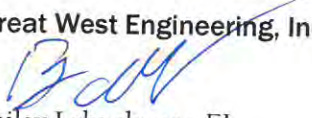
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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The State Historic Preservation Office Montana Historical Society has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Musselshell County
Floodplain Administrator
704 1st Street East
Roundup, MT 59072

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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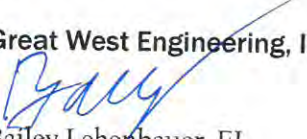
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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The Musselshell County Floodplain Administrator has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Musselshell Valley Historical Society
524 First Street West
Roundup, MT 59072

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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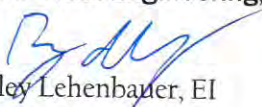
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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The Musselshell Valley Historical Society has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

City of Roundup
Floodplain Administrator
3949 Carter Mountain Drive
Cody, WY 82414

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

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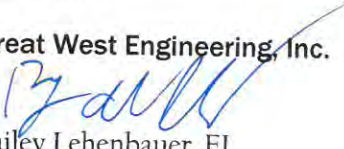
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Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The City of Roundup Floodplain Administrator has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Montana Sage Grouse Habitat Conservation Program
<https://sagegrouse.mt.gov/>

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

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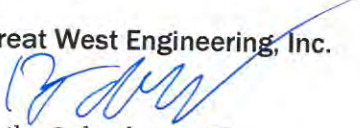
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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The Montana Sage Grouse Habitat Conservation Program has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Michael Blackwolf
Tribal Historic Preservation Officer
656 Agency Main Street
Harlem, MT 59526

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

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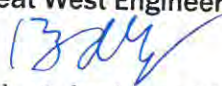
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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The Michael Blackwolf Tribal Historic Preservation Officer has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Emerson Bull Chief
Tribal Historic Preservation Officer
P.O. Box 159
Crow Agency, MT 59022

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

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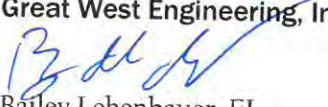
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Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The Emerson Bull Chief Tribal Historic Preservation Officer has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Blain Edmo
Tribal Chairman
P.O. Box 306
Fort Hall, ID 83203

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

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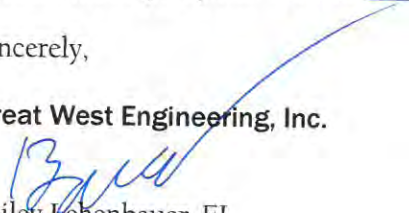
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Sincerely,

Great West Engineering, Inc.



Bailey Echenbauer, EI
Project Engineer

Enclosure: Site Map

- [] The Blain Edmo Tribal Chairman has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

February 27, 2020

Bob Komardlety
Tribal Chairman
P.O. Box 1330
Anadarko, OK 73005

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

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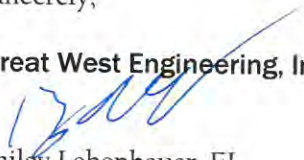
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Please review the proposed improvements and return to us any comments you may have regarding the potential environmental impacts of the project, if any, within 30 days. A written response from your program is required by the funding agencies that will be utilized on this project. If you have no comment on this project, please check the box below and countersign the end of this letter and return to us at the address listed above.

If you need further information or have any questions regarding the project, please feel free to contact me at (406) 652-5000 or blehenbauer@greatwesteng.com. Thank you.

Sincerely,

Great West Engineering, Inc.



Bailey Lehenbauer, EI
Project Engineer

Enclosure: Site Map

[] The Bob Komardlety Tribal Chairman has reviewed the enclosed proposed project and has no comments.

Printed Name

Signature

Date

Ilene Neudick

From: Bailey Lehenbauer
Sent: Thursday, April 2, 2020 3:53 PM
To: Ilene Neudick
Subject: FW: Water system improvements - Roundup

Ilene,

Can you print out the email below, stamp a received date on it and scan it back to me?

Thanks.

Bailey Lehenbauer | Staff Engineer

Great West Engineering, Inc.

DIRECT 406-281-8592

CELL 406-861-4882

From: Whitaker, Brianna <brwhitaker@mt.gov>
Sent: Thursday, April 2, 2020 11:50 AM
To: Bailey Lehenbauer <blehenbauer@greatwesteng.com>
Subject: Water system improvements - Roundup

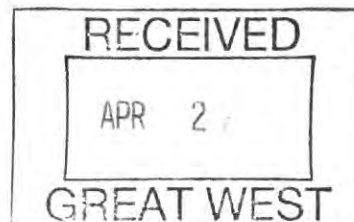
The Montana Department of Transportation (MDT) staff would like to thank you for the opportunity to provide input on the proposed water system improvements in the City of Roundup.

This proposal appears to have potential impact on MDT facilities (US12) in Roundup; however we do not have enough information to make a determination at this time. Please contact Tom Tilzey, Billings District Maintenance Chief regarding any permits that may be necessary for the proposed improvements. Tom can be reached at (406)657-0217.

Let me know if you have any questions.

Thanks,

Brianna Whitaker | Transportation Planner | Policy, Program & Performance Analysis | Montana Department of Transportation | P.O. Box 201001 | Helena, MT | 59620-1001 | 406-444-9342 | brwhitaker@mt.gov



Bailey Lehenbauer

From: Brandon Duffey
Sent: Tuesday, March 17, 2020 2:11 PM
To: Bailey Lehenbauer
Cc: Greg Lukasik
Subject: FW: Water System improvements, Roundup, Montana

Brandon Duffey, PE | Project Manager

Great West Engineering, Inc.

DIRECT 406-281-8595

CELL 406-450-1195

www.greatwesteng.com



From: Martin, Jacob <jacob_martin@fws.gov>
Sent: Tuesday, March 17, 2020 2:03 PM
To: Brandon Duffey <bduffey@greatwesteng.com>
Cc: Davies, Jess J <jess_davies@fws.gov>
Subject: Water System improvements, Roundup, Montana

Dear Mr. Duffey:

Thank you for your February 27, 2020, letter requesting U.S. Fish and Wildlife Service comment on the proposed subject project in Roundup, Montana.

This email represents our official response to your inquiry for your records.

The U.S. Fish and Wildlife Service reviewed the project description and has no comments regarding federally-listed or proposed threatened or endangered species or other trust species. Additional information may be obtained using the IPaC project-planning tool, which streamlines the USFWS environmental review process at <https://ecos.fws.gov/ipac/>.

Thank you for the opportunity to comment. If you have any questions or comments about this correspondence please contact Jess Davies at jess_davies@fws.gov or 406-449-5225, extension 214.

Sincerely,

Jacob M. (Jake) Martin
Assistant Field Supervisor
Montana Ecological Services Office
Helena, Montana 59601
(406) 449-5225x215
jacob_martin@fws.gov



JAMES SCHLADWEILER, President of Council
TANYA LANTER, Clerk/ Treasurer
CASSANDRA MANN, Assistant Clerk
LON E. SIBLEY, Director of Public Works
DONNA MARSH, City Judge

SANDRA JONES, Mayor

City of Roundup

P.O. Box 660
Roundup, Montana 59072
Phone (406) 323-2804 • Fax (406) 323-2757

Aldermen:

GARY TOOMBS, 1st Ward
JAMES SCHLADWEILER, 1st Ward
WOODROW WEITZEL, 2nd Ward
RICHARD GRIFFITH, 2nd Ward
JOAN PERRELLA, 3rd Ward
DAVE PICCHIONI, 3rd Ward
DAVID LIGGETT, 4th Ward
FLOYD FISHER, 4th Ward

March 16, 2020

Re: Water System Improvements-Roundup Montana

Dear Mr. Lehenbauer of Great West Engineering, Inc.,

I am responding to your request for comment, on behalf of the City of Roundup, regarding the Water System Improvements project stated in your letter dated February 27, 2020. I do not have any comments on the proposed improvements currently, however, it does appear that there are proposed improvements within the floodplain boundary. If your final design involves construction in the floodplain, note that a permit will be required prior to any work beginning. If the final design does not include any work within the boundary of the floodplain, no permit will be required.

If you have any questions, please feel free to contact my office.

Sincerely,



Vanessa Hoene, PE, CFM
City of Roundup Floodplain Administrator

cc: Mayor Sandra Jones





REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
HELENA REGULATORY OFFICE
10 WEST 15TH STREET, SUITE 2200
HELENA, MONTANA 59626

March 6, 2020



Regulatory Branch
Montana State Program
Corps No. **NWO-2010-00193-MTH**

Subject: City of Roundup – Water System Improvements – unnamed tributary

GreatWest Engineering
Attn: Bailey Lehenbauer
6780 Trade Center Ave.
Billings, Montana 59101

Dear Mr. Lehenbauer:

We are responding to your request for comment, on behalf of the City of Roundup, regarding the Water System Improvements project in Musselshell County, Montana. The project includes the proposed replacement of over 2 miles of derelict cast-iron water mains. Waterways located within the identified boundary, include an unnamed intermittent tributary of the Musselshell River. The project is located near Latitude 46.438975°, Longitude -108.536819°, within Section 24, Township 8 N, Range 25 E, Roundup, Musselshell County, Montana.

The mission of the U.S. Army Corps of Engineers (Corps) Regulatory Program is to protect the Nation's aquatic resources while allowing reasonable development through fair, flexible and balanced permit decisions. In particular, under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899, we work to protect the biological, physical, and chemical integrity of the Nation's aquatic resources. Projects are evaluated on a case-by-case basis to determine the potential benefits and detriments that may occur as a result of the proposal. In all cases an applicant must avoid and minimize impacts to aquatic resources to the greatest extent practicable.

Under the authority of Section 404 of the Clean Water Act (CWA), Department of the Army (DA) permits are required for the discharge of fill material into waters of the U.S. Waters of the U.S. include the area below the ordinary high water mark of stream channels and lakes or ponds connected to the tributary system, and wetlands adjacent to these waters. Isolated waters and wetlands, as well as man-made channels, may be waters of the U.S. in certain circumstances, which must be determined on a case-by-case basis. Under the authority of Section 10 of the Rivers and Harbors Act, DA permits are required for structures or work in, over, under or affecting navigable waters of the U.S.

Based on the information provided in your submittal, it appears that jurisdictional waters of the U.S. may be within the project area, specifically in the vicinity of 7th Avenue and 5th Street West. If your final design includes the placement of fill material in any of the jurisdictional areas described in the paragraph above, or otherwise requires authorization by a DA permit, please submit a permit application to this office prior to starting any work. Any loss of an aquatic site may require mitigation. Mitigation requirements will be determined during the Department of the Army permitting review. After a review of the materials submitted we will determine what type of permit, if any, will be required. In order to provide the necessary information you may use the

Montana Joint Permit Application Form, found at: <http://www.dnrc.mt.gov/licenses-and-permits/stream-permitting>. If you do not wish to use this form, or do not have internet access please contact our office at the address below to obtain more information.

Note that this letter is not a DA authorization to proceed. It only informs you of your need to obtain a DA permit if waters of the U.S. will be affected. If waters of the U.S. will not be affected by a jurisdictional activity a DA permit will not be required for the project.

Please refer to identification number **NWO-2010-00193-MTH** in any correspondence concerning this project. If you have any questions, please contact me at Post Office Box 7032, Billings, Montana 59103, by email at Marena.A.Gilbert@usace.army.mil, or telephone at (406) 657-5912.

Sincerely,



Marena A. Gilbert
Regulatory Project Manager

BILLINGS
6780 Trade Center Ave.
Billings, MT 59101
406.652.5000 • Fax 406.248.1363
www.greatwesteng.com



February 27, 2020

Musselshell County
Floodplain Administrator
704 1st Street East
Roundup, MT 59072

RE: Water System Improvements-Roundup, Montana

Dear Reviewer:

The City of Roundup is in the process of evaluating and improving their water system. In order to determine needed improvements, the City completed a Preliminary Engineering Report (PER) for the water system. After evaluating possible alternatives, the PER recommended improvements to include replacement of existing cast iron water mains that are undersized and corroded, which are causing many leaks and low flows within the system. This project is the sixth phase of a multi-phased project that began with similar PERs in 2010, 2012, 2014, 2016 and 2018. Some of the improvements from the 2018 PER are currently under design and should be constructed in the spring of 2020. The major items within this PER are:

- Replacement of over two miles of dilapidated and undersized cast iron water main.

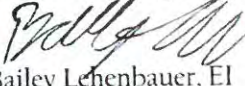
Enclosed you will find a map showing the locations of the proposed water main replacements. All proposed improvements are in Sections 12, 13 and 14 within Township 8N, Range 25E.

Please review the proposed improvements and return to us any comments you may have regarding the potential environmental impacts of the project, if any, within 30 days. A written response from your program is required by the funding agencies that will be utilized on this project. If you have no comment on this project, please check the box below and countersign the end of this letter and return to us at the address listed above.

If you need further information or have any questions regarding the project, please feel free to contact me at (406) 652-5000 or blehenbauer@greatwesteng.com. Thank you.

Sincerely,

Great West Engineering, Inc.


Bailey Lehenbauer, El
Project Engineer

Enclosure: Site Map

BOISE
3050 N. Lakeharbor Ln.
Suite 201
Boise, ID 83703
208.576.6646

HELENA
2501 Belt View Dr.
PO Box 4817
Helena, MT 59604
406.449.8627

GREAT FALLS
702 2nd Street South #2
Great Falls, MT 59405
406.952.1109

SPOKANE
9221 N. Division St.,
Suite F
Spokane, WA 99218
509.413.1430



- [X] The Musselshell County Floodplain Administrator has reviewed the enclosed proposed project and has no comments.

Andrew Harper Flood plain manager
Printed Name

Andrew Harper Flood plain manager
Signature

3-4-2020
Date



From: [Murdo, Damon](#)
To: [Bailey Lehenbauer](#)
Subject: RE: Historical Places in Roundup, MT
Date: Wednesday, February 5, 2020 9:36:08 AM
Attachments: [CRJS.pdf](#)
[CRABS.pdf](#)
[2020020509.pdf](#)

Big Sky. Big Land. Big History.
Montana
Historical Society

February 5, 2020

Bailey Lehenbauer
Great West Engineering
6780 Trade Center Ave
Billings MT 59101

RE: ROUNDUP PHASE 6 WATER LINEIMPROVEMENTS PER. SHPO Project #: 2020020509

Dear Mr. Lehenbauer:

I have conducted a cultural resource file search for the above-cited project located in Sections 11, 13, 14, T8N R25E. According to our records there have been a few previously recorded sites within the designated search locales. In addition to the sites there have been a few previously conducted cultural resource inventories done in the areas. If you would like any further information regarding the site or reports, you may contact me at the number listed below.

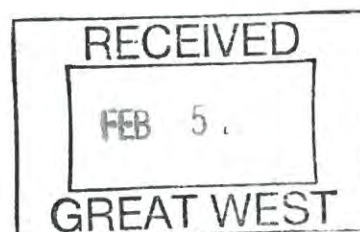
It is SHPO's position that any structure over fifty years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. If any structures are to be altered and are over fifty years old, we would recommend that they be recorded, and a determination of their eligibility be made prior to any disturbance taking place.

As long as there will be no disturbance or alteration to structures over fifty years of age, we feel that there is a low likelihood cultural properties will be impacted. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time. However, should structures need to be altered or if cultural materials be inadvertently discovered during this project, we would ask that our office be contacted, and the site investigated.

If you have any further questions or comments, you may contact me at (406) 444-7767 or by e-mail at dmurdo@mt.gov. I have attached an invoice for the file search. Thank you for consulting with us.

Sincerely,

Damon Murdo
Cultural Records Manager
State Historic Preservation Office





[✓] The Musselshell Valley Historical Society has reviewed the enclosed proposed project and has no comments.

Musselshell Valley Historical Society
Printed Name

[Signature]
Signature

3/3/20
Date



Development Projects (/DevelopmentProjects)	Roundup Water Main Replacement Phase 6
---	--

NOTE: This page has been updated. Changes are marked as **NEW**. Learn more in [What's New](#).

This project is in Review (Due Diligence). You cannot edit the project at this time.

Project ID:

Project ID:

3909

Name:

Roundup Water Main Replacement Phase 6

Project Type:

Infrastructure - Pipeline (Major)

Description:

Roundup Phase 6 water mainline in the City of Roundup, Montana. This project entails replacement of existing water mains within city limits.

Proponent:

Lehenbauer, Bailey (/User/2572/Details)

Email:

blehenbauer@greatwesteng.com (mailto:blehenbauer@greatwesteng.com)

Phone:

(406) 652-5000

Mailing Address:

6780 Trade Center Ave, Billings, MT, 59101

Addt. Contact Info:

Great West Engineering

Reviewer:

Not Assigned

Leaflet (<http://leafletjs.com>) | Esri (<https://services.arcgis.com/arcgis/rest/services>)

EO Habitat Class:

EO-General Habitat

Core Area Names:

Not in any Core Area

Management Zones:

Great Plains Management Zone

No Surface Occupancy Areas:

Not in any NSOA

Exempt Community Boundaries:

Roundup

In BLM Priority Habitat Area?

No

Counties:

Musselshell

TRS:

Township 8 North, Range 25 East, Section 11, 12, 13, 14, 23, 24

Township 8 North, Range 26 East, Section 7, 18, 1... More

Land Owner Information:

City Government, County Government, Private

NEW REVIEWER COMMENTS

There are no comments for this project.

DDCT RESULTS

DDCT Analysis Area	Proposed Disturbances Area	Existing + Proposed Disturbances Area within DDCT Analysis Area	DDCT Result	New disturbed acres	Affected Leks within the DDCT Analysis Area
0 acres	0 acres	0 acres	0.00%	0 acres	0

DISTURBANCES

City of Roundup

Basics**Disturbance Name:**

City of Roundup

Type of Disturbance:

Pipeline

Area:

3,374.433 acres

Length:

29,915.9 ft

Width:

6,214 ft

EO Habitat Classes:

EO-General Habitat, Not In EO Area

Core Area Names:

Not in any Core Area

Management Zones:

Great Plains Management Zone

No Surface Occupancy Areas:

Not in any NSOA

Exempt Community Boundaries:

2/27/2020

3909 - Roundup Water Main Replacement Phase 6

Roundup

In BLM Priority Habitat Area?

No

Counties:

Musselshell

TRS:

Township 8 North, Range 25 East, Section 11, 12, 13, 14, 23, 24, Township 8 North, Range 26 East, Section 7, 18, 19

Land Owner Information:

City Government, County Government, Private

Notes:

Questionnaire

Construction Timeframe:

May, 2022 to September, 2022, Temporary
(< 1 Year)

Operations Timeframe:

October, 2022 to October, 2022, Temporary
(< 1 Year)

Will the pipe, power line, or cable be above ground

Buried

How will the buried pipeline, power line, or cable be installed (trencher, backhoe, other)?

Backhoe

Will construction be entirely within an existing right-of-way? If outside existing right-of-way, be sure to include spatial data.

Yes

Will a new right-of-way be obtained?

No

Is a permit required for this project?

No

ATTACHMENTS

Currently viewing 1 of 1 Attachments

File Name		Title	Type	Uploaded	Uploaded By	Description
1 2-13125-TO22-PER-Figure 5- Proposed Improvements		Plan of Development, Project		02/27/2020 11:01 AM	Lehenbauer, Bailey /U	Water line improvements fo

HISTORY

Currently viewing 3 of 3 Events

Date	Triggered By	Event Type	Project Stage	Description	Attachments
02/27/2020 11:05 AM	Lehenbauer, Bailey	System Notification	Due Diligence	Email sent to blehenbauer@greatwesteng.com	
02/27/2020 11:05 AM	Lehenbauer, Bailey	Project Stage Tran	Due Diligence	Project Submitted for Review	Due Diligence Project Snaps
02/27/2020 10:56 AM	Lehenbauer, Bailey	Initial Draft	Draft	Initial Draft	

Most Recent Submit: 02/27/2020

Review Start: 02/27/2020

Review Complete: Review Not Complete

Review Duration: 0 days

MONTANA SAGE GROUSE HABITAT CONSERVATION PROGRAM
1539 ELEVENTH AVE. HELENA, MT 59601 | SAGEGROUSE@MT.GOV (MAILTO:SAGEGROUSE@MT.GOV) | 406-444-1467 OR 406-444-2613

© 2020 This website and the Montana Sage Grouse Habitat Conservation Program are hosted by the Montana Department of Natural Resources and Conservation.
Created by Sitka Technology Group (<https://sitkatech.com/>)

Last Built on 02/24/2020 8:49 AM

Montana Natural Heritage - SOC Report

Species List Last Updated 10/31/2019

Animal Species of Concern

27 Species of Concern

1 Special Status Species

Filtered by the following criteria:

Town (buffered by 10 miles) = Roundup (based on mapped Species Occurrences)



A program of the Montana State Library's
Natural Resource Information System
operated by the University of Montana.

Expand All | Collapse All

Introduction

Species of Concern

Species of Concern

27 Species

Filtered by the following criteria:

Town (buffered by 10 miles) = Roundup (based on mapped Species Occurrences)

MAMMALS (MAMMALIA)									
SCIENTIFIC NAME COMMON NAME TAXA SORT	FAMILY (SCIENTIFIC) FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	FWP SWAP	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE
<i>Corynorhinus townsendii</i> Townsend's Big-eared Bat	Vespertilionidae Bats	G4	S3		Sensitive - Known on Forests (BD, BRT, CG, HLC, KOOT, LOLO)	SENSITIVE	SGCN3	5%	87%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Fergus, Flathead, Gall, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, McConne, Meagher, Mineral, Missoula, Musselshell, Park, Phillips, Powder River, Powell, Prairie, Rosebud, Sanders, Silver Bow, Stillwater, Treasure, Valley, Yellowstone State Rank Reason: Species is widespread, but uncommon and appears to occur at low densities. Disturbance of cave and mine roosts and the hard closure of a term persistence.									
<i>Cynomys ludovicianus</i> Black-tailed Prairie Dog	Sciuridae Squirrels	G4	S3		Sensitive - Known on Forests (CG)	SENSITIVE	SGCN3	15%	71%
Species Occurrences verified in these Counties: Big Horn, Blaine, Carbon, Carter, Cascade, Chouteau, Custer, Fallon, Fergus, Garfield, Golden Valley, Hill, Jelf Clark, Liberty, McConne, Musselshell, Petroleum, Phillips, Powder River, Prairie, Richland, Rosebud, Stillwater, Sweet Grass, Toole, Treasure, Valley, Wheatland, Y State Rank Reason: Across much of eastern Montana this species occurs in areas with suitable soil and topography. However sylvatic plague has caused the spec colony size and dynamics. Ongoing threats from disease and persecution due to perceived competition with grazing make long-term status of this species uncer									
<i>Euderma maculatum</i> Spotted Bat	Vespertilionidae Bats	G4	S3		Sensitive - Known on Forests (BD, CG)	SENSITIVE	SGCN3, SGIN	5%	27%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Cascade, Chouteau, Dawson, Fergus, Gallatin, Jefferson, Madison, Musselshell, Phillips, Powder River, Richland, Rosebud, Silver Bow, Stillwater, Treasure, Yellowstone State Rank Reason: Little is known about this species in Montana. Although widely distributed, the species is quite rare in almost all of its range. Little is know abundance or occupancy, or life history.									
<i>Lasiurus borealis</i> Eastern Red Bat	Vespertilionidae Bats	G3G4	S3					0%	46%
Species Occurrences verified in these Counties: Big Horn, Blaine, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Fergus, Garfield, Glacier, Hill, Judith B. Musselshell, Park, Petroleum, Phillips, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sweet Grass, Toole, Valley, Wheatland, Yellowstone State Rank Reason: Recent surveys using acoustic detectors have shown this species to be present across much of central and eastern Montana during the summ species, including the Eastern Red Bat, are commonly killed at wind farms, which presents a substantial threat to the long-term viability of populations within t									
<i>Lasiurus cinereus</i> Hoary Bat	Vespertilionidae Bats	G3G4	S3				SGCN3	2%	100%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Deer Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, McConne, Meagher, Mineral, M Park, Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland, Wibaux, Yellowstone State Rank Reason: Species is common and widespread, but under significant threat of catastrophic declines due to White-Nose Syndrome, a fungal disease res populations of this species in the eastern US.									
<i>Myotis lucifugus</i> Little Brown Myotis	Vespertilionidae Bats	G3	S3				SGCN3	3%	100%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Deer Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, McConne, Meagher, Mineral, A Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland, Wibaux, Yellowstone State Rank Reason: Species is common and widespread, but under significant threat of catastrophic declines due to White-Nose Syndrome, a fungal disease res populations of this species in the eastern US.									
BIRDS (AVES)									
SCIENTIFIC NAME COMMON NAME TAXA SORT	FAMILY (SCIENTIFIC) FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	FWP SWAP	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE
<i>Anthus spragueii</i> Sprague's Pipit	Motacillidae Pipits	G3G4	S3B	MBTA; BCC11; BCC17		SENSITIVE	SGCN3	18%	67%
Species Occurrences verified in these Counties: Blaine, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Fallon, Fergus, Gallatin, Garfield, Glacier, Golde Lewis and Clark, Liberty, Madison, McConne, Meagher, Musselshell, Park, Petroleum, Phillips, Pondera, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Stillwater, Valley, Wheatland, Wibaux State Rank Reason: Although population trends in Montana appear to be relatively stable in recent years, populations have been in decline over the long run ar from coverytype conversion, overgrazing, exotic plant invasions, altered fire regimes, and mowing prior to fledgling of young.									
<i>Aquila chrysaetos</i> Golden Eagle	Accipitridae Hawks / Kites / Eagles	G5	S3	BGEPA; MBTA; BCC17		SENSITIVE	SGCN3	3%	100%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Dawson, Deer Lodge, I Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, McConne, Meagher, Mineral, M Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Trez Wibaux, Yellowstone									
<i>Ardea herodias</i> Great Blue Heron	Ardeidae Bitterns / Egrets / Herons / Night-Herons	G5	S3	MBTA			SGCN3	3%	100%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Dawson, Deer Lodge, I Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Lincoln, Madison, McConne, Meagher, Mineral, M Petroleum, Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Wibaux, Yellowstone State Rank Reason: Small breeding population size, evidence of recent declines, and declining regeneration of riparian cottonwood forests due to altered hydr									

Buteo regalis Ferruginous Hawk	Accipitridae Hawks / Kites / Eagles	G4	S3B	MBTA; BCC10; BCC17		SENSITIVE	SGCN3	11%	95%
Species Occurrences verified in these Counties: Beaverhead, Blaine, Broadwater, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Fallon, Fergus, Gallatin Valley, Hill, Jefferson, Judith Basin, Lewis and Clark, Liberty, Madison, Mccone, Meagher, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Prairie, Stillwater, Teton, Toole, Valley, Wheatland, Wibaux, Yellowstone									
Calcarius ornatus Chestnut-collared Longspur	Calcariidae Longspurs and Snow Buntings	G5	S2B	MBTA; BCC11; BCC17		SENSITIVE	SGCN2	32%	67%
Species Occurrences verified in these Counties: Big Horn, Blaine, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Fallon, Fergus, Garfield, Glacier Basin, Lewis and Clark, Liberty, Mccone, Musselshell, Petroleum, Phillips, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Stillwater, Sweet Grass, Wheatland, Wibaux, Yellowstone									
State Rank Reason: Species has a negative short-term population trend and faces threats from loss of native prairie grassland habitats and altered frequency, in of grazing and fire regimes it is dependent on.									
Centrocercus urophasianus Greater Sage-Grouse	Phasianidae Upland Game Birds	G3G4	S2		Sensitive - Known on Forests (RD) Sensitive - Suspected on Forests (CG, HLC)	SENSITIVE	SGCN2	17%	75%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Chouteau, Custer, Dawson, Deer Lodge, Fallon, Fe Valley, Hill, Madison, Mccone, Meagher, Musselshell, Park, Petroleum, Phillips, Powder River, Prairie, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Vall Yellowstone									
Centronyx bairdii Baird's Sparrow	Passerellidae New World Sparrows	G4	S3B	MBTA; BCC11; BCC17		SENSITIVE	SGCN3	27%	67%
Species Occurrences verified in these Counties: Blaine, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Fallon, Fergus, Glacier, Hill, Judith Basin, Lewis Meagher, Musselshell, Petroleum, Phillips, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Stillwater, Sweet Grass, Teton, Toole, Valley, Yellowstone									
State Rank Reason: Montana populations were declining until recently and the species is declining in most or the surrounding states and provinces.									
Charadrius montanus Mountain Plover	Charadriidae Plovers	G3	S2B	MBTA; BCC11; BCC17		SENSITIVE	SGCN2	20%	73%
Species Occurrences verified in these Counties: Blaine, Broadwater, Carbon, Fergus, Garfield, Golden Valley, Jefferson, Madison, Musselshell, Petroleum, Phil Treasure, Valley, Wheatland									
Gymnorhinus cyanocephalus Pinyon Jay	Corvidae Jays / Crows / Magpies	G3	S3	MBTA; BCC17			SGCN3	5%	55%
Species Occurrences verified in these Counties: Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Fergus, Gallatin, Garfield, Golden Clark, Musselshell, Park, Petroleum, Phillips, Powder River, Rosebud, Stillwater, Sweet Grass, Wheatland, Yellowstone									
Haemorhous cassinii Cassin's Finch	Fringillidae Finches	G5	S3	MBTA; BCC10			SGCN3	11%	62%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Broadwater, Carbon, Cascade, Chouteau, Custer, Deer Lodge, Fergus, Flathead, Gallatin, Granite, Jefferson, Judith Basin, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Musselshell, Park, Petroleum, Phillips, Powder River, Pow Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland, Yellowstone									
State Rank Reason: Data show recent short-term declines in population for this species									
Lanius ludovicianus Loggerhead Shrike	Laniidae Shrikes	G4	S3B	MBTA; BCC10; BCC17		SENSITIVE	SGCN3	4%	100%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Falc Glacier, Golden Valley, Hill, Jefferson, Liberty, Madison, Mccone, Meagher, Musselshell, Petroleum, Phillips, Pondera, Powder River, Prairie, Richland, Roosevelt, Sweet Grass, Teton, Toole, Valley, Wheatland, Wibaux, Yellowstone									
Numenius americanus Long-billed Curlew	Scolopacidae Sandpipers	G5	S3B	MBTA; BCC10; BCC11; BCC17		SENSITIVE	SGCN3	19%	100%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Deer Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Judith Basin, Lake, Lewis and Clark, Liberty, Madison, Mccone, Meagher, Missoula, / Phillips, Pondera, Powder River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley Yellowstone									
Oreoscoptes montanus Sage Thrasher	Mimidae Thrashers / Mockingbirds / Catbirds	G4	S3B	MBTA; BCC10; BCC17		SENSITIVE	SGCN3	9%	84%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Broadwater, Carbon, Carter, Chouteau, Custer, Fallon, Gallatin, Garfield, Golden Valley, Madison, Musselshell, Park, Petroleum, Phillips, Powder River, Prairie, Richland, Rosebud, Sanders, Silver Bow, Stillwater, Sweet Grass, Valley, Wheatland, Yellow									
Rhynchophanes mccownii McCown's Longspur	Calcariidae Longspurs and Snow Buntings	G4	S3B	MBTA; BCC10; BCC11; BCC17		SENSITIVE	SGCN3	41%	79%
Species Occurrences verified in these Counties: Beaverhead, Blaine, Broadwater, Chouteau, Daniels, Fergus, Glacier, Golden Valley, Hill, Judith Basin, Lewis & Mccone, Musselshell, Petroleum, Phillips, Pondera, Roosevelt, Rosebud, Sheridan, Stillwater, Sweet Grass, Teton, Toole, Valley, Wheatland, Yellowstone									
State Rank Reason: Species faces threats from cover type conversion and altered grazing and fire regimes, and although populations in the core of their breed appear to be relatively stable, declines are occurring in much of the species' global breeding range.									
Spizella breweri Brewer's Sparrow	Passerellidae New World Sparrows	G5	S3B	MBTA; BCC10; BCC17		SENSITIVE	SGCN3	12%	100%
Species Occurrences verified in these Counties: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Chouteau, Custer, Dawson, Deer Lodge, Fallon, Fe Garfield, Glacier, Golden Valley, Granite, Hill, Jefferson, Lake, Lewis and Clark, Liberty, Lincoln, Madison, Mccone, Meagher, Missoula, Musselshell, Park, Petrol River, Powell, Prairie, Ravalli, Richland, Roosevelt, Rosebud, Sanders, Sheridan, Silver Bow, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, V									
State Rank Reason: Species faces threats from loss of sagebrush habitats it is dependent on as a result of habitat conversion for agriculture and increased freq encroachment and drought.									

REPTILES (REPTILIA)

TOWN INFLUENCED BY 10 MILES - ROUNDUP (based on map)

SCIENTIFIC NAME COMMON NAME TAXA SORT	FAMILY (SCIENTIFIC) FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	FWP SWAP	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE
Apalone spinifera Spiny Softshell	Trionychidae Softshell Turtles	G5	S3			SENSITIVE	SGCN3	2%	26%
Species Occurrences verified in these Counties: Big Horn, Blaine, Carbon, Cascade, Chouteau, Custer, Dawson, Fergus, Garfield, Glacier, Golden Valley, Lewis Petroleum, Phillips, Pondera, Prairie, Richland, Rosebud, Stillwater, Sweet Grass, Teton, Toole, Treasure, Wheatland, Wibaux, Yellowstone									
Lampropeltis gentilis Western Milksnake	Colubridae Colubrid Snakes	G5	S2		Sensitive - Known on Forests (CG)	SENSITIVE	SGCN2	2%	51%
Species Occurrences verified in these Counties: Big Horn, Blaine, Carbon, Custer, Dawson, Fergus, Garfield, Musselshell, Petroleum, Phillips, Powder River, Ro									
Phrynosoma hernandesi Greater Short-horned Lizard	Phrynosomatidae Sagebrush / Spiny Lizards	G5	S3		Sensitive - Known on Forests (CG) Sensitive - Suspected on Forests (HLC)	SENSITIVE	SGCN3, SGIN	19%	66%
Species Occurrences verified in these Counties: Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Dawson, Fergus, Gallatin, Garfield, Lewis and Clark, Liberty, Mccone, Musselshell, Petroleum, Phillips, Pondera, Powder River, Prairie, Richland, Roosevelt, Rosebud, Silver Bow, Stillwater, Sweet G Valley, Wheatland, Wibaux, Yellowstone									

AMPHIBIANS (ANURA)									
SCIENTIFIC NAME COMMON NAME TAXA SORT	FAMILY (SCIENTIFIC) FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	FWP SWAP	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE
<i>Anaxyrus cognatus</i> Great Plains Toad	<i>Bufo</i> True Toads	G5	S2		Sensitive - Known on Forests (CG)	SENSITIVE	SGCN2	8%	62%
Species Occurrences verified in these Counties: Big Horn, Blaine, Carter, Cascade, Chouteau, Custer, Garfield, Golden Valley, Hill, Lewis and Clark, Liberty, M Phillips, Powder River, Prairie, Rosebud, Sheridan, Stillwater, Toole, Valley, Yellowstone. State Rank Reason: Current trend is unknown due to a scarcity of observations, but long-term declines are possible due to declines in ephemeral waterbodies (threats from habitat loss including development of native habitat, and reduced availability of burrows due to black-tailed prairie dog declines).									

FISH (ACTINOPTERYGII)									
SCIENTIFIC NAME COMMON NAME TAXA SORT	FAMILY (SCIENTIFIC) FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	FWP SWAP	% OF GLOBAL BREEDING RANGE IN MT	% OF MT THAT IS BREEDING RANGE
<i>Chrosomus eos</i> Northern Redbelly Dace	<i>Cyprinidae</i> Minnows	G5	S3				SGCN3	4%	27%
Species Occurrences verified in these Counties: Blaine, Cascade, Chouteau, Daniels, Dawson, Fergus, Golden Valley, Hill, Judith Basin, Lewis and Clark, McCone, Petroleum, Phillips, Pondera, Richland, Roosevelt, Sheridan, Stillwater, Sweet Grass, Teton, Toole, Valley, Wheatland, Wibaux. State Rank Reason: The Northern Redbelly Dace is currently listed as an "S3" species of concern in Montana because they are potentially at risk because of limited range and/or habitat, even though it may be abundant in some areas.									
<i>Chrosomus eos</i> x <i>Chrosomus neogaeus</i> Northern Redbelly X Finescale Dace	<i>Cyprinidae</i> Minnows	GNA	S3			SENSITIVE	SGCN3		20%
Species Occurrences verified in these Counties: Blaine, Cascade, Chouteau, Fergus, Golden Valley, Judith Basin, Meagher, Musselshell, Petroleum, Phillips, Pondera, Wheatland. State Rank Reason: The Northern Redbelly/Finescale Dace Hybrid is currently listed as an "S3" species of concern in Montana because they are potentially at risk because of declining numbers, range and/or habitat, even though it may be abundant in some areas.									

Potential Species of Concern

Special Status Species

Additions To Statewide List

Species Removed From Statewide List

Species of Greatest Inventory Need

Citation for data on this website:

Montana Animal Species of Concern Report. Montana Natural Heritage Program and Montana Fish, Wildlife and Parks. Retrieved on 2/19/2020, from <http://mtnhp.org/SpeciesOfConcern/?AorP=a>

Montana Natural Heritage - SOC Report

Plant Species of Concern

Species List Last Updated **10/31/2019**

A program of the Montana State Library's
Natural Resource Information System
operated by the University of Montana.

1 Species of Concern

1 Potential Species of Concern - Species Occurrences are not maintained for Animal PSOC, therefore we cannot filter these species geographically

Filtered by the following criteria:

Town (buffered by 10 miles) = Roundup (based on mapped Species Occurrences)

Expand All | Collapse All

Introduction

Species of Concern

Species of Concern

1 Species

Filtered by the following criteria:

Town (buffered by 10 miles) = Roundup (based on mapped Species Occurrences)

FLOWERING PLANTS - DICOTS (MAGNOLIOPSIDA)								
SCIENTIFIC NAME COMMON NAME TAXA SORT	OTHER NAMES	FAMILY (SCIENTIFIC) FAMILY (COMMON)	GLOBAL RANK	STATE RANK	USFWS	USFS	BLM	MNPS THREAT CATEGORY
<i>Senecio integerrimus</i> var. <i>scribneri</i> Scribner's Ragwort		<i>Asteraceae</i> Aster/Sunflowers	G5T2T3	S2S3				
Species Occurrences verified in these Counties: Carbon, Custer, Fergus, Golden Valley, Hill, Liberty, Musselshell, Park, Phillips, Yellowstone State Rank Reason: See rank details.								

Potential Species of Concern

Special Status Species

Additions To Statewide List

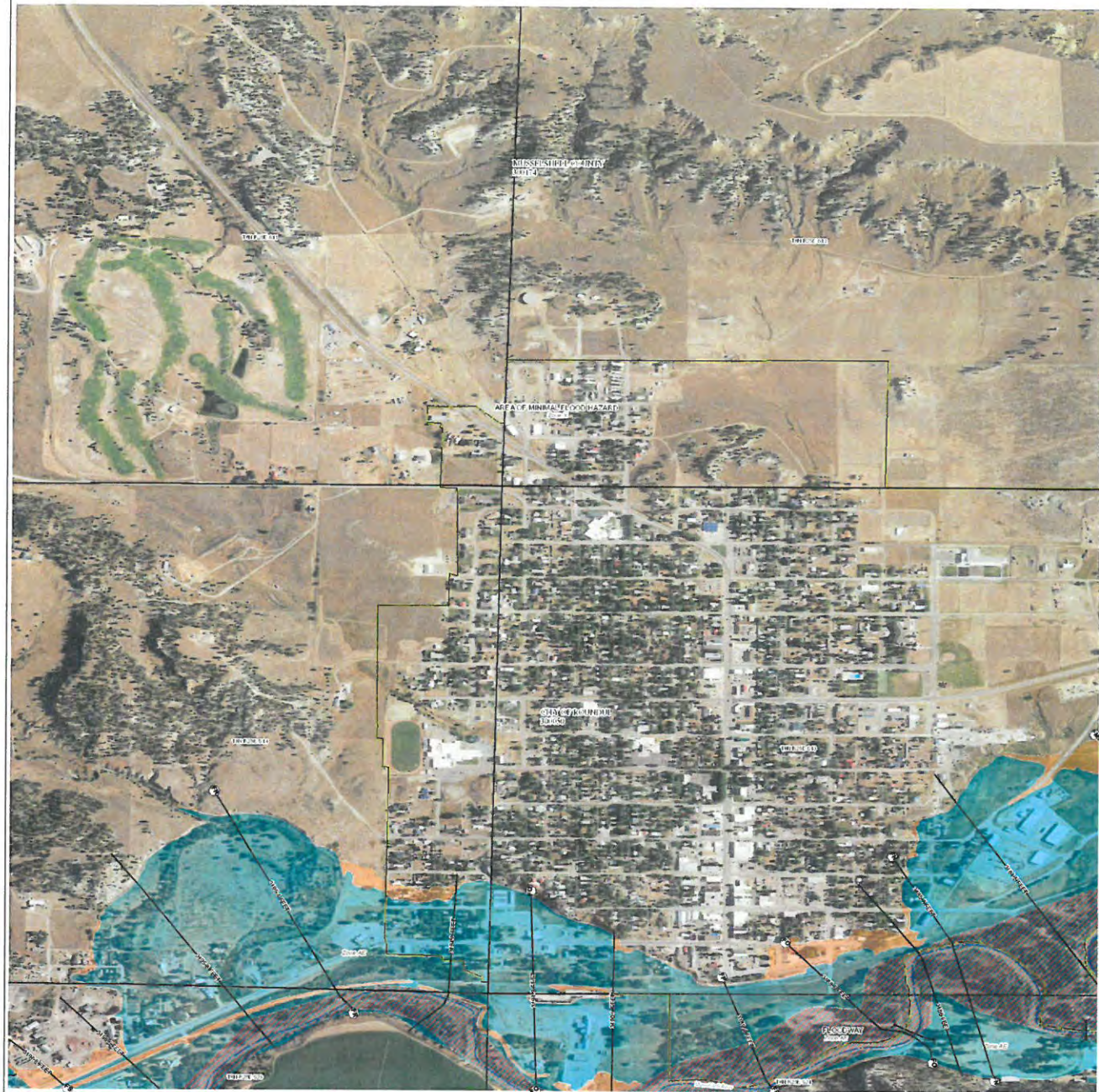
Species Removed From Statewide List

Citation for data on this website:

Montana Plant Species of Concern Report. Montana Natural Heritage Program. Retrieved on 2/19/2020, from <http://mtnhp.org/SpeciesOfConcern/?AorP=p>

Appendix B:

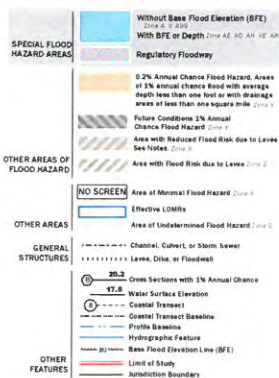
Miscellaneous Maps



USGS The National Map, Orthorectified Data refreshed April, 2016
48°29'04.2"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT



NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information Center at 1-877-FEMA-6872 or visit the FEMA Flood Map Service Center website at <http://www.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website www.fema.gov. Communities seeking land or adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and corporate map data refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-658-5820.

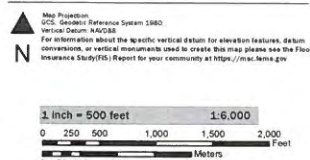
Resurvey information shown on this FIRM was provided in digital format to USACE, Farm Service Agency (FSA). This information was derived from NAD83 (GDA84) April 11, 2016.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on 10/20/2016 at 10:10 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or be updated separately by new data over time. For additional information, please see the Flood Hazard Mapping Update Overview Fact Sheet at <http://www.fema.gov/media-library/assets/documents/15418>.

This map complies with FEMA's standards for the use of digital flood maps. If it is not used as described below, the community shall comply with FEMA's baseline accuracy standards.

This map image is void if the date or more of the following map elements do not appear: baseline imagery, flood zone labels, legend, scale bar, map creation date, community identifier, FIRM panel number, and FIRM effective date.

SCALE



FEMA
National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAP

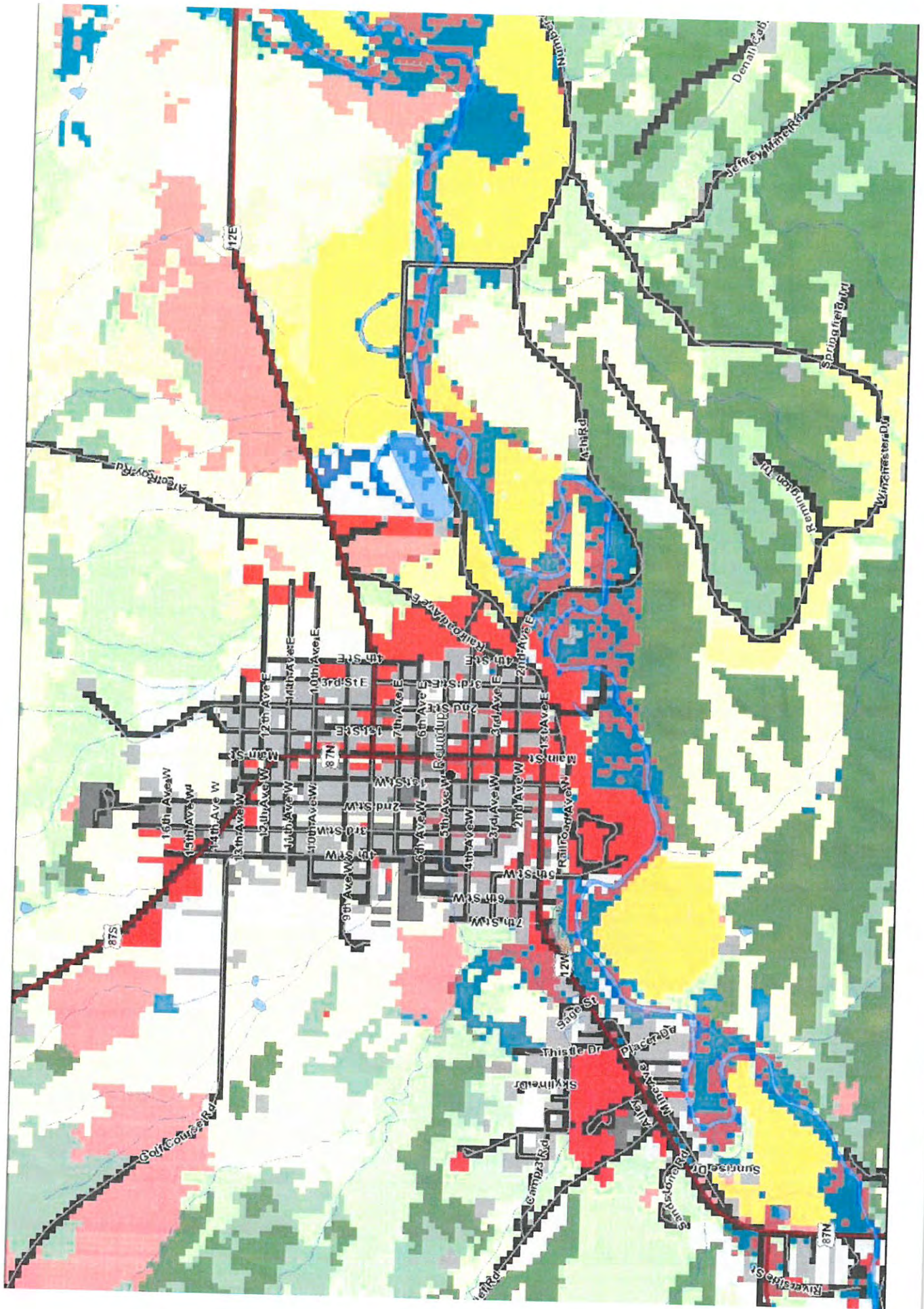
MUSSELSHELL COUNTY, MONTANA
AND INCORPORATED AREAS
PANEL 833 OF 1060

Panel Contains	NUMBER	PANEL
COMMUNITY	30066	0833
CITY OF BOUNDARY	30074	0833
MONTANA		
MUSSELSHELL COUNTY		
MONTANA		

MAP NUMBER
30066C0833C
EFFECTIVE DATE
11/15/2019



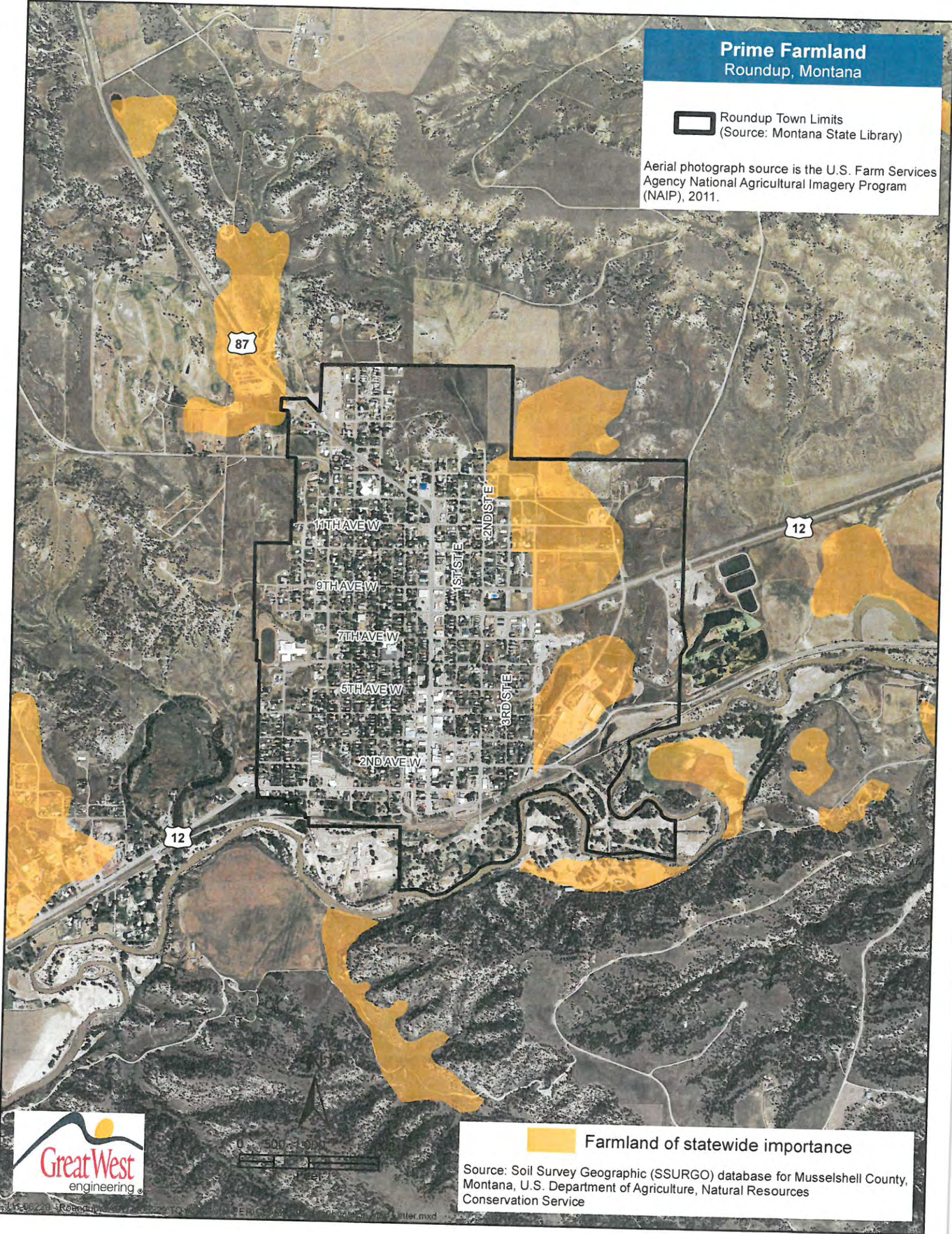
Land Use



Prime Farmland Roundup, Montana

 Roundup Town Limits
(Source: Montana State Library)

Aerial photograph source is the U.S. Farm Services Agency National Agricultural Imagery Program (NAIP), 2011.



 Farmland of statewide importance

Source: Soil Survey Geographic (SSURGO) database for Musselshell County, Montana, U.S. Department of Agriculture, Natural Resources Conservation Service



Unified Soil Classification (Surface)—Musselshell County, Montana



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

2/5/2020
Page 1 of 5

MAP LEGEND

Area of Interest (AOI)
Area of Interest (AOI)

Soils

Soil Rating Polygons

- CH
- CL
- CL-A (proposed)
- CL-K (proposed)
- CL-ML
- CL-O (proposed)
- CL-T (proposed)
- GC
- GC-GM
- GM
- GP
- GP-GC
- GP-GM
- GW
- GW-GC
- GW-GM
- MH
- MH-A (proposed)
- MH-K (proposed)
- MH-O (proposed)
- MH-T (proposed)
- ML

- ML-A (proposed)
- ML-K (proposed)
- ML-O (proposed)
- ML-T (proposed)
- OH
- OH-T (proposed)
- OL
- PT
- SC
- SC-SM
- SM
- SP
- SP-SC
- SP-SM
- SW
- SW-SC
- SW-SM
- Not rated or not available

Soil Rating Lines

- CH
- CL
- CL-A (proposed)
- CL-K (proposed)
- CL-ML
- CL-O (proposed)
- CL-T (proposed)

- SP
- SP-SC
- SP-SM
- SW
- SW-SC
- SW-SM
- Not rated or not available
- Soil Rating Points
- CH
- CL
- CL-A (proposed)
- CL-K (proposed)
- CL-ML
- CL-O (proposed)
- CL-T (proposed)
- GC
- GC-GM
- GM
- GP
- GP-GC
- GP-GM
- GW
- GW-GC
- GW-GM
- MH
- MH-A (proposed)
- MH-K (proposed)
- MH-O (proposed)
- MH-T (proposed)
- ML
- ML-A (proposed)
- ML-K (proposed)
- ML-O (proposed)
- ML-T (proposed)
- OH
- OH-T (proposed)
- OL
- PT
- SC
- SC-SM
- SM
- SP
- SP-SC
- SP-SM
- SW
- SW-SC
- SW-SM
- Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

+++

MAP INFORMATION



The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 3, 2013—Oct 30, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Unified Soil Classification (Surface)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
9A	Havre loam, 0 to 2 percent slopes, rarely flooded	CL	35.7	4.3%
11A	Havre-Glendive complex, 0 to 2 percent slopes, rarely flooded	CL	71.8	8.6%
33B	Yamacall loam, 2 to 8 percent slopes	CL	24.4	2.9%
36B	Yamacall-Delpoint loams, 2 to 8 percent slopes	CL	13.2	1.6%
39B	Delpoint loam, calcareous, 2 to 8 percent slopes	CL	0.1	0.0%
39C	Delpoint, calcareous-Cabbart-Yamacall, calcareous, loams, 4 to 15 percent slopes	CL	91.5	11.0%
40C	Kobase silty clay loam, calcareous, 1 to 8 percent slopes	CL	98.9	11.9%
41B	Yamacall loam, calcareous, 2 to 8 percent slopes	CL	35.2	4.2%
82C	Cabbart-Delpoint, calcareous-Rock outcrop complex, 4 to 15 percent slopes	CL	7.8	0.9%
181D	Cabbart-Crago-Delpoint complex, 4 to 15 percent slopes	CL	0.1	0.0%
UL	Urban land		455.6	54.6%
Totals for Area of Interest			834.2	100.0%



Description

The Unified soil classification system classifies mineral and organic mineral soils for engineering purposes on the basis of particle-size characteristics, liquid limit, and plasticity index. It identifies three major soil divisions: (i) coarse-grained soils having less than 50 percent, by weight, particles smaller than 0.074 mm in diameter; (ii) fine-grained soils having 50 percent or more, by weight, particles smaller than 0.074 mm in diameter; and (iii) highly organic soils that demonstrate certain organic characteristics. These divisions are further subdivided into a total of 15 basic soil groups. The major soil divisions and basic soil groups are determined on the basis of estimated or measured values for grain-size distribution and Atterberg limits. ASTM D 2487 shows the criteria chart used for classifying soil in the Unified system and the 15 basic soil groups of the system and the plasticity chart for the Unified system.

The various groupings of this classification correlate in a general way with the engineering behavior of soils. This correlation provides a useful first step in any field or laboratory investigation for engineering purposes. It can serve to make some general interpretations relating to probable performance of the soil for engineering uses.

For each soil horizon in the database one or more Unified soil classifications may be listed. One is marked as the representative or most commonly occurring. The representative classification is shown here for the surface layer of the soil.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

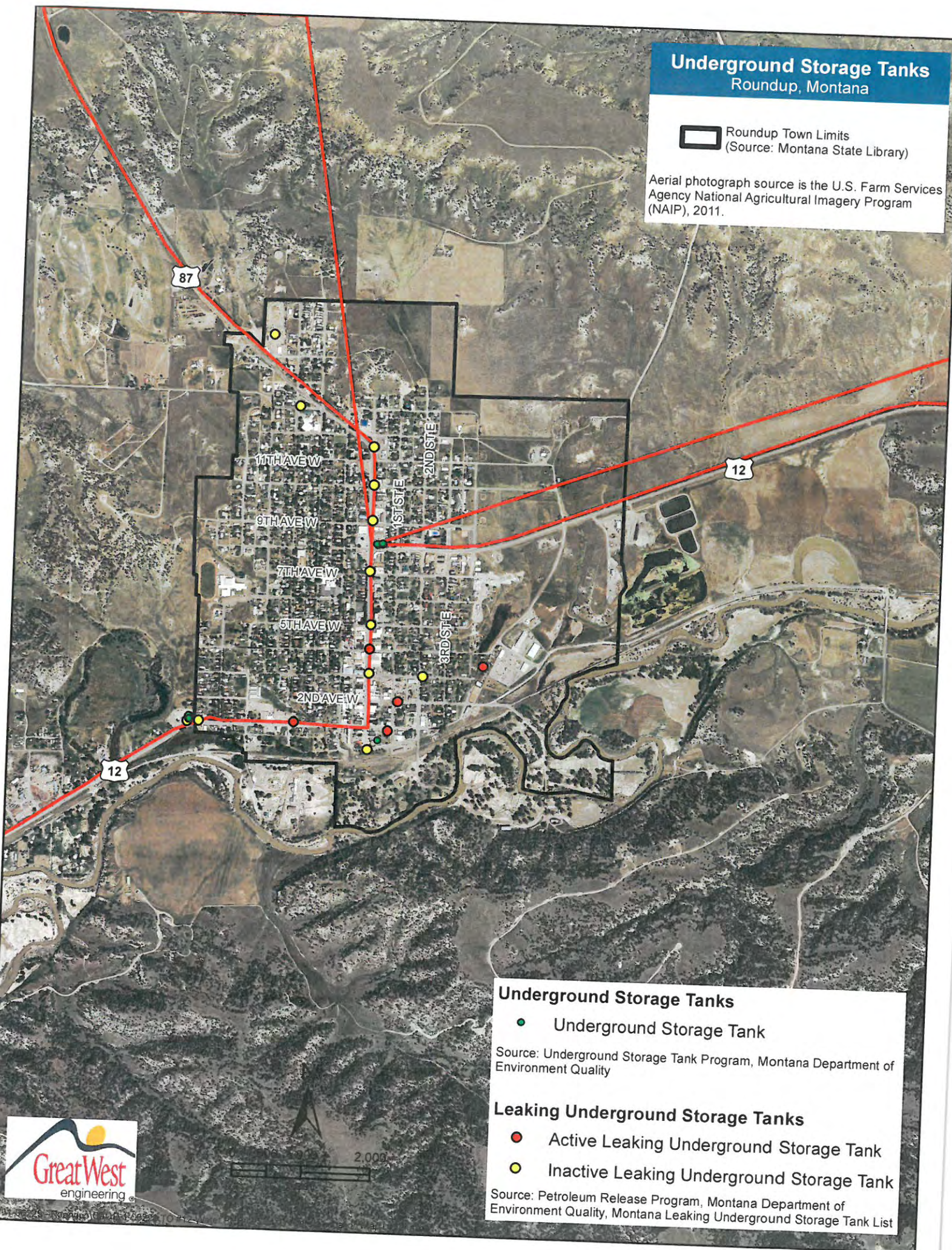
Tie-break Rule: Lower

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

Underground Storage Tanks Roundup, Montana

 Roundup Town Limits
(Source: Montana State Library)

Aerial photograph source is the U.S. Farm Services Agency National Agricultural Imagery Program (NAIP), 2011.



Underground Storage Tanks

-  Underground Storage Tank

Source: Underground Storage Tank Program, Montana Department of Environment Quality

Leaking Underground Storage Tanks

-  Active Leaking Underground Storage Tank
-  Inactive Leaking Underground Storage Tank

Source: Petroleum Release Program, Montana Department of Environment Quality, Montana Leaking Underground Storage Tank List

Musselshell County, Montana

9A—Havre loam, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: cgm7

Elevation: 2,750 to 4,460 feet

Mean annual precipitation: 10 to 14 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 105 to 135 days

Famland classification: Farmland of statewide importance

Map Unit Composition

Havre and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Havre

Setting

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Concave

Parent material: Alluvium

Typical profile

Ap - 0 to 4 inches: loam

C - 4 to 60 inches: stratified fine sandy loam to clay loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: Rare

Frequency of ponding: None

Calcium carbonate, maximum in profile: 5 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT),

Bottomland (R046XP801MT)

Hydric soil rating: No

Minor Components

Glendive

Percent of map unit: 7 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Sandy (Sy) RRU 58A-C 11-14" p.z.
(R058AC042MT)
Hydric soil rating: No

Harlake

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Clayey (Cy) RRU 58A-C 11-14" p.z.
(R058AC041MT)
Hydric soil rating: No

Bigsandy

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Subirrigated (Sb) RRU 58A-C 11-14" p.z.
(R058AC044MT)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Musselshell County, Montana

11A—Havre-Glendive complex, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: cghh
Elevation: 2,740 to 4,410 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 105 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Havre and similar soils: 50 percent
Glendive and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Havre

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

Ap - 0 to 4 inches: loam
C - 4 to 60 inches: stratified fine sandy loam to clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT),
Bottomland (R046XP801MT)

Hydric soil rating: No

Description of Glendive

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

Ap - 0 to 8 inches: fine sandy loam
C1 - 8 to 14 inches: sandy loam
C2 - 14 to 60 inches: stratified loamy fine sand to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High
(1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Very slightly saline to moderately
saline (2.0 to 8.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: Sandy (Sy) RRU 58A-C 11-14" p.z.
(R058AC042MT), Bottomland (R046XP801MT)
Hydric soil rating: No

Minor Components

Harlake

Percent of map unit: 8 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Clayey (Cy) RRU 58A-C 11-14" p.z.
(R058AC041MT)
Hydric soil rating: No

Bigsandy

Percent of map unit: 4 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave

Ecological site: Subirrigated (Sb) RRU 58A-C 11-14" p.z.
(R058AC044MT)
Hydric soil rating: Yes

Bullhook

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Saline Upland (SU) RRU 58A-C 11-14" p.z.
(R058AC050MT)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Musselshell County, Montana

33B—Yamacall loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2vdkh

Elevation: 1,900 to 4,620 feet

Mean annual precipitation: 10 to 14 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 105 to 135 days

Farmland classification: Not prime farmland

Map Unit Composition

Yamacall and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yamacall

Setting

Landform: Alluvial fans

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy alluvium

Typical profile

A - 0 to 3 inches: loam

Bw - 3 to 11 inches: loam

Bk - 11 to 60 inches: loam

Properties and qualities

Slope: 2 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to high (0.57 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Gypsum, maximum in profile: 1 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 5.0

Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)

Hydric soil rating: No

Minor Components

Busby

Percent of map unit: 5 percent

Landform: Alluvial fans

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Sandy (Sy) RRU 58A-C 11-14" p.z.
(R058AC042MT)

Hydric soil rating: No

Delpoint

Percent of map unit: 5 percent

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)

Hydric soil rating: No

Kobase

Percent of map unit: 3 percent

Landform: Alluvial fans

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Clayey (Cy) RRU 58A-C 11-14" p.z.
(R058AC041MT)

Hydric soil rating: No

Rominell

Percent of map unit: 2 percent

Landform: Alluvial fans, stream terraces

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Claypan (Cp) RRU 58A-C 11-14" p.z.
(R058AC054MT)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Musselshell County, Montana

Survey Area Data: Version 15, Sep 16, 2019



Musselshell County, Montana

36B—Yamacall-Delpoint loams, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2vdkj
Elevation: 1,900 to 4,700 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 105 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Yamacall and similar soils: 50 percent
Delpoint and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yamacall

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from interbedded sedimentary rock

Typical profile

A - 0 to 3 inches: loam
Bw - 3 to 11 inches: loam
Bk - 11 to 60 inches: loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Description of Delpoint

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from interbedded
sedimentary rock

Typical profile

A - 0 to 3 inches: loam
Bw - 3 to 12 inches: loam
Bk - 12 to 28 inches: loam
Cr - 28 to 60 inches: bedrock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0
mmhos/cm)
Available water storage in profile: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Minor Components

Cabbart

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope,
crest
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Shallow (Sw) RRU 58A-C 11-14" p.z.
(R058AC057MT)

Hydric soil rating: No

Rominell

Percent of map unit: 2 percent

Landform: Stream terraces, alluvial fans

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Claypan (Cp) RRU 58A-C 11-14" p.z.
(R058AC054MT)

Hydric soil rating: No

Busby

Percent of map unit: 2 percent

Landform: Alluvial fans

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Sandy (Sy) RRU 58A-C 11-14" p.z.
(R058AC042MT)

Hydric soil rating: No

Kobase

Percent of map unit: 2 percent

Landform: Alluvial fans

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: Clayey (Cy) RRU 58A-C 11-14" p.z.
(R058AC041MT)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Musselshell County, Montana

39B—Delpoint loam, calcareous, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: cgk2
Elevation: 3,010 to 3,970 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 105 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Delpoint, calcareous, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delpoint, Calcareous

Setting

Landform: Hills
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Colluvium derived from sedimentary rock and/or residuum weathered from sedimentary rock

Typical profile

Ap - 0 to 3 inches: loam
Bw - 3 to 11 inches: loam
Bk - 11 to 22 inches: loam
Cr - 22 to 60 inches: bedrock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Minor Components

Cabbart

Percent of map unit: 12 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Shallow (Sw) RRU 58A-C 11-14" p.z.
(R058AC057MT)
Hydric soil rating: No

Twilight

Percent of map unit: 8 percent
Landform: Hills
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Sandy (Sy) RRU 58A-C 11-14" p.z.
(R058AC042MT)
Hydric soil rating: No

Delpoint

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Yamacall

Percent of map unit: 2 percent
Landform: Stream terraces, fans, low hills
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Musselshell County, Montana

39C—Delpoint, calcareous-Cabbart-Yamacall, calcareous, loams, 4 to 15 percent slopes

Map Unit Setting

National map unit symbol: cgk3
Elevation: 2,900 to 4,470 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 105 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Delpoint, calcareous, and similar soils: 40 percent
Cabbart and similar soils: 25 percent
Yamacall, calcareous, and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delpoint, Calcareous

Setting

Landform: Hills
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Colluvium derived from sedimentary rock and/or residuum weathered from sedimentary rock

Typical profile

Ap - 0 to 3 inches: loam
Bw - 3 to 11 inches: loam
Bk - 11 to 22 inches: loam
Cr - 22 to 60 inches: bedrock

Properties and qualities

Slope: 4 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Description of Cabbart

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

A - 0 to 4 inches: loam
Bk1 - 4 to 10 inches: loam
Bk2 - 10 to 16 inches: loam
Cr - 16 to 60 inches: bedrock

Properties and qualities

Slope: 4 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: Shallow (Sw) RRU 58A-C 11-14" p.z. (R058AC057MT)
Hydric soil rating: No

Description of Yamacall, Calcareous

Setting

Landform: Fans, low hills, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave

Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 3 inches: loam
Bw - 3 to 11 inches: loam
Bk - 11 to 60 inches: loam

Properties and qualities

Slope: 4 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Minor Components

Twilight

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: Sandy (Sy) RRU 58A-C 11-14" p.z. (R058AC042MT)
Hydric soil rating: No

Delpoint

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Busby

Percent of map unit: 5 percent
Landform: Swales, alluvial fans
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: Sandy (Sy) RRU 58A-C 11-14" p.z.
(R058AC042MT)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Musselshell County, Montana

40C—Kobase silty clay loam, calcareous, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: cgk5

Elevation: 2,770 to 4,610 feet

Mean annual precipitation: 10 to 14 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 105 to 135 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Kobase, calcareous, and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kobase, Calcareous

Setting

Landform: Stream terraces, fans

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium

Typical profile

A - 0 to 6 inches: silty clay loam

Bw - 6 to 24 inches: silty clay loam

Bk - 24 to 60 inches: silty clay loam

Properties and qualities

Slope: 1 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 15 percent

Gypsum, maximum in profile: 5 percent

Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 13.0

Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C
Ecological site: Clayey (Cy) RRU 58A-C 11-14" p.z.
(R058AC041MT)
Hydric soil rating: No

Minor Components

Kobase

Percent of map unit: 8 percent
Landform: Fans, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (Cy) RRU 58A-C 11-14" p.z.
(R058AC041MT)
Hydric soil rating: No

Yamacall

Percent of map unit: 7 percent
Landform: Fans, low hills, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Zatoville

Percent of map unit: 5 percent
Landform: Alluvial fans, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (Cy) RRU 58A-C 11-14" p.z.
(R058AC041MT)
Hydric soil rating: No

Lostriver

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Saline Lowland (SL) RRU 58A-C 11-14" p.z.
(R058AC051MT)
Hydric soil rating: No

Harlake

Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Overflow (Ov) RRU 58A-C 11-14" p.z.
(R058AC045MT)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Musselshell County, Montana

41B—Yamacall loam, calcareous, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: cgk7
Elevation: 2,870 to 4,680 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 105 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Yamacall, calcareous, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yamacall, Calcareous

Setting

Landform: Fans, stream terraces, low hills
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 3 inches: loam
Bw - 3 to 11 inches: loam
Bk - 11 to 25 inches: loam
BC - 25 to 60 inches: loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Minor Components

Yamacall

Percent of map unit: 8 percent
Landform: Fans, stream terraces, low hills
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Kobase

Percent of map unit: 5 percent
Landform: Stream terraces, fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Clayey (Cy) RRU 58A-C 11-14" p.z.
(R058AC041MT)
Hydric soil rating: No

Delpoint

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Rominell

Percent of map unit: 2 percent
Landform: Alluvial fans, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Claypan (Cp) RRU 58A-C 11-14" p.z.
(R058AC054MT)
Hydric soil rating: No

Busby

Percent of map unit: 2 percent
Landform: Swales, alluvial fans
Down-slope shape: Linear
Across-slope shape: Concave, linear
Ecological site: Sandy (Sy) RRU 58A-C 11-14" p.z.
(R058AC042MT)

Hydric soil rating: No

Data Source Information

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Musselshell County, Montana

82C—Cabbart-Delpoint, calcareous-Rock outcrop complex, 4 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2yk09
Elevation: 2,910 to 4,410 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 105 to 125 days
Farmland classification: Not prime farmland

Map Unit Composition

Cabbart, calcareous, and similar soils: 45 percent
Delpoint, calcareous, and similar soils: 30 percent
Rock outcrop: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cabbart, Calcareous

Setting

Landform: Low hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from interbedded sedimentary rock

Typical profile

A - 0 to 3 inches: loam
Bk1 - 3 to 10 inches: loam
Bk2 - 10 to 16 inches: loam
Cr - 16 to 60 inches: bedrock

Properties and qualities

Slope: 4 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (K_{sat}): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: Shallow (Sw) RRU 58A-C 11-14" p.z.
(R058AC057MT)
Hydric soil rating: No

Description of Delpoint, Calcareous

Setting

Landform: Low hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from interbedded sedimentary rock

Typical profile

A - 0 to 3 inches: loam
Bw - 3 to 11 inches: loam
Bk - 11 to 22 inches: loam
Cr - 22 to 60 inches: bedrock

Properties and qualities

Slope: 4 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.00 to 0.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Description of Rock Outcrop

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Minor Components

Blacksheep

Percent of map unit: 5 percent
Landform: Low hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Shallow (Sw) RRU 58A-C 11-14" p.z.
(R058AC057MT)
Hydric soil rating: No

Yawdim

Percent of map unit: 3 percent
Landform: Low hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Shallow Clay (SwC) RRU 58A-C 11-14" p.z.
(R058AC059MT)
Hydric soil rating: No

Yamacall

Percent of map unit: 2 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Musselshell County, Montana

181D—Cabbart-Crago-Delpoint complex, 4 to 15 percent slopes

Map Unit Setting

National map unit symbol: cgj5
Elevation: 3,010 to 4,650 feet
Mean annual precipitation: 10 to 14 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 105 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Cabbart and similar soils: 45 percent
Crago and similar soils: 30 percent
Delpoint and similar soils: 15 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cabbart

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

A - 0 to 4 inches: loam
Bk1 - 4 to 10 inches: loam
Bk2 - 10 to 16 inches: loam
Cr - 16 to 60 inches: bedrock

Properties and qualities

Slope: 4 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: Shallow (Sw) RRU 58A-C 11-14" p.z.
(R058AC057MT)
Hydric soil rating: No

Description of Crago

Setting

Landform: Fan remnants, stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from limestone

Typical profile

A - 0 to 4 inches: gravelly loam
Bk1 - 4 to 21 inches: very gravelly loam
Bk2 - 21 to 37 inches: extremely gravelly sandy loam
2C - 37 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 4 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: Silty-Limy (SiLy) RRU 58A-C 10-14" p.z.
(R058AC613MT)
Hydric soil rating: No

Description of Delpoint

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear

Parent material: Colluvium derived from sedimentary rock and/or residuum weathered from sedimentary rock

Typical profile

Ap - 0 to 3 inches: loam
Bw - 3 to 11 inches: loam
Bk - 11 to 22 inches: loam
Cr - 22 to 60 inches: bedrock

Properties and qualities

Slope: 4 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: Silty (Si) RRU 58A-C 11-14" p.z. (R058AC040MT)
Hydric soil rating: No

Minor Components

Musselshell

Percent of map unit: 5 percent
Landform: Stream terraces, fan remnants
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty-Limy (SiLy) RRU 58A-C 10-14" p.z. (R058AC613MT)
Hydric soil rating: No

Yawdim

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluvium, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Shallow Clay (SwC) RRU 58A-C 11-14" p.z. (R058AC059MT)
Hydric soil rating: No

Tetonview

Percent of map unit: 2 percent

Landform: Fan remnants, stream terraces

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Ecological site: Wet Meadow (WM) RRU 58A-C 11-14" p.z.
(R058AC043MT)

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Musselshell County, Montana

UL—Urban land

Map Unit Composition

Urban land: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Data Source Information

Soil Survey Area: Musselshell County, Montana
Survey Area Data: Version 15, Sep 16, 2019

Appendix C:

Water Quality Sampling & Hydrant Test Data

Full 22.3 } Tank Level Range
Low 15.0 }

HYDRANT FLOW AND PRESSURE TEST REPORT FORM

Water System: Roundup Tester: ATC Date: 10-16-19
Flow Test#: 1 Tank Level: 19.2 Tank Pressure: _____ Pumps On/Off: off

Flow Hydrant

Hydrant ID: 1st Street West & 10th Avenue
Hydrant Location: _____
Static Pressure Before Test (psi): 28.29

Observed Hydrant # 2

Hydrant ID: Third St W & Sixth Avenue W
Hydrant Location: _____
Static Pressure Before Test (psi): 28.9

Observed Hydrant #1:

Hydrant ID: 1st Avenue & 3rd & 4th Street E
Hydrant Location: _____
Static Pressure Before Test (psi): 54

Observed Hydrant #3

Hydrant ID: 1st Street W & 10th Ave West
Hydrant Location: _____
Static Pressure Before Test (psi): 50.5

Flow Hydrant			OH # 1	OH # 2	OH # 3
Time (Min)	Flowrate (GPM)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)
2			54	28.9	49.0
3			↓	29	
4				28.5	
5	600-650	15 psi	↓	28.5	
				28.4	50.0

Notes: Start 10:34 End 10:39

HYDRANT FLOW AND PRESSURE TEST REPORT FORM

Water System: Remedial Tester: AJC Date: 10-16-19
 Flow Test#: 2 Tank Level: 19.2 Tank Pressure: 1 Pumps On/Off: off

Flow Hydrant

Hydrant ID: 12th Ave W & 4th St W
 Hydrant Location: _____
 Static Pressure Before Test (psi): 54

Observed Hydrant # 2

Hydrant ID: 10th Ave & 3rd St E
 Hydrant Location: _____
 Static Pressure Before Test (psi): 29

Observed Hydrant #1:

Hydrant ID: 13th Ave & 4th St E
 Hydrant Location: _____
 Static Pressure Before Test (psi): 54

Observed Hydrant #3

Hydrant ID: 1st West & 10th Ave W
 Hydrant Location: _____
 Static Pressure Before Test (psi): 50.5

Flow Hydrant			OH # 1	OH# 2	OH# 3
Time (Min)	Flowrate (GPM)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)
	<u>85-86.5</u>	<u>27.30 psi</u>	<u>52</u>	<u>28.0</u>	<u>50</u>

Notes: Start 10:53 to 10:58

HYDRANT FLOW AND PRESSURE TEST REPORT FORM

Water System: Ironclaw Tester: ASC Date: 10-16-19
 Flow Test#: 3 Tank Level: 19.2 Tank Pressure: _____ Pumps On/Off: off

Flow Hydrant

Hydrant ID: 8
10th Avenue & 1st St. West
 Hydrant Location: _____
 Static Pressure Before Test (psi): _____

Observed Hydrant # 2

Hydrant ID: 1st Ave & main
 Hydrant Location: _____
 Static Pressure Before Test (psi): 70 psi
off 65 static

Observed Hydrant #1:

Hydrant ID: 10th Ave & 1st St West
 Hydrant Location: _____
 Static Pressure Before Test (psi): 54 50.5

Observed Hydrant #3

Hydrant ID: 3rd Ave between 6th & 7th Streets West
 Hydrant Location: _____
 Static Pressure Before Test (psi): 70 68

Flow Hydrant			OH # 1	OH # 2	OH # 3
Time (Min)	Flowrate (GPM)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)
2	900 78	38	50	68	68
4	900	35			

Notes: Static 11.29

HYDRANT FLOW AND PRESSURE TEST REPORT FORM

Water System: Epping Tester: ASC Date: 10-16-19
 Flow Test#: 4 Tank Level: 19.7 Tank Pressure: _____ Pumps On/Off: off

Flow Hydrant

Hydrant ID: Second Ave 3rd Ave between 6th & 7th
 Hydrant Location: Street West
 Static Pressure Before Test (psi): _____

Observed Hydrant # 2

Hydrant ID: 4th Ave & main
 Hydrant Location: _____
 Static Pressure Before Test (psi): 70-70

Office 63
 Static
 & test
 use instead of
 4th main

Observed Hydrant #1:

Hydrant ID: 3rd Ave between 6th & 7th St. W.
 Hydrant Location: _____
 Static Pressure Before Test (psi): 70

Observed Hydrant #3

Hydrant ID: 10th Ave & 1st St. West
 Hydrant Location: _____
 Static Pressure Before Test (psi): 50-50

Flow Hydrant			OH # 1	OH# 2	OH# 3
Time (Min)	Flowrate (GPM)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)	Pressure (PSI)
	<u>1000 1000</u>	<u>40</u>	<u>60</u>	<u>70</u>	<u>50</u>

Notes: Start



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LABORATORY ANALYTICAL REPORT

Client: City of Roundup
Project: Roundup Water System
Lab ID: B10020119-001
Client Sample ID: Source Well

Report Date: 02/10/10
Collection Date: 02/01/10 14:00
Date Received: 02/02/10
Matrix: Aqueous

Analysis	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.1	s.u.		0.1		A4500-H B	02/02/10 10:44 / sam
Color	ND	c.u.		5		A2120 B	02/02/10 15:50 / sam
Odor	ND					A2150 B	02/02/10 15:50 / sam
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	02/02/10 14:44 / qed
Solids, Total Dissolved TDS @ 180 C	2900	mg/L		10		A2540 C	02/02/10 16:40 / qed
INORGANICS							
Alkalinity, Total as CaCO ₃	531	mg/L		4		A2320 B	02/02/10 16:37 / ehb
Chloride	22	mg/L	D	2		E300.0	02/03/10 22:50 / kh
Sulfate	1550	mg/L	D	10		E300.0	02/03/10 22:50 / kh
METALS, TOTAL							
Aluminum	ND	mg/L		0.1		E200.8	02/02/10 21:31 / tao
Calcium	209	mg/L		1		E200.7	02/03/10 11:52 / tao
Iron	1.44	mg/L	D	0.04		E200.7	02/03/10 11:52 / tao
Magnesium	125	mg/L		1		E200.7	02/03/10 11:52 / tao
Manganese	0.34	mg/L		0.01		E200.8	02/02/10 21:31 / tao

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Client: City of Roundup
Project: Roundup Water System
Lab ID: B10020119-002
Client Sample ID: Clear Well

Report Date: 02/10/10
Collection Date: 02/01/10 14:15
Date Received: 02/02/10
Matrix: Aqueous

Analytes	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.0	s.u.		0.1		A4500-H B	02/02/10 10:49 / sam
Color	ND	c.u.		5		A2120 B	02/02/10 15:55 / sam
Odor	ND					A2150 B	02/02/10 15:55 / sam
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	02/02/10 14:44 / qed
Solids, Total Dissolved TDS @ 180 C	2870	mg/L		10		A2540 C	02/02/10 16:42 / qed
INORGANICS							
Alkalinity, Total as CaCO ₃	515	mg/L		4		A2320 B	02/02/10 16:44 / ehb
Chloride	31	mg/L	D	2		E300.0	02/03/10 23:02 / kh
Sulfate	1540	mg/L	D	10		E300.0	02/03/10 23:02 / kh
METALS, TOTAL							
Aluminum	ND	mg/L		0.1		E200.8	02/02/10 21:38 / tao
Calcium	211	mg/L		1		E200.7	02/03/10 12:04 / tao
Iron	1.32	mg/L	D	0.04		E200.7	02/03/10 12:04 / tao
Magnesium	129	mg/L		1		E200.7	02/03/10 12:04 / tao
Manganese	0.58	mg/L		0.01		E200.8	02/02/10 21:38 / tao

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Client: City of Roundup
Project: Roundup Water System
Lab ID: B10020110-003
Client Sample ID: Hydrant Prior Flush

Report Date: 02/10/10
Collection Date: 02/01/10 14:45
Date Received: 02/02/10
Matrix: Aqueous

Analysis	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.2	s.u.		0.1		A4500-HB	02/02/10 10:52 / sam
Color	ND	c.u.		5		A2120 B	02/02/10 16:57 / sam
Odor	ND					A2160 B	02/02/10 16:57 / sam
Solids, Total Suspended TSS @ 105 C	40	mg/L		10		A2540 D	02/02/10 14:44 / qed
Solids, Total Dissolved TDS @ 180 C	2920	mg/L		10		A2540 C	02/02/10 16:52 / qed
INORGANICS							
Alkalinity, Total as CaCO ₃	510	mg/L		4		A2320 B	02/02/10 16:50 / ehb
Chloride	32	mg/L	D	2		E300.0	02/03/10 23:13 / kh
Sulfate	1620	mg/L	D	10		E300.0	02/03/10 23:13 / kh
METALS, TOTAL							
Aluminum	ND	mg/L		0.1		E200.8	02/05/10 01:41 / tao
Calcium	207	mg/L		1		E200.7	02/03/10 16:24 / tao
Iron	20.4	mg/L	D	0.04		E200.7	02/03/10 16:24 / tao
Magnesium	128	mg/L		1		E200.7	02/03/10 16:24 / tao
Manganese	0.60	mg/L		0.01		E200.7	02/03/10 16:24 / tao

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Client: City of Roundup
Project: Roundup Water System
Lab ID: B10020119-004
Client Sample ID: Hydrant After Flush

Report Date: 02/10/10
Collection Date: 02/01/10 15:00
Date Received: 02/02/10
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.1	s.u.		0.1		A4500-H B	02/02/10 10:53 / sam
Color	20	c.u.		5		A2120 B	02/02/10 16:00 / sam
Odor	Present					A2150 B	02/02/10 16:00 / sam
Solids, Total Suspended TSS @ 105 C	10700	mg/L		10		A2640 D	02/02/10 14:44 / qed
Solids, Total Dissolved TDS @ 180 C	2930	mg/L		10		A2540 C	02/08/10 13:29 / jlh
Faint smell of dirt/mud							
INORGANICS							
Alkalinity, Total as CaCO ₃	501	mg/L		4		A2320 B	02/04/10 15:09 / ehb
Chloride	30	mg/L	D	2		E300.0	02/04/10 22:22 / qed
Sulfate	1520	mg/L	D	10		E300.0	02/04/10 22:22 / qed
METALS, TOTAL							
Aluminum	0.3	mg/L		0.1		E200.8	02/05/10 02:16 / tao
Calcium	373	mg/L	D	4		E200.7	02/03/10 16:28 / tao
Iron	3470	mg/L	D	4		E200.7	02/03/10 16:28 / tao
Magnesium	149	mg/L	D	4		E200.7	02/03/10 16:28 / tao
Manganese	18.0	mg/L	D	0.04		E200.7	02/03/10 16:28 / tao

Report

Definitions:

RL - Analyte reporting limit.

QCL - Quality control limit.

D - RL increased due to sample matrix interference.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Client: City of Roundup
Project: Roundup Water System
Client Sample ID: Source Well
Sampled By: Lon Sibley
Lab ID: B10020119-001C

Report Date: 02/10/10
Collection Date: 02/01/10 14:00
Received Date: 02/02/10 09:00
Matrix: Aqueous

Analytes	Result	Units	Safe/Unsafe	Qualifier	Method	Analyze Date / By
MICROBIOLOGICAL						
Coliform, Total	Absent		SAFE		A9223	02/02/10 10:30 / kh
Coliform, E-Coli	Absent				A9223	02/02/10 10:30 / kh

Comments: The notation "SAFE" indicates that the water was bacteriologically SAFE when sampled.

The notation "UNSAFE" indicates that the water was bacteriologically UNSAFE when sampled.

Method Reference: E - EPA / MCAWW Methodology A - Standard Methods 19th Ed.

02/10/2010 WED 17:14 FAX 406 252 6069 BLCANON



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LABORATORY ANALYTICAL REPORT

Client: City of Roundup
Project: Roundup Water System
Client Sample ID: Clear Well
Sampled By: Lon Sibley
Lab ID: B10020119-002C

Report Date: 02/10/10
Collection Date: 02/01/10 14:15
Received Date: 02/02/10 09:00
Matrix: Aqueous

Analyses	Result	Units	Safe/Unsafe	Qualifier	Method	Analysis Date / By
MICROBIOLOGICAL						
Coliform, Total	Absent		SAFE		A9223	02/02/10 10:30 / kh
Coliform, E-Coli	Absent				A8223	02/02/10 10:30 / kh
Chlorine, Residual (Field)	0.97	mg/L				

Comments: The notation "SAFE" indicates that the water was bacteriologically SAFE when sampled.

The notation "UNSAFE" indicates that the water was bacteriologically UNSAFE when sampled.

Method Reference: E - EPA / MCAWW Methodology A - Standard Methods 18th Ed.



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LABORATORY ANALYTICAL REPORT

Client: City of Roundup
Project: Roundup Water System
Client Sample ID: Hydrant Prior Flush
Sampled By: Lon Sibley
Lab ID: B10020119-003C

Report Date: 02/10/10
Collection Date: 02/01/10 14:45
Received Date: 02/02/10 09:00
Matrix: Aqueous

Analytes	Result	Units	Safe/Unsafe	Qualifier	Method	Analyze Date / By
MICROBIOLOGICAL						
Coliform, Total	Absent		SAFE		A9223	02/02/10 10:30 / kh
Coliform, E-Coli	Absent				A9223	02/02/10 10:30 / kh
Chlorine, Residual (Field)	0.23	mg/L				

Comments: The notation "SAFE" Indicates that the water was bacteriologically SAFE when sampled.

The notation "UNSAFE" Indicates that the water was bacteriologically UNSAFE when sampled.

Method Reference: E - EPA / MCAWW Methodology A - Standard Methods 19th Ed.



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LABORATORY ANALYTICAL REPORT

Client: City of Roundup
Project: Roundup Water System
Client Sample ID: Hydrant After Flush
Sampled By: Lon Sibley
Lab ID: B10020119-004C

Report Date: 02/10/10
Collection Date: 02/01/10 15:00
Received Date: 02/02/10 09:00
Matrix: Aqueous

Analyses	Result	Units	Safe/Unsafe	Qualifier	Method	Analysis Date / By
MICROBIOLOGICAL						
Coliform, Total	Absent		SAFE		A9223	02/02/10 13:30 / ldv
Coliform, E-Coli	Absent				A9223	02/02/10 13:30 / ldv

Comments: The notation "SAFE" indicates that the water was bacteriologically SAFE when sampled.

The notation "UNSAFE" indicates that the water was bacteriologically UNSAFE when sampled.

Method Reference: E - EPA / MCAWW Methodology A - Standard Methods 19th Ed.



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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Roundup City of

Client Sample ID: 205 3rd St West

PWS #: MT0000321 Name: ROUNDUP WATER DEPARTMENT

Facility ID: DS001

Sampling Point/Location: SP001 / 205 3rd St West

Project ID: MT0000321 Roundup Water Dept

Collector's Name: Glen Russell

Contact Phone #:

Compliance Sample: YES

Sample Type: RT

Lab ID: B14082646-001

Report Date: 09/11/14

Collection Date: 08/28/14 07:00

Date Received: 08/28/14

Matrix: Drinking Water

Federal ID#: MT000005

FRDS Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
1022 Copper	0.264	mg/L		0.005	1.3	E200.8	09/03/14 14:30 / amm
1030 Lead	0.002	mg/L		0.001	0.015	E200.8	09/03/14 14:30 / amm

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Roundup City of

Client Sample ID: 317 5th St West

PWS #: MT0000321 Name: ROUNDUP WATER DEPARTMENT

Facility ID: DS001

SamplingPoint/Location: SP001 / 317 5th St West

Project ID: MT0000321 Roundup Water Dept

Collector's Name: Glen Russell

Contact Phone #:

Compliance Sample: YES

Sample Type: RT

Lab ID: B14082646-002

Report Date: 09/11/14

Collection Date: 08/28/14 07:05

Date Received: 08/28/14

Matrix: Drinking Water

Federal ID#: MT000005

FRDS Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
1022 Copper	0.115	mg/L		0.005	1.3	E200.8	09/03/14 14:33 / amm
1030 Lead	ND	mg/L		0.001	0.015	E200.8	09/03/14 14:33 / amm

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Roundup City of

Client Sample ID: 1202 2nd St East

PWS #: MT0000321 Name: ROUNDUP WATER DEPARTMENT

Facility ID: DS001

Sampling Point/Location: SP001 / 1202 2nd St East

Project ID: MT0000321 Roundup Water Dept

Collector's Name: Glen Russell

Contact Phone #:

Compliance Sample: YES

Sample Type: RT

Lab ID: B14082646-003

Report Date: 09/11/14

Collection Date: 08/28/14 07:10

Date Received: 08/28/14

Matrix: Drinking Water

Federal ID#: MT00005

FRDS Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
1022 Copper	0.009	mg/L		0.005	1.3	E200.8	09/03/14 14:58 / amm
1030 Lead	ND	mg/L		0.001	0.015	E200.8	09/03/14 14:58 / amm

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Roundup City of

Client Sample ID: 620 3rd St West

PWS #: MT0000321 Name: ROUNDUP WATER DEPARTMENT

Facility ID: DS001

Sampling Point/Location: SP001 / 620 3rd St West

Project ID: MT0000321 Roundup Water Dept

Collector's Name: Glen Russell

Contact Phone #:

Compliance Sample: YES

Sample Type: RT

Lab ID: B14082646-004

Report Date: 09/11/14

Collection Date: 08/28/14 07:15

Date Received: 08/28/14

Matrix: Drinking Water

Federal ID#: MT00005

FRDS Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
1022 Copper	0.017	mg/L		0.005	1.3	E200.8	09/03/14 15:01 / amm
1030 Lead	ND	mg/L		0.001	0.015	E200.8	09/03/14 15:01 / amm

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Roundup City of

Client Sample ID: 1023 3rd St West

PWS #: MT0000321 Name: ROUNDUP WATER DEPARTMENT

Facility ID: DS001

Sampling Point/Location: SP001 / 1023 3rd St West

Project ID: MT0000321 Roundup Water Dept

Collector's Name: Glen Russell

Contact Phone #:

Compliance Sample: YES

Sample Type: RT

Lab ID: B14082646-005

Report Date: 09/11/14

Collection Date: 08/28/14 07:20

Date Received: 08/28/14

Matrix: Drinking Water

Federal ID#: MT000005

FRDS Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
1022 Copper	0.014	mg/L		0.005	1.3	E200.8	09/03/14 15:04 / amm
1030 Lead	ND	mg/L		0.001	0.015	E200.8	09/03/14 15:04 / amm

Report
Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Roundup City of

Client Sample ID: 1302 Main St

PWS #: MT0000321 Name: ROUNDUP WATER DEPARTMENT

Facility ID: DS001

SamplingPoint/Location: SP001 / 1302 Main St

Project ID: MT0000321 Roundup Water Dept

Collector's Name: Glen Russell

Contact Phone #:

Compliance Sample: YES

Sample Type: RT

Lab ID: B14082646-006

Report Date: 09/11/14

Collection Date: 08/28/14 07:25

Date Received: 08/28/14

Matrix: Drinking Water

Federal ID#: MT000005

FRDS Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
1022 Copper	0.080	mg/L		0.005	1.3	E200.8	09/03/14 19:32 / amm
1030 Lead	ND	mg/L		0.001	0.015	E200.8	09/03/14 19:32 / amm

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Roundup City of

Client Sample ID: 319 4th St West

PWS #: MT0000321 Name: ROUNDUP WATER DEPARTMENT

Facility ID: DS001

Sampling Point/Location: SP001 / 319 4th St West

Project ID: MT0000321 Roundup Water Dept

Collector's Name: Glen Russell

Contact Phone #:

Compliance Sample: YES

Sample Type: RT

Lab ID: B14082646-007

Report Date: 09/11/14

Collection Date: 08/28/14 07:30

Date Received: 08/28/14

Matrix: Drinking Water

Federal ID#: MT00005

FRDS Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
1022 Copper	0.017	mg/L		0.005	1.3	E200.8	09/03/14 15:07 / amm
1030 Lead	ND	mg/L		0.001	0.015	E200.8	09/03/14 15:07 / amm

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Roundup City of

Client Sample ID: 905 5th St West

PWS #: MT0000321 Name: ROUNDUP WATER DEPARTMENT

Facility ID: DS001

Sampling Point/Location: SP001 / 905 5th St West

Project ID: MT0000321 Roundup Water Dept

Collector's Name: Glen Russell

Contact Phone #:

Compliance Sample: YES

Sample Type: RT

Lab ID: B14082646-008

Report Date: 09/11/14

Collection Date: 08/28/14 07:35

Date Received: 08/28/14

Matrix: Drinking Water

Federal ID#: MT00005

FRDS Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
1022 Copper	0.037	mg/L		0.005	1.3	E200.8	09/03/14 15:11 / amm
1030 Lead	0.002	mg/L		0.001	0.015	E200.8	09/03/14 15:11 / amm

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Roundup City of

Client Sample ID: 310 2nd St West

PWS #: MT0000321 Name: ROUNDUP WATER DEPARTMENT

Facility ID: DS001

Sampling Point/Location: SP001 / 310 2nd St West

Project ID: MT0000321 Roundup Water Dept

Collector's Name: Glen Russell

Contact Phone #:

Compliance Sample: YES

Sample Type: RT

Lab ID: B14082646-009

Report Date: 09/11/14

Collection Date: 08/28/14 07:40

Date Received: 08/28/14

Matrix: Drinking Water

Federal ID#: MT00005

FRDS Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
1022 Copper	0.080	mg/L		0.005	1.3	E200.8	09/03/14 15:14 / amm
1030 Lead	0.001	mg/L		0.001	0.015	E200.8	09/03/14 15:14 / amm

Report Definitions: RL - Analyte reporting limit.
QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



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LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Roundup City of

Lab ID: B14082646-010

Client Sample ID: 1103 3rd St West

Report Date: 09/11/14

PWS #: MT0000321 Name: ROUNDUP WATER DEPARTMENT

Collection Date: 08/28/14 07:45

Facility ID: DS001

Date Received: 08/28/14

Sampling Point/Location: SP001 / 1103 3rd St West

Matrix: Drinking Water

Project ID: MT0000321 Roundup Water Dept

Federal ID#: MT00005

Collector's Name: Glen Russell

Contact Phone #:

Compliance Sample: YES

Sample Type: RT

FRDS Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
METALS, TOTAL							
1022 Copper	0.031	mg/L		0.005	1.3	E200.8	09/03/14 15:26 / amm
1030 Lead	0.002	mg/L		0.001	0.015	E200.8	09/03/14 15:26 / amm

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Appendix D:

Supply Wells and Booster Station Pump Data

	2018	2018	
	Gallons Pumped	Gallons Sold	
Jan	5,967,000.00	3,892,360.00	
Feb	4,830,000.00	3,826,830.00	
Mar	4,712,000.00	3,758,854.00	
Apr	4,719,000.00	4,106,001.00	
May	6,529,000.00	4,769,315.00	
Jun	6,923,000.00	6,375,217.00	
Jul	13,367,000.00	8,380,986.00	
Aug	14,352,000.00	10,583,990.00	
Sep	9,071,000.00	8,971,783.00	
Oct	5,706,000.00	4,416,943.00	
Nov	5,572,000.00	3,778,209.00	
Dec	5,078,000.00	4,136,527.00	loss
Total	86,826,000.00	66,997,015.00	19,828,985.00

	2019	2019	
	Gallons Pumped	Gallons Sold	
Jan	4,257,000.00	3,504,564.00	
Feb	4,501,000.00	4,447,735.00	
Mar	4,945,000.00	6,309,141.00	
Apr	5,050,000.00	4,081,814.00	
May	6,044,000.00	5,354,785.00	
Jun	8,601,000.00	7,391,512.00	
Jul	13,512,000.00	10,876,206.00	
Aug	15,770,000.00	12,169,523.00	
Sep	9,435,000.00	10,324,233.57	
Oct	4,923,000.00	4,545,968.00	
Nov	4,428,000.00	3,950,264.17	
Dec	5,086,000.00	3,221,554.00	loss
Total	86,552,000.00	76,177,299.74	10,374,700.26

Pump #2

MONTH Dec YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1				
2				
3				
4		457.225	534,000	# 22
5		457.759	325,000	# 9
6		458.084	571,000	16 #
7				
8				
9				
10		458.455	891,000	37 #
11				
12		459.346		
13		459.682	336,000	13 #
14				
15				
16		460.006	324,000	15 #
17				
18		460.546	540,000	22 #
19				
20		460.840	294,000	13 #
21				
22				
23				
24		461.171	331,000	17 #
25				
26		461.56	585,000	30 #
27				
28		461.951	195,000	9 #
29				
30				
31		462.303	352,000	18 #

Pump #2

MONTH Nov. YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1				
2				
3		451972	300,000	14#
4				
5				
6		452272	488,000	29#
7				
8		452760	284,000	15#
9				
10	Clean Tank	453044	304,000	13#
11	Clean Tank	453348	200,000	10#
12	Clean Tank	453548	195,000	9#
13	Clean Tank	453743	315,000	16#
14	Clean Tank	454058	144,000	6#
15		454202	249,000	12#
16				
17		454451	330,000	17#
18				
19				
20		454781	565,000	28#
21				
22		455346	359,000	17#
23				
24		455707	242,000	25#
25				
26				
27		455999	549,000	23#
28				
29		456348	321,000	14#
30				
31		456849	677,000	16#

Pump #2

MONTH Oct YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1				
2		446542	40,000	18 #
3				
4		446952	332,000	19 #
5				
6		447384	349,000	15 #
7				
8		447633	523,000	25 #
9				
10		448509	349,000	18 #
11				
12				
13		448836	603,000	15 #
14				
15		448836	603,000	29 #
16				
17		449499	343,000	16 #
18		449794	92,000	5 #
19		449886	145,000	7 #
20				
21				
22		450031	531,000	26 #
23				
24		450562	334,000	16 #
25				
26		450896	282,000	15 #
27				
28				
29		451178	468,000	23 #
30				
31		451696	326,000	16 #

Pump #2

MONTH Sept.

YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1		437431	289,000	10#
2		437720	329,000	12#
3		438049	335,000	11#
4		438384	419,000	15#
5		438803	324,000	12#
6		439127	445,000	14#
7		439572	306,000	11#
8		439828	318,000	12#
9		440196	377,000	13#
10		440573	372,000	12#
11		440945	337,000	13#
12		441282	400,000	18#
13		441682	403,000	17#
14		442085	305,000	13#
15		442390	307,000	13#
16		442697	325,000	15#
17		443022	367,000	16#
18		443389	381,000	17#
19		443770	225,000	11#
20		443995	310,000	14#
21		444305	246,000	18#
22		444551	261,000	11#
23		444812	277,000	12#
24		445089	284,000	12#
25		445372	272,000	12#
26		445644	271,000	12#
27		445916	248,000	12#
28		446164	177,000	7#
29				
30		446341	201,000	9#
31				

Pump #2

MONTH Aug YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1		423079	583,000	17#
2		423662	531,000	17#
3		424193	494,000	17#
4		424687	501,000	16#
5		425188	527,000	16#
6		425715	449,000	16#
7		426164	765,000	26#
8		426929	550,000	19#
9		427479	684,000	24#
10		428163	600,000	20#
11		428763	798,000	30#
12		429561	461,000	17#
13		430022	629,000	24#
14		430651	493,000	19#
15		431143	625,000	23#
16		431768	516,000	23#
17		432344	589,000	22#
18		432933	368,000	15#
19		433301	328,000	13#
20		433629	360,000	13#
21		433989	299,000	11#
22		434288	310,000	11#
23		434598	341,000	13#
24		434939	288,000	10#
25		435227	313,000	11#
26		435540	351,000	12#
27		435891	293,000	11#
28		436184	342,000	12#
29		436526	258,000	10#
30		436784	339,000	10#
31		437123	308,000	11#

Pump #2

MONTH July YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1		409712	195,000	5#
2		409907	477,000	13#
3				
4		410384	515,000	12#
5				
6		410899	587,000	17#
7		411486	238,000	7#
8		411724	424,000	13#
9		412148	341,000	10#
10		412489	480,000	14#
11		412969	361,000	9#
12		413330	490,000	15#
13		413820	451,000	13#
14		414271	470,000	17#
15		414741	411,000	12#
16		415157	668,000	21#
17		415820	372,000	13#
18		416192	389,000	14#
19		416581	430,000	13#
20		417011	465,000	16#
21		417476	501,000	16#
22	Bad Leak	418037	288,000	11#
23		418325	1,556,000	52#
24		419881	228,000	6#
25		420109	567,000	18#
26		420676	399,000	13#
27		421075	310,000	9#
28		421385	343,000	11#
29		421728	361,000	10#
30		422089	452,000	14#
31		422541	538,000	15#

Pump # 2

MONTH June YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1		402789	290,000	7#
2				
3		403029	178,000	5#
4		403207	432,000	14#
5				
6		403646	419,000	14#
7				
8		404065	463,000	15#
9				
10		404528	369,000	13#
11		404897	459,000	15#
12				
13		405356	573,000	19#
14				
15		405929	775,000	25#
16				
17	Pump			
18		406704	480,000	16#
19				
20		407184	428,000	13#
21				
22		407612	450,000	14#
23				
24		408062	245,000	7#
25		408307	396,000	12#
26				
27		408705	526,000	15#
28				
29		409231	481,000	14#
30				
31				

Pump #2

MONTH May YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1				
2		396260	343,000	11#
3				
4		396603	588,000	20#
5				
6				
7		397191	474,000	18#
8		397665	199,000	7#
9		397863	243,000	79#
10				
11		398106	410,000	15#
12				
13				
14		398516	553,000	19#
15				
16		399069	401,000	15#
17				
18		399470	685,000	25#
19	Pumped			
20				
21		400155	563,000	19#
22				
23		400718	415,000	15#
24				
25		401133	389,000	13#
26				
27		401522	195,000	7#
28		401717	408,000	14#
29				
30		402125	664,000	23#
31				

PUMP #2

MONTH

April

YEAR

2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1				
2		391541	449,000	18#
3				
4		391990	276,000	10#
5				
6		392266	296,000	11#
7				
8				
9		392562	456,000	17#
10				
11		393018	277,000	10#
12				
13		393295	302,000	11#
14				
15				
16		393597	428,000	14#
17				
18		394025	316,000	11#
19				
20		394341	283,000	9#
21				
22				
23		394624	490,000	18#
24				
25		395114	284,000	10#
26				
27		395398	332,000	12#
28				
29				
30		395730	530,000	19#
31				

Pump #2

MONTH March YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1				
2		387054	315,000	11#
3				
4				
5		387369	471,000	18#
6				
7		387840	307,000	11#
8				
9		388147	279,000	10#
10				
11				
12		388426	444,000	17#
13				
14		388870	260,000	7#
15				
16		389130	313,000	10#
17				
18				
19		389443	463,000	16#
20				
21		389906	275,000	7#
22				
23		390181	305,000	10#
24				
25				
26		390486	466,000	16#
27				
28		390952	279,000	11#
29				
30		391231	589,000	12#
31				

Pump #2

MONTH Feb. YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1				
2		382224	332,000	11#
3				
4				
5		382556	582,000	20#
6				
7		383138	257,000	10#
8				
9		383395	333,000	11#
10				
11				
12		383728	537,000	19#
13				
14		384265	308,000	10#
15				
16		384573	353,000	14#
17				
18				
19				
20		384926	440,000	16#
21				
22		385336	440,000	17#
23				
24		385806	376,000	13#
25				
26		386182	556,000	21#
27				
28				
29		386738	316,000	12#
30				
31				

Pump #2

MONTH Jan YEAR 2018

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1		376257	542,000	14#
2				
3		376799	319,000	16#
4				
5		377118	413,000	13#
6				
7				
8		377531	624,000	22#
9				
10		378155	353,000	13#
11				
12		378508	476,000	16#
13				
14				
15		378984	576,000	21#
16				
17		379560	377,000	13#
18				
19		379937	386,000	13#
20				
21				
22		380323	507,000	17#
23				
24		380830	299,000	11#
25				
26		381129	325,000	
27				
28				
29				
30		381454	488,000	16#
31		381942	282,000	9#

Pump #2

MONTH Dec. YEAR 2019

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1				
2		545385	453,000	16#
3				
4		545838	393,000	14#
5				
6		546231	446,000	16#
7				
8				
9		546677	513,000	19#
10				
11		547190	267,000	9#
12				
13		547457	345,000	12#
14				
15				
16		547802	428,000	15#
17				
18		548230	274,000	9#
19				
20		548504	316,000	11#
21				
22				
23		548820	490,000	19#
24				
25		549310	318,000	11#
26				
27		549628	324,000	11#
28				
29				
30		549952	519,000	18#
31				

MONTH Oct. YEAR 2019

[illegible]

Pump #2

MONTH Sept. YEAR 2019

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1		526811	435,000	17#
2		526746	584,000	24#
3		527330	373,000	15#
4		527703	549,000	22#
5		528252	432,000	17#
6		528684	485,000	20#
7		529149	310,000	12#
8		529479	321,000	12#
9		529800	312,000	11#
10		530112	325,000	13#
11		530437	300,000	11#
12		530737	331,000	13#
13		531068	399,000	14#
14		531467	243,000	9#
15		531710	396,000	15#
16		532106	347,000	12#
17		532453	333,000	12#
18		532786	294,000	6#
19		533080	276,000	13#
20		533356	242,000	11#
21				
22				
23		533598	464,000	20#
24		534062	188,000	8#
25		534250	235,000	9#
26		534485	200,000	5#
27		534685	226,000	9#
28		534905	214,000	9#
29				
30				
31		535119	627,000	24#

Pump #2

MONTH August YEAR 2019

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1		510547	533,000	23 #
2		511080	575,000	25 #
3		511655	604,000	27 #
4		512259	642,000	27 #
5		512901	734,000	32 #
6		513635	570,000	12 #
7		514205	777,000	33 #
8		514952	661,000	28 #
9		515613	555,000	23 #
10		516168	567,000	24 #
11		516735	514,000	23 #
12		517249	406,000	17 #
13		517655	498,000	20 #
14		518153	520,000	22 #
15		518673	536,000	23 #
16		519209	538,000	23 #
17		519747	368,000	16 #
18		520115	333,000	14 #
19		520448	565,000	24 #
20		521013	472,000	20 #
21		521485	441,000	18 #
22		521926	518,000	22 #
23		522444	353,000	15 #
24		522797	505,000	22 #
25		523302	412,000	17 #
26		523714	478,000	20 #
27		524192	354,000	14 #
28		524546	467,000	19 #
29		525013	419,000	17 #
30		525432	473,000	22 #
31		525905	406,000	17 #

Pump #2

MONTH July YEAR 2019

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1		496565	435,000	19#
2		497000	416,000	20#
3		497416	356,000	16#
4		497772	308,000	14#
5		498080	260,000	12#
6		498340	270,000	12#
7		498610	360,000	16#
8		498970	300,000	13#
9		499270	354,000	16#
10		499624	293,000	13#
11		499917	436,000	18#
12		500353	345,000	15#
13		500698	311,000	14#
14		501009	357,000	17#
15		501366	396,000	17#
16		501762	356,000	16#
17		502118	367,000	16#
18		502485	516,000	23#
19		503001	586,000	25#
20		503587	463,000	22#
21		504050	537,000	26#
22		504587	581,000	28#
23		505168	585,000	27#
24		505753	544,000	24#
25		506297	578,000	25#
26		506875	623,000	27#
27		507498	645,000	30#
28		508143	522,000	23#
29		508665	722,000	31#
30		509387	534,000	23#
31		509921	626,000	26#

MONTH June YEAR 2019

MONTH June YEAR 2019

Pump #2

MONTH May YEAR 2019

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1				
2		481920	318,000	14#
3				
4		482238	327,000	15#
5				
6				
7		482565	557,000	24#
8				
9		483122	362,000	24# 13#
10				
11		483424	360,000	16#
12				
13				
14		483789	618,000	27#
15				
16		484402	457,000	20#
17				
18		484859	387,000	16#
19				
20				
21		485246	612,000	26#
22				
23		485858	367,000	16#
24				
25		486225	321,000	12#
26				
27				
28		486546	639,000	28#
29				
30		487185	395,000	15#
31		487580	384,000	17#

MONTH April YEAR 2019

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1		476870	513,000	24#
2				
3		477383	291,000	14#
4				
5		477674	390,000	15#
6				
7				
8		478014	537,000	25#
9				
10		478551	274,000	12#
11				
12		478825	330,000	15#
13				
14				
15				
16		479155	507,000	22#
17				
18		479662	307,000	14#
19				
20		479969	303,000	14#
21				
22				
23		480272	486,000	23#
24				
25		480758	312,000	15#
26				
27		481070	346,000	16#
28				
29				
30		481476	504,000	23#
31				

MONTH Feb. YEAR 2019

[illegible]

Pump #2

MONTH Jan YEAR 2019

DATE	REMARKS	CURRENT READING	GALLONS PUMPED	# Chlorine USED
1				
2				
3		462771	305,000	13#
4				
5		463076	330,000	16#
6				
7				
8		463406	508,000	22#
9				
10		463919	294,000	14#
11				
12		464208	379,000	17#
13				
14				
15		464587	442,000	20#
16				
17		465029	313,000	14#
18				
19		465342	282,000	13#
20				
21				
22		465624	470,000	21#
23				
24		466094	380,000	16#
25				
26		466474	187,000	8#
27				
28				
29		466661	461,000	20#
30				
31		467122	329,000	16#

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1-26-16 6th St. West & 4th Ave 6" AC
2-8-16 1st Ave East between Main & 1st 8" CI
5-11-16 6th Ave West between 4th & 5th 6" AC
7-10-16 1st St. West & 10th Ave 4" CI
9-11-16 600 blk 2nd St East 6" CI
1-12-16 Main & 3rd Ave. East 6" CI
-19-17 1st Ave West & between 5th & 6th 6" CI
-21-17 5th St. West & 1st Ave 6" CI
-24-17 5th West & 1st Ave 6" CI
-6-17 7th Ave East between 3rd & 4th 4" CI
-4-17 3rd St. West 13th Ave 10" CI
12-17 4th St. West 12th Ave 4" CI
-21-18 8th Ave East & 1st St. 4" CI
27-18 4th St. West & 13th Ave 6" CI
21-18 1300 blk of 3rd West 10" CI
23-18 500 blk 1st East 8" AC
-30-18 1100 blk 4th West 4" CI
-8-19 1000 blk 4th West 4" CI
28-19 900 blk Main 4" CI
-4-19 700 blk 8th East 4" CI
28-20 3rd St & 3rd Ave East 12" PVC-Sleeve (CI)
7-20 200 blk 1st Ave. West 6" AC
11/17-20 400 Block of 2nd St E

~~1-10-14~~

1-10-14 3rd Ave East between Main & 1st 8" AC
5-2-14 1st Ave West on Laundry Hill 6" AC
6-18-14 6th Ave West & 5th St. 6" AC
7-19-14 6th Ave West - between 5th & 6th 6" AC
8-17-14 3rd Ave East between Main & 1st 8" AC
9-1-14 Main St & 400 blk 6" CI
5-6-15 2nd St East & 9th Ave 6" CI
5-12-15 1st St. West & 8th Ave. 4" CI
7-19-15 1st Ave West & 3rd St. below Laundry Hill 6" AC
7-20-15 1st Ave East & 1st East 8" CI
7-28-15 900 blk of 1st West 4" CI
8-23-15 1st Ave East between Main & 1st St. E. 8" CI
11-27-15 400 blk Main St. 6" CI
12-14-15 4th Ave. West & 6th St. West 6" AC
12-13-15 6th Ave West & 6th St. West 6" AC
12-17-15 4th Ave West & 6th St 6" AC
1-15-15 6th Ave. West & 5th St. 6" AC
2-1-16 6th Ave. West & 6th St 6" AC
2-18-16 1st Ave East & 2nd St 8" CI see other page
5-16-16 4th St West & 5th Ave 12" CI
5-17-16 1st Ave West & 7th St. 4" CI
5-17-16 6th Ave West & 5th St. 6" AC
5-17-16 1st Ave East & 2nd St. 8" CI



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2-23-11 900 blk 2nd East 6" CI

3-7-11 1st Ave W. & Main 6" CI

3-8-11 1st Alley West behind Laundry Mat 4" CI

3-8-11 " " " " " " 4" CI

~~8-12-11 1st Ave East between 1st & 2nd St~~

6-11 5th St. West + RR Ave 6" CI

5-12 2nd St. East 900 blk 6" AC

6-12 7th Ave East + 3rd St. 4" CI

5-12 13th Ave West between 2nd & 3rd St. 6" CI

4-12 900 blk 3rd St. West. 4" CI

5-12 400 blk 2nd East 6" AC
 8-12 100 blk Main St. 4" CI
 8-12 700 blk 1st West 4" CI
 8-12 3rd St. West + 8th Ave 4" CI
 10-12 400 blk 4th East 4" CI
 12-12 9th Ave East + 2nd St. 6" CI
 2-13 1st St. West + 9th Ave 4" CI
 2-13 1st Ave West + 5th St. 6" CI
 2-13 2nd St. East + 10th Ave 6" CI
 3-13 700 blk 2nd St. West 6" CI
 4-13 7th Ave. East + 3rd St. 4" CI
 4-13 3rd St. West + 8th Ave 4" CI
 3-13 800 blk 1st West 4" CI
 4-13 1st Ave. East between Main + 1st 8" CI
 7-13 13th Ave West between 2nd + 3rd 6" CI
 8-13 900 blk 3rd St. West 4" CI
 8-13 1st Ave. West between 5th + 6th 6" CI
 8-13 800 blk 1st St. East 4" CI
 4-13 6th Ave West - High School 6" AC
 10-13 3rd St. West + 7th Ave 4" CI
 1-14 3rd Ave East between Main + 1st 8" AC

WATER LEAKS - 2006-Current

October 24, 2006 3rd St. West & 16th Ave. West 10" CI T going to hydrant

November 7, 2006 700 block 3rd St. West 4" CI

April 10, 2007 800 block 1st St. West 4" CI

April 17, 2007 800 block 1st St. West 4" CI

May 14, 2007 200 block 1st St. West 6" CI

June 7, 2007 800 block 1st St. West 4" CI

July 31, 2007 500 block Main Street old service line

August 27, 2007 100 block 6th St. West 4" CI

August 29, 2007 500 block 4th St. West 4" CI

January 23, 2008 800 block 3rd St. West 4" CI

August 1, 2008 200 block 6th St. West 4" CI

August 3, 2008 200 block 6th St. West 4" CI

August 6, 2008 1000 blk 2nd St. East 6" CI

January 14, 2009 500 block 4th St. West 4" CI

January 29, 2009 1100 block 4th St. West 4" X 6" CI changeover

April 6, 2009 800 block 6th St. West change out hydrant that won't close

July 14, 2009 13th Ave. West Change out hydrant that won't close

July 21, 2009 13th Ave. East 200 block 6" CI

September 1, 2009 11th Ave. & 2nd St. East change broken valve 6"

October 3, 2009 800 block 1st St. West 4" CI

11-27-09 500 BIK 1st Ave West 6" CI

1-4-10 700 BIK 2nd St. West 6" CI

1-25-10 700 BIK 3rd St West 6" CI

1-30-10 1st St. East & 8th Ave. 4" CI valve

2-15-10 600 BIK 2nd West 6" CI

2-17-10 600 BIK 2nd West 6" CI

3-11-10 700 BIK 2nd West 6" CI

3-25-10 - Laundry Hill 6" AC

3-25-10 - 500 blk 4th East 4" CI

7-21-10 100 blk 1st West 6" AC

8-9-10 100 blk Main old service

8-18-10 High School 6" AC

9-1-10 Bob Mihalovich's 4" CI

10-13-10 1200 BIK 1st East 4" CI

10-13-10 1200 BIK 1st East 4" CI

11-6-10 1200 BIK 1st East 4" CI

Appendix E:

Source Water Protection

CITY OF ROUNDUP PUBLIC WATER SYSTEM

PWS ID No. MT0000321

DRAFT SOURCE WATER DELINEATION & ASSESSMENT REPORT

PREPARED BY:

**MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
SOURCE WATER PROTECTION PROGRAM**

PREPARED FOR:

**City of Roundup Water Department
Gary Thomas
*Certified Operator***

**PO Box 660
Roundup, Montana, 59072**

January 2005



EXECUTIVE SUMMARY

This Source Water Delineation and Assessment Report (SWDAR) was prepared under the requirements and guidance of the Federal Safe Drinking Water Act and the US Environmental Protection Agency, as well as a detailed Source Water Assessment Plan developed by a statewide citizen's advisory committee here in Montana. The Department of Environmental Quality (DEQ) is completing these assessments for all public water systems in Montana. The purpose is to provide information so that the public water system staff/operator, consumers, and community citizens can begin developing strategies to protect your source of drinking water. The information that is provided includes the identification of the area most critical to maintaining safe drinking water, i.e., the inventory region, an inventory of potential sources of contamination within this area, and an assessment of the relative threat that these potential sources pose to the water system.

Roundup's drinking water is supplied by two wells in an abandoned coal mine south of town. In accordance with the Montana Source Water Protection Program criteria (1999), the aquifer (source water) is considered to have a high sensitivity to potential contaminant sources since the system's clearwell is potentially under the direct influence of surface water. Sensitivity is defined as the relative ease that contaminants can migrate to source water through the natural materials.

As part of this assessment, three types of source water protection management areas were mapped for the Roundup public water system. They are: the control zone, the inventory region, the surface water buffer, and the recharge region. Potential sources of contamination were identified within each of these three regions and the results are as follows:

- No potential sources of contamination were identified within the control zone. The goal of management in the control zone is to avoid introducing contaminants directly into the water supply's well or immediate surrounding areas. The control zone is delineated as a 100-foot radius around the wellheads. All sources of potential contaminants should be excluded from the control zones.
- Significant potential contaminant sources identified within the inventory region and surface water buffer include municipal sewer lines, underground petroleum storage tanks, and commercial or industrial facilities that use, transport, store or generate hazardous materials.

The inventory region should be managed to prevent contaminants from reaching the well before natural processes reduce their concentrations. The inventory region includes the area upgradient of the well that is expected to supply groundwater recharge to the well over the next three years.

- Potential contaminant sources identified within the recharge region are limited to minor agricultural lands. Few point sources of potential contaminants were identified in this sparsely developed region.

The goal of management in the recharge region is to maintain and improve water quality over long periods of time or increased usage. Recharge to the aquifer is primarily from infiltration of precipitation and surface water into the Fort Union Formation in the northern half of the Bull Mountains. An unidentified percentage of the source water likely infiltrates the source aquifer from the overlying Musselshell River.

Low risk potential sources and potential sources located outside the inventory region, but within the recharge region may still pose a threat over time, but are not discussed in detail in this assessment. This provides a quick look at the existing potential sources of contamination that could, if improperly managed or released, impact the source water for the Roundup. The susceptibility analysis provides the community and the public water system with information on where the greatest risk occurs and where to focus resources for protection of this valuable drinking water resource.

The costs associated with contaminated drinking water are high, and prevention is preferable to treatment. Public awareness is a powerful tool for protecting drinking water. The information in this report will help increase public awareness about the relationship between land use activities and drinking water quality.

As noted in previous correspondence, the former infiltration gallery currently used a clearwell dramatically increases the system's susceptibility to potential contaminant sources. It has been noted that the City intends to remove this system component in a future capital upgrade. This course of action is strongly endorsed. Removing the clearwell would result in a marked reduction of the system's susceptibility, which would likely be rated 'low' in such circumstances.

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FIGURES

[Figure 1 – Public Water Supply Location](#)

[Figure 2 – Regional Geology of the Public Water Supply](#)

[Figure 3 – Source Water Inventory and Surface Water Buffer Regions](#)

APPENDICES

Appendix A - PWS Sanitary Survey, Well Logs and Hydrogeologic Assessment

Appendix B - Water Quality Analytical Results

Appendix C - Underground Storage Tank (UST) and Standard Industrial Code Database Reports

Appendix D - Source Water Monitoring Waivers

Appendix E - Concurrence Letter

1.0 INTRODUCTION

Eric Sivers, a hydrogeologist with the Montana Department of Environmental Quality (DEQ) Source Water Protection Section, completed the Roundup (PWS ID No. 00321) Source Water Delineation and Assessment Report (SWDAR). Much of the information regarding the public water supply and its setting is derived from a hydrogeologic assessment of the Roundup water supply that was completed by John Wheaton of the Montana Bureau of Mines and Geology (MBMG) in 1999. This report and the most recent sanitary survey are attached as Appendix A.

The primary purpose of this source water delineation and assessment report is to provide information that helps Roundup protect its drinking water source. The Montana Source Water Protection Program is intended to be a practical and cost-effective approach to protect public drinking water supplies from contamination. Two major components of the Montana Source Water Protection Program are *delineation* and *assessment*. Delineation is the process of mapping source water protection areas, which contribute water used for drinking. Assessment involves identifying locations or regions in source water protection areas where contaminants may be generated, stored, or transported, and then determining the relative potential for contamination of drinking water by these sources.

This Source Water Delineation and Assessment Report is intended to meet the technical requirements for the completion of the delineation and assessment for the Roundup Public Water System (PWS) as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182).

2.0 BACKGROUND

Roundup is located in Musselshell County in central Montana ([Figure 1](#)), approximately 50 miles north of Billings. According to the Census Bureau, the population of Musselshell County in 2000 was 4,464, with 1,931 individuals residing in Roundup.

2.1 PHYSICAL SETTING

2.1.1 Geography and Geology

Roundup is located in the Musselshell River valley, on the northern edge of the Bull Mountains. Roundup lies at an elevation of approximately 3,200 feet above mean sea level.

Bedrock exposed in the Roundup area is largely comprised of the Tongue River Member of the Fort Union Formation. The Fort Union Formation is a fluvial-deltaic deposit of Tertiary age, conformably overlying the Cretaceous Hell Creek Formation, which is exposed in outcrops north of the city. The Tongue River Member is largely fine-grained sandstone, with lesser amounts of shale and coal, and minor beds of fresh-water limestone. The geology of the Roundup area is shown on [Figure 2](#). Roundup is on the western margin of a structural feature known as the Bull Mountain Basin (Stricker, 1999). This is an east-west trending asymmetric syncline, with minor folds and faults within the basin. The strata in this basin generally dip less than five degrees (Stricker, 1999), although steeper local dips have been reported in the Roundup vicinity. Wheaton (1999) reported that the Fort Union Formation dips to the south at approximately 13 degrees beneath the Musselshell River at Roundup.

Roundup is located in the Central Non-Glaciated Plains groundwater region of North America (Heath, 1984). The community is in the Middle Musselshell Watershed, in the Lower Missouri River drainage of Montana.

2.1.2 Climate

Climate in the Roundup area is semi-arid and typical of central Montana. Annual total precipitation is 12.3 inches. Rainfall occurs April through September with May and June being the wettest months. Roundup receives an annual average of 24.3 inches of snow, mainly November to April. Climate data is provided by the Western Regional Climate Center, operated by the Desert Research Institute of Reno, Nevada. See Table 1 for additional climate information.

Table 1. Monthly Climate Summary: Roundup Climate Station (247214)

Period of Record: 06/04/1914 to 06/30/2004

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Ave. Max. Temp (F)	35.9	41.1	48.4	60.3	70.3	78.8	88.6	87.4	75.8	63.7	47.8	38.4	61.4
Ave. Min. Temp. (F)	11.7	15.7	21.8	31.8	41.0	49.3	55.1	52.6	43.0	33.7	22.8	14.9	32.8
Ave Tot. Precip. (in.)	0.41	0.34	0.56	1.05	2.08	2.54	1.42	1.07	1.09	0.90	0.41	0.43	12.30
Ave. Tot. Snowfall (in.)	5.7	3.7	4.3	1.3	0.2	0.0	0.0	0.0	0.1	1.1	3.0	4.8	24.3
Ave Snow Depth (in.)	1	1	0	0	0	0	0	0	0	0	0	1	0

2.2 THE PUBLIC WATER SUPPLY

2.2.1 Water Supply System

The Roundup PWS serves approximately 1,900 people, at a rate of approximately 130,000 gallons per day. The Roundup PWS is classified as a community public water system since it serves at least 25 of the same people every day. Information on the water system was obtained from correspondence in the DEQ Public Water Supply Section files including the most recent sanitary survey, completed in 2002 (attached as Appendix A). Groundwater is provided by two wells completed into voids of an abandoned coal mine. Water from the wells is pumped under the Musselshell River to a clearwell where it is gas chlorinated prior to transmission to storage tanks north of town. One tank provides a reserve of 2,000,000 gallons.

The clearwell is part of an older infiltration gallery. Although the system strives to maintain positive pressure in the clearwell by pumping into it faster than out of it, this portion of the system is potentially under the direct influence of surface water.

2.2.2 Supply Well Information

Much of this section is derived from previous work by MBMG (Wheaton, 1999). Roundup's drinking water is supplied by two wells located approximately one mile southeast of town. These wells are adjacent to each other, and located within the same wellhouse. The wells are completed into flooded voids of the Republic Number 1 mine. The wells were reportedly completed in 1950 and 1977. Void space was only reported on one log, from 95 to 105 feet below grade. According to the MBMG's Ground Water Information Center (GWIC) the supply wells are designated as GWIC IDs 1643 and 21149. However, two other wells (21150 and 21151) are also designated as public supply wells for the City of Roundup. The well logs from the GWIC database are attached as Appendix A. Also included in Appendix A (as Appendix D of the MBMG hydrogeologic assessment) are copies of transcribed logs believed to correspond to these wells.

2.2.3 Source Water

The Roundup PWS wells are completed in a flooded coal mine. This mine was constructed in consolidated sandstone bedrock. This aquifer is recharged by infiltration of precipitation and surface water in the Bull Mountains south of Roundup, as shown on [Figure 3](#). Additionally, MBMG's hydrogeologic assessment (Wheaton, 1999) reported that as the recharge to the mine voids is greater than that predicted by the bulk hydraulic conductivity of the Fort Union Formation, a percentage of the recharge is probably provided by stream loss from the overlying Musselshell River.

Based on the results of a groundwater under the direct influence of surface water (GWUDISW) study completed in 1999, the source water is classified as groundwater. However, the well water is chlorinated in a former infiltration gallery. Although the water system maintains positive pressure in the gallery by pumping into it at a higher rate than pumping out of it, it is still potentially hydraulically connected to the Musselshell River alluvium in which it is constructed. Therefore, the water system is considered to be potentially under the direct influence of surface water.

According to the Source Water Protection Program (DEQ, 1999) the source water aquifer is considered to have very high sensitivity to potential contamination.

2.3 WATER QUALITY

Each PWS is required to perform regular sampling of their water supply to detect contamination. The analytical parameters include: coliform bacteria and other pathogenic organisms, nitrates, metals, petroleum hydrocarbons, and other organic chemicals. The monitoring schedule depends on factors such as the size and source water of a PWS, the number of supplies (e.g. wells), and the population served. Monitoring programs are tailored to each system, following the general protocols defined by DEQ. Monitoring schedules are available at: <http://nris.state.mt.us/wis/swap/swapquery.asp>. The Roundup PWS monitoring data from DEQ's database for the past five years was reviewed and is summarized in this section. Analytical results are compared to quality standards established by the US EPA. Maximum Contaminant Levels (MCLs) are enforceable standards that limit the highest level of a contaminant allowed in drinking water. National Secondary Drinking Water Standards (known as SMCLs) are non-enforceable guidelines regarding contaminants that may cause aesthetic (color, odor, taste) or cosmetic (staining, skin/tooth discoloration) issues.

2.3.1 Public Water Supply Monitoring Results

Health-based violations are issued when the amount of contaminant exceeds the MCL. Coliform bacteria were detected in June 2000. Bacteria have not been detected in subsequent analyses.

Nitrate + nitrite has not been detected above the method detection level, nor have any other regulated parameters. Sulfate has been detected at concentrations of 1,390 mg/L, above the SMCL of 250 mg/L. The water quality results are attached as Appendix B.

2.3.2 Background Water Quality Monitoring Results

Background water quality data was identified for the Roundup supply wells (GWIC IDs 1643 and 21149). Background water quality sampling typically includes general water quality parameters: major dissolved ions (calcium, magnesium, sodium, potassium, iron, manganese, silica, bicarbonate, carbonate, chloride, sulfate, nitrate, fluoride and orthophosphate), trace

elements, and metals. Well 1643 was sampled in 1986; well 21149 was sampled in 1993 and 1995.

The water quality is similar in both wells, and is of poor aesthetic quality. The water is characterized by high levels of iron, manganese, sodium, sulfate and total dissolved solids (TDS). The concentrations of all five parameters exceeded their respective SMCLs. The water is extremely hard. The analytical reports are attached as Appendix B.

3.0 MANAGEMENT AREA DELINEATION

This report delineates three source water management areas. The goal of source water management is protection of the source water by 1) controlling activities in the control zone, 2) managing significant potential contaminant sources in the inventory region and surface water buffer, and 3) ensuring that major land use activities or other significant activities in the recharge region pose minimal threat to the source water.

3.1 CONCEPTUAL MODEL

Roundup is located in the Middle Musselshell River watershed (USGS Hydrologic Unit Code 10040202), which is located within Montana's Lower Missouri River watershed. As detailed above, the majority of Roundup's drinking water source is interpreted to originate as rainfall and runoff in the Bull Mountains, with an undetermined percentage from the overlying alluvium of the Musselshell River.

The mine voids are in consolidated sandstone bedrock, and the wells are considered to have low source water sensitivity to contamination. However, the public water supply is considered to have very high sensitivity to contamination, due to the clearwell incorporated in the system. This determination is according to the DEQ Source Water Protection Program criteria for ranking aquifer sensitivity (DEQ 1999).

3.2 DELINEATION

Methods and criteria for delineating source water protection areas are specified in the Montana Source Water Protection Program (DEQ, 1999). The delineated management zones for the wells are shown on [Figure 3](#).

Control Zone – A 100-foot radius control zone is delineated for the wells. All sources of potential contaminants should be excluded in these regions.

Inventory Region – The inventory region is the area that is expected to contribute to the water supply within no less than three years. All significant sources of potential contaminants are inventoried in this region. According to the DEQ's Source Water Protection Program criteria for a consolidated sandstone bedrock aquifer (DEQ, 1999), the inventory zone for the wellheads was delineated based on a 1,000-foot fixed radius around the wellheads.

The clearwell inventory region includes the area within a one-half mile radius of the clearwell. This distance was used based on a conservative estimate of aquifer properties and likely flowpaths. This region overlaps and includes the inventory region for the supply wells, which is a 1,000-foot radius around the wellheads.

Surface Water Buffer – A ½-mile surface water buffer was delineated since the clearwell is potentially in hydraulic connection with the Musselshell River. The surface water buffer extends

approximately 10 miles upriver ([Figure 3](#)). Potential sources of nitrate and pathogens are inventoried in the surface water buffer. The goal of management in the surface water buffer is to prevent release of contaminants that could flow to the well before being removed by natural processes.

Recharge Region –The recharge region for the Roundup source water includes the portion of the Bull Mountains north of the Yellowstone River divide, as shown on [Figure 3](#), as well as the upper Musselshell River drainage. The inventory for the recharge region focuses on general land uses and large industrial facilities. The goal of management in the recharge region is to maintain and improve the long-term quality of groundwater in the aquifer

4.0 INVENTORY

Significant potential contaminant sources in the source water management areas were inventoried to assess the susceptibility of Roundup's source water to contamination, and to provide a foundation for source water protection planning. The inventory for Roundup focuses on facilities or features that generate, use, store, or transport potential contaminants, as well as certain land uses in the inventory and recharge regions. It is important to remember that the sites and areas identified in this section are only potential sources of contamination to the drinking water. Contamination of drinking water sources is less likely when potential contaminants are properly used and managed.

4.1 INVENTORY METHOD

The inventory focus is slightly different in each of the delineated management areas. The inventory for the Roundup focuses on all activities in the control zones; certain types of facilities and land uses in the inventory region and surface water buffer; and general land uses and large facilities in the Recharge Region. Information on facilities and land uses that are potential sources of regulated contaminants was obtained from a number of databases, described below. The process for completing the inventory included several steps, which are summarized as follows:

- Step 1: Land uses were identified from the U.S. Geological Survey's (USGS) Geographic Information Retrieval and Analysis System <<http://nris.state.mt.us/gis/datalist.html>>. Sewered and unsewered residential land uses were identified from boundaries of sewer coverage obtained from municipal wastewater utilities.
- Step 2: The US Environmental Protection Agency's (EPA) Envirofacts System <<http://www.epa.gov/enviro/>> was queried to identify EPA-regulated facilities located in the management areas. This system accesses facilities listed in the following databases: Resource Conservation and Recovery Information System (RCRIS), Biennial Reporting System (BRS), Toxic Release Inventory System (TRIS), and Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) and the Permit Compliance System (PCS - for Concentrated Animal Feeding Operations with MPDES permits). The available reports were browsed for facility information including the Handler/Facility Classification to be used in assessing whether a facility should be classified as a significant potential contaminant source.
- Step 3: Montana DEQ databases were queried to identify any of the following in the management areas:
 - Underground storage tanks (USTs) <<http://www.deq.state.mt.us/UST/USTDownloads.asp>>
 - Hazardous waste contaminated sites, above ground storage tanks (ASTs), landfills, and abandoned and active mines, including gravel pits <<http://nris.state.mt.us/gis/bundler/>>

Any information on past releases and present compliance status was noted.

- Step 4: A business phone directory was queried by Standard Industrial Classification (SIC) code to identify businesses that generate, use, or store chemicals in the management areas. Particular attention was paid to equipment manufacturing and/or repair facilities, printing or photographic shops, dry cleaners, farm chemical suppliers, and wholesale fuel suppliers.
- Step 5: Major road and rail transportation routes were identified throughout the inventory region: <http://nris.state.mt.us/gis/gisdata/lib/gisDataList.aspx>.

Potential contaminant sources are considered significant if they fall into one or more of the following categories:

1. Large quantity hazardous waste generators.
2. Landfills.
3. Underground storage tanks.
4. Known groundwater contamination (including open or closed hazardous waste sites, state or federal Superfund sites, and leaking UST sites).
5. Underground injection well.
6. Major roads or rail transportation routes.
7. Cultivated cropland exceeding 20% of the inventory region.
8. Animal feeding operations.
9. Wastewater treatment facilities, sludge handling sites, or land application areas.
10. Septic systems.
11. Sewer mains.
12. Storm sewer outflows.
13. Abandoned or active mines

4.2 INVENTORY RESULTS

4.2.1 Control Zone Inventory Results

The 100-foot control zones around the wellheads include the wellheads. No potential sources of contamination were identified within the control zone. The PWS should be vigilant to ensure that potential sources of contamination are excluded from the control zone and that positive drainage away from the wellheads is maintained.

4.2.2 Inventory Region / Surface Water Buffer Results

The inventory results for Roundup's source water are summarized in Table 2, and are shown on [Figure 3](#). The wellheads are across the river from the City of Roundup, and thus isolated from potential contaminant sources located within the city limits. The clearwell, however, is located downgradient of the city.

The inventory region and surface water buffer includes the southern half of the City of Roundup and approximately 10 miles of US Highway 87 southwest of Roundup. The EPA's RCRIS database identified seven RCRA listings in the Roundup vicinity; however none of these are large quantity generators (LQGs). Multiple UST facilities were identified within the inventory region, including several leaking UST (LUST) sites. The database report of UST facilities in the Roundup area is attached as Appendix C for the operator's review and general reference. Multiple businesses that handle potentially hazardous materials were identified in the SIC database query, 10 of which are located within the inventory region. The SIC database results are also included in Appendix C.

The primary land cover types within the inventory region are: urban land, evergreen forest, and grassland. Municipal sewer lines are present in the inventory region, and present a moderate hazard. Septic system density within the inventory region is low and is not

considered a hazard to the PWS drinking water. There is a low percentage of agricultural land, which presents a low hazard to the source water.

4.2.3 Recharge Region Inventory Results

According to the 1992 National Land Cover dataset, the primary land cover in the recharge region is grassland and evergreen forest, with some agricultural (crop-fallow small grain) land use along the Musselshell River valley. Septic system density within the watershed/recharge region is low, except for a short stretch of the Musselshell River outside of the city where the density is rated medium, and small isolated areas of high density. The septic system density is not considered a hazard to the PWS drinking water.

4.3 INVENTORY UPDATE

To make this SWDAR a useful document for the years to come, the certified water system operator should review the inventory every year. Changes in land uses or potential contaminant sources should be noted and additions made as appropriate. The complete inventory should be submitted to DEQ every five years to ensure the source water delineation and assessment remains current.

5.0 SUSCEPTIBILITY ASSESSMENT

5.1 INTRODUCTION TO SUSCEPTIBILITY

Susceptibility is the degree of likelihood for a public water supply to be impacted by inventoried contaminant sources, at concentrations that would pose a concern. Susceptibility is assessed to prioritize potential pollutant sources for local management, in this case the Roundup PWS managers and operators. Alternative management approaches that could be used by the PWS managers and operators to reduce susceptibility are recommended in this chapter.

5.2 DETERMINATION OF SUSCEPTIBILITY

According to the DEQ Source Water Protection Program (DEQ, 1999) Susceptibility is determined by considering the *hazard* rating for each potential contaminant source relative to any contaminant *barriers*. Proximity or density of significant potential contaminant sources and nature of contaminants determines hazard.

Barriers to contamination are anything that decreases the likelihood of contaminants reaching a spring or well. Barriers may be engineered structures, management actions, or natural conditions. Examples of engineered barriers include spill catchment structures and leak detection for underground storage tanks. Emergency planning and best management practices (BMPs) are considered management barriers. Thick clay-rich soils, a deep water table or a thick unsaturated zone above the well intake are examples of natural barriers. Where credited, barriers are noted in Table 2.

5.3 RESULTS OF SUSCEPTIBILITY ASSESSMENT

A summary of the susceptibility assessment for the Roundup wells is provided in Table 2. This table only includes the potential contaminant sources (identified in the inventory) that were determined to present a significant potential risk to the drinking water supply. Therefore, this list is not exhaustive, and it is highly recommended that the PWS operator and community members familiar with the nature of businesses and land use in the area enhance the inventory through further research and local input.

Table 2. Susceptibility Assessment of Significant Potential Contaminant Sources

Potential Contaminant Source	Potential Contaminants	Hazard	Hazard	Barriers	Susceptibility	Management Recommendations
<i>Inventory Region / Surface Water Buffer</i>						
Municipal Sewer Lines	Pathogens, nitrate (NO ₃)	Ongoing or catastrophic leakage of sewage into groundwater	Moderate	None	High	Ensure ongoing inspection and maintenance with rehabilitation or replacement of existing sewer mains if necessary. Use sewer main liners. Develop rapid response plan for leaks or ruptures.
Septic Systems	Pathogens, nitrate (NO ₃)	System failure could result in discharge of untreated effluent	Low	No septic systems in vicinity of wells or gallery	Low	Encourage septic system owners to periodically inspect their septic systems.
USTs and LUSTs	VOCs, petroleum hydrocarbons	Release of petroleum hydrocarbons to soil and groundwater	High	1998-compliant upgrades, site cleanup, groundwater monitoring	Moderate	Review permit status; ensure proper operation and maintenance, emergency planning, training of local emergency response personnel, spill prevention, and BMPs. Properly abandon and remove tanks if out-of-service. Encourage soil testing to evaluate potential impact from historic spills or leaks.
Commercial or industrial users, transporters, and generators of hazardous materials	Petroleum products, maintenance products, VOCs, SOCs and others	Spills or leaks of chemicals used	Moderate	Management actions	Moderate	Protect areas from fuel or other chemical spills. Maintain sealed concrete floors. Ensure proper chemical and waste use, storage, and disposal/recycling. Ensure good housekeeping.
Agricultural Land: Cropland and grazing lands	NO ₃ and SOCs from fertilizer, pesticides and herbicides. Pathogens from pastures.	Contaminants leaching into groundwater	Low	Distance from wells and gallery	Low	Encourage BMPs.
Transportation Routes: Roads and Railroads	Pesticides, fertilizers, VOCs, SOCs, other	Spills, routine spraying, storm water runoff, infiltration into groundwater	Low	Emergency spill response	Low	Encourage and support emergency planning, training of local emergency response personnel, and cooperation with MDOT to reduce herbicide use.
Class V Injection Wells	VOCs, SOCs, metals	Infiltration into groundwater	Unknown at this time	None	Unknown at this time	Work with EPA to identify locations and appropriate response.
<i>Recharge Region</i>						
Agricultural Crop Land	NO ₃ and SOCs from fertilizer, pesticides and herbicides. Pathogens (if grazing occurs)	Contaminants leaching into groundwater	Not assessed	None	Not assessed outside inventory region	Encourage use of BMPs in the recharge region.

6.0 LIMITATIONS

This Source Water Delineation and Assessment Report is intended to meet the technical requirements for delineation and assessment of the Roundup Public Water System (PWS) as required by the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182). The following limitations should be noted:

- This report was prepared to assess the susceptibility of the Roundup PWS to significant potential contaminant sources, and is based on published information and correspondence within DEQ files. The terms “drinking water supply” or “drinking water source” refer specifically to the source of the Roundup public water supply and not any other public or private water supply. Also, not every potential or existing source of groundwater or surface water contamination in the Roundup area has been identified. Only potential sources of contamination in areas that contribute water to its drinking water source are considered
- Delineation of the source water protection areas for the Roundup wells is based on map and aerial photograph interpretation. In the absence of extensive field investigations to accurately characterize aquifer characteristics, the assumptions are necessarily conservative. The use of such conservative assumptions was to ensure that the inventory zone reflects the actual area where contamination to the system may occur.
- Without field investigations to better characterize groundwater flow and surface water interactions in the region of the clearwell, conservative assumptions must be made regarding the susceptibility of the public water supply to potential sources of contamination. As a result, the ‘very high’ susceptibility rating of this public water supply is based entirely on this feature. If the clearwell were to be isolated from the system in the future, the susceptibility analysis would change considerably.
- The potential contaminant sources described in the inventory are identified from readily available information. Consequently, unregulated activities or unreported contaminant releases may have been overlooked. The use of multiple sources of information increases the likelihood that the major threats to the source water for Roundup’s public water supply have been identified. The inventory is not exhaustive. If a type of potential contaminant source is not identified in the inventory or susceptibility assessment of this report, it does not necessarily follow that the potential for contamination does not exist, or there is not a threat. It is highly recommended that the PWS and community enhance or refine the identification of potential contamination sources through further research and local input.

7.0 CONCLUSIONS

This Source Water Delineation and Assessment Report (SWDAR) was prepared under the requirements and guidance of the Federal Safe Drinking Water Act and the US Environmental Protection Agency, as well as a detailed Source Water Assessment Plan developed by a statewide citizen's advisory committee here in Montana. The Department of Environmental Quality (DEQ) is completing these assessments for all public water systems in Montana. The purpose is to provide information so that the public water system staff/operator, consumers, and community citizens can begin developing strategies to protect your source of drinking water. The information that is provided includes the identification of the area most critical to maintaining safe drinking water, i.e., the inventory region, an inventory of potential sources of contamination within this area, and an assessment of the relative threat that these potential sources pose to the water system.

Roundup's drinking water is supplied by two wells in an abandoned coal mine south of town. In accordance with the Montana Source Water Protection Program criteria (1999), the aquifer (source water) is considered to have a high sensitivity to potential contaminant sources since the system's clearwell is potentially under the direct influence of surface water. Sensitivity is defined as the relative ease that contaminants can migrate to source water through the natural materials.

As part of this assessment, three types of source water protection management areas were mapped for the Roundup public water system. They are: the control zone, the inventory region, the surface water buffer, and the recharge region. Potential sources of contamination were identified within each of these three regions and the results are as follows:

- No potential sources of contamination were identified within the control zone. The goal of management in the control zone is to avoid introducing contaminants directly into the water supply's well or immediate surrounding areas. The control zone is delineated as a 100-foot radius around the wellheads. All sources of potential contaminants should be excluded from the control zones.
- Significant potential contaminant sources identified within the inventory region and surface water buffer include municipal sewer lines, underground petroleum storage tanks, and commercial or industrial facilities that use, transport, store or generate hazardous materials.

The inventory region should be managed to prevent contaminants from reaching the well before natural processes reduce their concentrations. The inventory region includes the area upgradient of the well that is expected to supply groundwater recharge to the well over the next three years.

- Potential contaminant sources identified within the recharge region are limited to minor agricultural lands. Few point sources of potential contaminants were identified in this sparsely developed region.

The goal of management in the recharge region is to maintain and improve water quality over long periods of time or increased usage. Recharge to the aquifer is primarily from infiltration of precipitation and surface water into the Fort Union Formation in the northern half of the Bull Mountains. An unidentified percentage of the source water likely infiltrates the source aquifer from the overlying Musselshell River.

Low risk potential sources and potential sources located outside the inventory region, but within the recharge region may still pose a threat over time, but are not discussed in detail in this assessment. This provides a quick look at the existing potential sources of contamination that could, if improperly managed or released, impact the source water for the Roundup. The susceptibility analysis provides the community and the public water system with information on where the greatest risk occurs and where to focus resources for protection of this valuable drinking water resource.

The costs associated with contaminated drinking water are high, and prevention is preferable to treatment. Public awareness is a powerful tool for protecting drinking water. The information in this report will help increase public awareness about the relationship between land use activities and drinking water quality.

As noted in previous correspondence, the former infiltration gallery currently used a clearwell dramatically increases the system's susceptibility to potential contaminant sources. It has been noted that the City intends to remove this system component in a future capital upgrade. This course of action is strongly endorsed. Removing the clearwell would result in a marked reduction of the system's susceptibility, which would likely be rated 'low' in such circumstances.

8.0 REFERENCES

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9.0 GLOSSARY

Acute Health Effect. A negative health effect in which symptoms develop rapidly.

Alkalinity. The capacity of water to neutralize acids.

Aquifer. A water-bearing layer of rock or sediment that will yield water in usable quantity to a well or spring.

Barrier. A physical feature or management plan that reduces the likelihood of contamination of a water source from a potential contaminant source

Best Management Practices (BMPs). Methods for various activities that have been determined to be the most effective, practical means of preventing or reducing non-point source pollution.

Biennial Reporting System (BRS). An EPA database that contains information on hazardous waste sites. The data can be accessed through the EPA Envirofacts website.

Chronic Health Effect. A negative health effect in which symptoms develop over an extended period of time.

Class V Injection Well. Any pit or conduit into the subsurface for disposal of waste waters, including drywells, storm drains and floor drains. The receiving unit for an injection well typically represents the aquifer, or water-bearing interval.

Coliform Bacteria. A general type of bacteria found in the intestinal tracts of animals and humans, and also in soils, vegetation and water. Their presence in water is used as an indicator of pollution and possible contamination by pathogens.

Comprehensive Environmental Cleanup and Responsibility Act (CECRA). Passed in 1989 by the Montana State Legislature, CECRA provides the mechanism and responsibility to clean up hazardous waste sites in Montana.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Enacted in 1980. CERCLA provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through the Act, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.

Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS). A database that provides information about specific sites through the EPA Envirofacts website.

Confined Animal Feeding Operation (CAFO). Any agricultural operation that feeds animals within specific areas, not on rangeland. Certain CAFOs require permits for operation.

Confined Aquifer. A fully saturated aquifer overlain by a confining unit such as a clay layer. The static water level in a well in a confined aquifer is at an elevation that is equal to or higher than the base of the overlying confining unit.

Confining Unit. A geologic formation present above a confined aquifer that inhibits the flow of water and maintains the pressure of the groundwater in the aquifer. The physical properties of a confining unit may range from a five-foot thick clay layer to shale that is hundreds of feet thick.

Delineation. The process of determining and mapping source water protection areas.

Glacial. Of or relating to the presence and activities of ice or glaciers. Also, pertaining to distinctive features and materials produced by or derived from glaciers.

Geographic Information Systems (GIS). A computerized database management and mapping system that allows for analysis and presentation of geographic data.

Hardness. Characteristic of water caused by presence of various calcium and magnesium salts. Hard water may interfere with some industrial processes and prevent soap from lathering. Hardness is often expressed in units of milligrams per liter (mg/L) or parts per million (ppm) of CaCO₃ (calcium carbonate). Waters with a total hardness in

the range of 0 to 60 mg/L are termed soft; from 60 to 120 mg/L moderately hard; from 120 to 180 mg/L hard; and above 180 mg/L very hard.

Hazard. A relative measure of the potential of a contaminant from a facility or associated with a land use to reach the water source for a public water supply. The location, quantity and toxicity of significant potential contaminant sources determine hazard.

Hydraulic Conductivity. A constant number or coefficient of proportionality that describes the rate water can move through an aquifer material.

Hydrology. The study of water and how it flows in the ground and on the surface.

Hydrogeology. The study of geologic formations and how they effect groundwater flow systems.

Inventory Region. A source water management area for groundwater systems that encompasses the area expected to contribute water to a public water supply within a fixed distance or a specified three year groundwater travel time.

Lacustrine. Pertaining to, produced by, or formed in a lake or lakes.

Large Capacity Septic System. Defined by Underground Injection Control regulations as an on-site septic system serving 20 or more persons.

Leaking Underground Storage Tank (LUST). A release from a UST and/or associated piping into the subsurface.

Maximum Contaminant Level (MCL). Maximum concentration of a substance in water that is permitted to be delivered to the users of a public water supply. Set by EPA under authority of the Safe Drinking Water Act to establish concentrations of contaminants in drinking water that are protective of human health.

Montana Bureau of Mines and Geology – Groundwater Information Center (MBMG/GWIC). The database of information on all wells drilled in Montana, including stratigraphic data and well construction data, when available.

Montana Pollutant Discharge Elimination System (MPDES). A permitting system that utilizes a database to track entities that discharge wastewater of any type into waters of the State of Montana.

National Pollutant Discharge Elimination System (NPDES). A national permitting system that utilizes a database to track entities that discharge wastewater into waters of the United States.

Nitrate. An important plant nutrient and type of inorganic fertilizer that can be a potential contaminant in water at high concentrations. In water the major sources of nitrates are wastewater treatment effluent, septic tanks, feed lots and fertilizers.

Nonpoint Source Pollution. Pollution sources that are diffuse and do not have a single point of origin or are not introduced into a receiving stream from a specific outlet. Examples of nonpoint- source pollution include agriculture, forestry, and run-off from city streets. Nonpoint sources of pollution, such as the use of herbicides, can concentrate low levels of these chemicals into surface and/or groundwaters at increased levels that may exceed MCLs.

Pathogens. A microorganism typically found in the intestinal tracts of mammals, capable of producing disease.

Phase II (and IIB) Rules. EPA updated or created legal limits on 38 contaminants. The rules became effective July 30, 1992 and January 1, 1993. Some of these contaminants are frequently-applied agricultural chemicals such as nitrate and others are industrial solvents.

Phase V Rule. EPA set standards for 23 contaminants in addition to those addressed by the Phase II Rules. The Phase V Rule became effective January 17, 1994. Some of these contaminants include inorganic chemicals such as cyanide and other Phase V contaminants are pesticides that enter water supplies through run-off from fields where farmers have applied them or by leaching through the soil into groundwater. Six are probable cancer-causing agents. Others can cause liver and kidney damage, or problems of the nervous system and brain.

Point Source. A stationary location or a fixed facility from which pollutants are discharged. This includes any single identifiable source of pollution, including but not limited to any pipe, ditch, channel, tunnel, conduit, well,

discrete fracture, container, rolling stock (tanker truck), or vessel or other floating craft, from which pollutants are or may be discharged.

Pollutant. Generally, any substance introduced into the environment that adversely affects the usefulness of a resource (e.g. groundwater used for drinking water).

Permit Compliance System (PCS). An EPA database that provides information on the status of required permits for specific activities for specific facilities. The data can be accessed through the EPA Envirofacts website.

Public Water System (PWS). A system that provides water for human consumption through at least 15 service connections or regularly serves 25 individuals.

Pumping Water Level. Water level elevation in a well when the pump is operating.

Recharge Region. An area in which water is absorbed that eventually reaches the zone of saturation in one or more aquifers. As a source water management region, the term generally describes the entire area that could contribute water to an aquifer used by a public water supply. Includes areas that could contribute water over long time periods or under different water usage patterns.

Resource Conservation and Recovery Act (RCRA). Enacted by Congress in 1976 to regulate hazardous materials 'from the cradle to the grave.' RCRA's primary goals are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner.

Resource Conservation and Recovery Information System (RCRIS). A database that provides information about specific RCRA sites through the EPA Envirofacts website.

Secondary Maximum Contaminant Levels (SMCL). The maximum concentration of a substance in water that is recommended to be delivered to users of a public water supply based on aesthetic qualities. SMCLs are non-enforceable guidelines for public water supplies, set by EPA under authority of the Safe Drinking Water Act. Compounds with SMCLs may occur naturally in certain areas, limiting the ability of the public water supply to treat for them.

Section Seven Tracking System (SSTS). SSTS is an automated system EPA uses to track pesticide producing establishments and the amount of pesticides they produce.

Sensitivity. The relative ease with which contaminants can migrate to source water through the natural materials

Source Water. Any surface water, spring, or groundwater source that provides water to a public water supply.

Source Water Delineation and Assessment Report (SWDAR). A report for a public water supply that delineates source water protection areas, provides an inventory of potential contaminant sources within the delineated areas, and evaluates the relative susceptibility of the source water to contamination from the potential contaminant sources under "worst-case" conditions.

Source Water Protection Areas. For surface water sources, the land and surface drainage network that contributes water to a stream or reservoir used by a public water supply. For groundwater sources, the area within a fixed radius or three-year travel time from a well, and the land area where the aquifer is recharged.

Spill Response Region. A source water management area for surface water systems that encompasses the area expected to contribute water to a public water supply within a fixed distance or a specified four-hour water travel time in a stream or river.

Standard Industrial Classification (SIC) Code. A method of grouping industries with similar products or services and assigning codes to these groups.

Static Water Level (SWL). Water level elevation in a well when the pump is not operating.

Susceptibility (of a PWS). The relative potential for a PWS to draw water contaminated at concentrations that would pose concern. Susceptibility is evaluated at the point immediately preceding treatment or, if no treatment is provided, at the entry point to the distribution system.

Syncline. A geologic structure consisting of a down-arched fold with an axial plan dividing it in half.

Synthetic Organic Compounds (SOC). Man-made organic chemical compounds (e.g. herbicides and pesticides).

Total Dissolved Solids (TDS). The dissolved solids collected after a sample of a known volume of water is passed through a very fine mesh filter.

Total Maximum Daily Load (TMDL). The total pollutant load to a surface water body from point, nonpoint, and natural sources. The TMDL program was established by section 303(d) of the Clean Water Act to help states implement water quality standards.

Toxicity. The quality or degree of being poisonous or harmful to plants, animals, or humans.

Toxicity Characteristic Leachate Procedure (TCLP). A test designed to determine whether a waste is hazardous or requires treatment to become less hazardous.

Toxic Release Inventory System (TRIS). An EPA database that compiles information about permitted industrial releases of chemicals to air and water. Information about specific sites can be obtained through the EPA Envirofacts website.

Transmissivity. The ability of an aquifer to transmit water. The transmissivity is determined by multiplying the hydraulic conductivity by the aquifer thickness.

Turbidity. The cloudy appearance of water caused by the presence of suspended matter. Turbidity is measured in nephelometric turbidity units (NTUs).

Unconfined Aquifer. An aquifer containing water that is not under pressure. The water table is the top surface of an unconfined aquifer.

Underground Storage Tanks (UST). A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals, and the associated plumbing system.

Volatile Organic Compounds (VOC). Chemicals such as petroleum hydrocarbons and solvents or other organic chemicals that evaporate readily to the atmosphere.

Watershed. The region drained by, or contributing water to, a stream, lake, or other water body of water.

FIGURES

APPENDIX A

PWS SANITARY SURVEY, WELL LOGS AND HYDROGEOLOGIC ASSESSMENT

Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
CITY OF ROUNDUP

[Plot this site on a topographic map](#)

Location Information

GWIC Id: 132785
 Location (TRS): 31N 27E 30 DAD
 County (MT): PHILLIPS
 DNRC Water Right: G030254-00
 PWS Id: 00203003
 Block:
 Lot:
 Addition:

Source of Data: LOG
 Latitude (dd): 48.4129
 Longitude (dd): -108.2613
 Geomethod: TRS-TWN
 Datum: NAD27
 Altitude (feet):
 Certificate of Survey:
 Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 105.00
 Static Water Level (ft): 19.50
 Pumping Water Level (ft): 23.90
 Yield (gpm): 150.00
 Test Type: AIR
 Test Duration: 1.50
 Drill Stem Setting (ft):
 Recovery Water Level (ft):
 Recovery Time (hrs):

How Drilled: FORWARD ROTARY
 Driller's Name: HICKEL & TOOKE
 Driller License: WWC196
 Completion Date (m/d/y): 10/17/1985
 Special Conditions:
 Is Well Flowing?:
 Shut-In Pressure:
 Geology/Aquifer: Not Reported
 Well/Water Use: PUBLIC WATER SUPPLY

Well Notes:

Hole Diameter Information

From	To	Diameter
0.0	105.0	12.0

Annular Seal Information

From	To	Description
6.0	8.0	K PACK NEOPREM
10.0	20.0	CEMENT & WATER

Lithology Information

From	To	Description
0.0	2.0	SURFACE
2.0	7.0	CLAY
7.0	11.0	SAND
11.0	15.0	CLAY
15.0	16.0	GRAVEL
16.0	19.0	SAND
19.0	21.0	GRAVEL
21.0	36.0	CLAY
36.0	38.0	GRAVEL
38.0	43.0	SANDY CLAY
43.0	54.0	SAND AND FINE GRAVEL
54.0	82.0	GRAVEL
82.0	94.0	SAND AND CLAY
94.0	102.0	GRAVEL
102.0	103.0	SAND
103.0	105.0	SHALE

Casing Information¹

From	To	Dia	Wall Thickness	Pressure Rating	Joint Type
-1.5	105.0	8.0			STEEL

Completion Information¹

From	To	Dia	# of Openings	Size of Openings	Description
61.0	65.0	6.0			BLACK
65.0	82.0	6.0			100 SLOT
82.0	95.0	6.0			BLACK
95.0	102.0	6.0			80 SLOT

¹ - All diameters reported are **inside** diameter of the casing.

**Montana Bureau of Mines and Geology
Ground-Water Information Center Site Report
TOWN OF ROUNDUP**

[Plot this site on a topographic map](#)

Location Information

GWIC Id: 42647
Location (TRS): 31N 27E 30 ADAD
County (MT): PHILLIPS
DNRC Water Right: W030255-00
PWS Id: 00203002
Block:
Lot:
Addition:

Source of Data: LOG
Latitude (dd): 48.4179
Longitude (dd): -108.2592
Geomethod: MAP
Datum: NAD27
Altitude (feet): 2311.00
Certificate of Survey:
Type of Site: WELL

Well Construction and Performance Data

Total Depth (ft): 30.00
Static Water Level (ft): 25.00
Pumping Water Level (ft): 20.00
Yield (gpm): 250.00
Test Type: PUMP
Test Duration: 1.00
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):

How Drilled: HAND DUG
Driller's Name:
Driller License:
Completion Date (m/d/y): 1/1/1916
Special Conditions:
Is Well Flowing?:
Shut-In Pressure:
Geology/Aquifer: 110ALVM
Well/Water Use: PUBLIC WATER SUPPLY

Well Notes:

Hole Diameter Information

From	To	Diameter
0.0	30.0	16.0

Casing Information¹

From	To	Dia	Wall Thickness	Pressure Rating	Joint Type
0.0	20.0	16.0			16 X 16 FT SQ
20.0	30.0	120.0			10 X 10 FT SQ

Annular Seal Information

No Seal Records currently in GWIC.

Completion Information¹

From	To	Dia	# of Openings	Size of Openings	Description
20.0	30.0	10.0			STEEL GRATING AND CONCRETE

Lithology Information

From	To	Description
0.0	25.0	SANDY LOAM
25.0	30.0	GRAVEL

¹ - All diameters reported are **inside** diameter of the casing.

These data represent the contents of the GWIC databases at the Montana Bureau of Mines and Geology at the time and date of the retrieval. The information is considered unpublished and is subject to correction and review on a daily basis. The Bureau warrants the accurate transmission of the data to the original end user. Retransmission of the data to other users is discouraged and the Bureau claims no responsibility if the material is retransmitted. Note: non-reported casing, completion, and lithologic records may exist in paper files at GWIC.

APPENDIX B

WATER QUALITY ANALYTICAL REPORTS

APPENDIX C

UNDERGROUND STORAGE TANK (UST) DATABASE REPORT SIC DATABASE REPORT

APPENDIX D

SOURCE WATER MONITORING WAIVERS

MONITORING WAIVERS

Waiver Recommendation

The Roundup PWS has a waiver for Phase 2 inorganics. Under the waiver, the PWS samples for these parameters every nine years rather than every three years. The PWS was grandfathered under the radionuclide rule and is only required to sample once every nine years for these parameters.

Before a susceptibility or use waiver is requested, the PWS Operators are encouraged to carefully review the Monitoring Waiver Requirements, described below. If after reviewing this section it is determined that an additional waivers are feasible, the PWS should submit a letter to DEQ requesting the specific monitoring waivers. The PWS must be in compliance with monitoring requirements to be considered. If requested by DEQ, the PWS may also need to provide additional information regarding chemical use in the area within the Inventory Region. The table below shows how identified potential contaminant sources affect the eligibility for monitoring waivers.

Susceptibility Assessment as it relates to Waiver Eligibility

Source	Contaminant	Susceptibility	Waiver Eligibility
Transportation Corridors	VOCs, SOCs, petroleum products and other chemicals		Chemical use in right-of-way may preclude waivers for some chemicals. PWS should confirm chemical use history along the right-of-way. Waivers might be rescinded if a spill occurred.
Sewer System/ Wastewater Treatment	Nitrates, pathogens		Waivers are not available for pathogens and nitrate.
Agricultural Cropped Areas	Nitrates and SOCs		Chemical use may preclude waivers for some chemicals. The PWS should confirm chemical use/storage history by land parcel.

Monitoring Waiver Requirements

The 1986 Amendments to the Safe Drinking Water Act require that community and non-community PWSs sample drinking water sources for the presence of volatile organic chemicals (VOCs) and synthetic organic chemicals (SOCs). The US EPA has authorized states to issue monitoring waivers for organic chemicals to systems that have completed an approved waiver application and review process. All PWSs in the State of Montana are eligible for consideration of monitoring waivers for several organic chemicals. The chemicals diquat, endothall, glyphosate, dioxins, ethylene dibromide (EDB), dibromochloropropane (DBCP), and polychlorinated biphenyls (PCBs) are excluded from monitoring requirements by statewide waivers.

Use Waivers

A Use Waiver can be allowed if through a vulnerability assessment, it is determined that specific organic chemicals were not used, manufactured, or stored in the area of a water source (or source area). If certain organic chemicals have been used, or if the use is unknown, the system would be determined to be vulnerable to organic chemical contamination and ineligible for a Use Waiver for those particular contaminants.

Susceptibility Waivers

If a Use Waiver is not granted, a system may still be eligible for a Susceptibility Waiver, if through a vulnerability assessment it is demonstrated that the water source would not be susceptible to contamination. The purpose of the vulnerability assessment procedures outlined in this section is to determine which of the organic chemical

contaminants are in the area of investigation. The vulnerability assessment of a surface water source must consider the watershed area above the source, or a minimum fixed radius of 1.5 miles upgradient of the surface water intake. PWSs developed in unconfined aquifers should use a minimum fixed radius of one mile as an area of investigation for the use of organic chemicals. Vulnerability assessment of spring water sources should use a minimum fixed radius of one mile as an area of investigation for the use of organic chemicals. Surface water and shallow groundwater sources under the direct influence of surface water (GWUDISW) should assess the watershed area above the source, or a minimum fixed radius of one and one-half miles upgradient.

Given the wide range of landforms, land uses, and the diversity of groundwater and surface water sources across the state, additional information is often required during the review of a waiver application. Additional information may include well logs, pump test data, water quality monitoring data from surrounding public water systems, delineation of zones of influence and contribution to a well; time-of-travel or attenuation studies; vulnerability mapping; and the use of computerized groundwater flow and transport models. DEQ's PWS Section and DEQ's Source Water Protection Program will conduct review of an organic chemical monitoring waiver application. Other state agencies may be asked for assistance.

Susceptibility Waiver for Unconfined Aquifers

Unconfined aquifers are the most common source of usable groundwater. Unconfined aquifers are not contained within impervious geologic strata. As a result, the upper groundwater surface, or water table, in an unconfined aquifer is not under the pressure that produces hydrostatic head common to confined aquifers.

Unconfined aquifers are usually locally recharged from surface water or precipitation. In general, groundwater flow gradients in unconfined aquifers reflect surface topography, and the residence time of water in the aquifer is generally shorter than for water in confined aquifers. Similar water chemistry often exists between unconfined groundwater and area surface water, and physical parameters and dissolved constituents can be an indicator of the hydraulic connection between groundwater and surface water. Consequently, unconfined aquifers can be susceptible to contamination by organic chemicals migrating from the ground surface to groundwater.

Properly assessing a susceptibility waiver application for an unconfined source aquifer requires: site-specific information pertaining to the location and construction of the source development, monitoring history of the source, geologic characteristics of the unsaturated soil and vadose zones, and chemical characteristics of the organic chemicals pertaining to their mobility and persistence in the environment. The zone of contribution of the unconfined groundwater source must be defined and plotted. This should describe the groundwater flow directions, gradients, and a 3-year time-of-travel. All surface water bodies within 1,000 feet of the PWS well(s) must be plotted. Analytical monitoring history of the PWS well and those nearby should be provided as well.

Susceptibility Waiver for Confined Aquifers

Confined groundwater is isolated from overlying material by relatively impermeable geologic units. A confined aquifer is generally subject to pressures greater than atmospheric pressure. A well that is screened in a confined aquifer will have a static water level that determined by the pressure (hydrostatic head) at the top of the aquifer.

The susceptibility of a confined aquifer relates to the probability of an introduced contaminant to travel from the source of contamination to the aquifer. Important hydrogeologic controls include the depth of the aquifer, the permeability of the soil and vadose zones, the thickness and uniformity of low permeability and confining layers between the surface and the aquifer, and hydrostatic head of the aquifer.

A confined aquifer may eventually be affected by contaminated groundwater from elsewhere in the recharge area. Improper well construction or abandonment can act as a hydraulic connection to the confined aquifer. The extent of confinement of an aquifer is critical to limiting susceptibility to organic chemical contamination. The extent of confinement must be demonstrated by the PWS in order to be considered for a confined aquifer susceptibility waiver. Typical information includes: pump test data (storage coefficient), geologic mapping, well logs, water quality history, and available information related to any other wells, active or abandoned, in the recharge region.

APPENDIX E

CONCURRENCE LETTER

Appendix F:

Water Rights



FILE



STATEMENT OF CLAIM



*40C *



204046



00

Current File Location: NEW STORAGE

Box Bar Code _____

File Bar Code _____

Date/Initials _____

204046

M4-L

DL-112-06-10

40

40C

STATEMENT OF CLAIM
FOR EXISTING WATER RIGHTS

OTHER USES

For the Water Courts of the State of Montana

RECEIVED

APR 30 1982

MONTANA D.N.R.C.

LEWISTOWN FIELD OFFICE

* DNR Owner of Water Right City of Roundup / ~~County of Musselshell~~ / ~~State of Montana~~ /
Last First Middle InitialCo-Owner or Other Interest Owner None / /
Last First Middle Initial

Address City Office

City Roundup State Montana Zip Code 59072

Home Phone No. 323-2804 Business Phone No. 323-2804

2. Person completing form Pratt / John / L.
Last First Middle Initial

Address P. O. Box 685

City Roundup State Montana Zip Code 59072

Home Phone No. 323-2804 Business Phone No. 323-1600

3. Use:
- | | | |
|---|--|---|
| ☐ Fish Raceways | ☐ Geothermal | ☐ Mining |
| ☐ Fish & Wildlife | ☐ Navigation | ☐ Power Generation |
| ☐ Commercial | ☐ Fire Protection | ☐ Recreation |
| ☐ Industrial | ☐ Agricultural Spraying | ☐ Other |
| ☒ Municipal | ☐ Oil Well Flooding | Explain _____ |

4. Source of Water:

- ☐ Stream Name _____ Tributary of _____
- ☐ Spring
- ☒ Well
- ☐ Lake Name _____ Stream _____
- Tributary of _____
- ☐ Reservoir Name _____ Stream _____
- Tributary of _____

5. Point of Diversion: County(ies) Musselshell

NW 1/4 SE 1/4 NW 1/4, Section 24, T 8 N/S, R 25 E/W

1/4 1/4 1/4, Section _____, T _____ N/S, R _____ E/W

Lot _____, Block _____, Subdivision _____

* DNR 6. Means of Diversion:

- ☒ Well
- ☒ Pump Capacity 2100 / 2,000,000 gpm day
- ☐ Headgate with ditch or pipeline
- ☐ Instream use
- ☐ Other Explain _____

7. Means of Conveyance:

- ☐ Ditch ☐ Instream
- ☒ Pipeline ☐ Other: _____

8. Place of Use: County(ies) Musselshell

☐ Instream ☒ City or Town ☐ Other: Explain _____

<u>1/4</u>	<u>1/4</u>	<u>1/4</u>	Section <u>11</u> , 12	T	8	N/S	R	25	E/W
<u>1/4</u>	<u>1/4</u>	<u>1/4</u>	Section <u>13</u> , 14	T	8	N/S	R	25	E/W
<u>1/4</u>	<u>1/4</u>	<u>1/4</u>	Section <u>23</u> , 24	T	8	N/S	R	25	E/W
<u>1/4</u>	<u>1/4</u>	<u>1/4</u>	Section _____	T	_____	N/S	R	_____	E/W
<u>1/4</u>	<u>1/4</u>	<u>1/4</u>	Section _____	T	_____	N/S	R	_____	E/W

Lot _____, Block _____, Subdivision _____

DWRC
9. Flow rate claimed: 2100 ~~2,000,000~~

☐ cubic feet per second
☒ gallons per minute *per minute*
☐ miner's inches

DWRC
10. Volume claimed: ~~Same~~ 2240 acre-feet

11. Period(s) of use:

DWRC
January 1st to December 31st of each year.

DWRC
12. Check one:

☐ Decreed Water Right
☐ Filed Appropriation Right
☒ Use Water Right

1907

13. Attach copies of the Decree, Record of Filing or Proof of Use Right.

14. Attach copies of aerial photographs, U.S. Geological Survey maps or such other documents necessary to show point of diversion, place of use, place of storage, and conveyance facilities.

15. Notarized Statement signed by claimant.

STATE OF MONTANA

County of Musselshell

I, JOHN L. PRATT, City Attorney, having been first duly sworn, depose(s) and say(s) that (he) (she) (they), being of legal age and being the claimant(s) of the foregoing claim of Existing Water Right, and the person(s) whose name(s) is (are) subscribed thereto as the claimant(s), that (he) (she) (they) know(s) the contents of said foregoing claim and that the matters and things therein are true and correct.

John L. Pratt
John L. Pratt, City Attorney
City of Roundup, Roundup, Montana

Subscribed and sworn before me, this 29th day of April 1982

Thomas H. Loh
Notary Public for the State of Montana

Residing at Roundup, Montana

My Commission expires July 1, 1984

204046

Form No. 76-A-3

ADDENDUM TO STATEMENT OF CLAIM FOR EXISTING WATER RIGHTS

For the Water Courts of the State of Montana

ADDITIONAL PLACE OF USE SHEET

Use this sheet if you have more places of use than can be listed on the claim form or if places of use are in different counties. Use the spaces on the claim form first.

County MUSSELSHELL Subdivision _____

04	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section <u>11</u> T <u>8</u> N/S R <u>25</u> E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section <u>13</u> T <u>8</u> N/S R <u>25</u> E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section <u>23</u> T <u>8</u> N/S R <u>25</u> E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
04	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W
	_____ Acres, Lot _____ Block _____, _____ 1/4 _____ 1/4 _____ 1/4, Section _____ T _____ N/S R _____ E/W

Use additional sheets if necessary

AFFIDAVIT

I, STEVE BIANCHI, know that on 1907 this well was developed and/or put to use on or near the Musselshell River for the purpose of supplying the Municipal water for the City of Roundup at a rate of 2,000,000 (2 million) gallons per day and volume SAME 2,000,000. The point of diversion of this development is in the NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 24, Township 8 North, Range 25 East, M.P.M., in Musselshell County, and the place of use is in the Sections of 11, 12, 13, 14, 23 and 24, Township 8 North, Range 25 East, in Musselshell County.

Please use the following space to provide additional pertinent information to substantiate the water development: The above described well was originally dug for purposes of a mine shaft and when the City of Roundup was incorporated in 1908, the City utilized the well for the municipal water supply. Records on file in the office of the Clerk and Recorder of Musselshell County and the City of Roundup substantiates the above described use. Water is pumped from the above well into the City's water distribution system and piped to a location on the North end of town where it is currently stored in a one million gallon tank and then distributed South into Sections 11, 12, 13, 14, 23 and 24 all in Township 8 North, Range 25 East, M.P.M.

Located in the above described well are two pumps, one 1200 gallons per minute, another 900 gallons per minute capacity pump which pumps the water from the well into the water distribution system. Through the winter months the average use per day in the City of Roundup is 500,000 gallons per day and the peak usage, which occurs in the summer, is up to 2,000,000 (two million) gallons of water per day. These figures may be substantiated by checking the records on file in the office of the City Clerk at the City Office, Roundup, Montana, 59072.

In approximately 1920, the above described well was inadequate to supply water to the City of Roundup and an additional well was tapped on the South side of the Musselshell River directly across from this well. The other well is approximately 80 foot deep and in said well, are two mine shaft turbine pumps that pump 1200 gallons per minute each. This well is actually an abandoned mine shaft. From said mine shaft the water is pumped by means of an eight inch cast iron pipe to the previous well which was in use in 1907. The total amount of water usage is up to two million gallons of water per day which is the peak use in the summer months in the City of Roundup.

When the well on the North side of the river, which is located in the NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 24, Township 8 North, Range 25 East, M.P.M., there were 15 inch perforated pipes running out in each direction from the well site to enable water to run into the well.

SUBSCRIBED AND SWORN before me this 29th day of April, 1982.

(SEAL)

Steve Bianchi
[Signature]
 Notary Public for the State of Montana
 Residing at Roundup, Montana
 My commission expires July 1, 1983.



1 Million
Gallow Storage Tank

204046

CITY OF ROUNDUP
MUSSELSHELL COUNTY
MONTANA

12 1/2 - 1/2

10 YEARS MAP

GARY THOMAS, COMMISSIONER OF PUBLIC WORKS

FEBRUARY, 1970

Section
11-8-25

Section
12-8-25

Section
11-8-25

Section
13-8-25

Section
24-8-25

Well
Pump
House

8" line

Point
at 1

82' deep Mine
Shaft

Diversion

STATEMENT OF CLAIM CHECKLIST

FORM TYPE: I S D O

OK	NOT OK	
☒	☐	Received
☒	☐	Basin
☒	☐	County
☒	☐	Division
☒	☐	Transmittal
☒	☐	Fee
☒	☐	
☒	☐	

City of Roundup

FORM ITEMS

	OK	NOT OK	
1	☒	☐	
2	☒	☐	
3	☒	☐	
4	☒	☐	
5	☒	☐	
6	☒	☐	<i>Clarify from addendum</i>
7	☒	☐	
8	☒	☐	
9	☒	☐	
10	☒	☐	
11	☒	☐	
12	☒	☐	
13	☒	☐	
14	☒	☐	
15	☒	☐	
16	☒	☐	

204046

Checked by J. Gregory Date 9-16-82

DEFICIENT:

☐ Phoned _____
Number _____ Date _____

☐ Sent Letter _____
To _____ Date _____

Correction Deadline: _____
Date _____

☐ Form Corrected _____
Date _____

☐ Incomplete Form & Correspondence Sent To Helena

☐ See notes on reverse side

04/09/84

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

ABSTRACT OF CLAIM FOR EXISTING WATER RIGHTS

CLAIM ID 40C -W-204046-00 PRIORITY DATE: 00:00 12-31-1997 CLAIM RECEIVED: 04/30/82 FEE PAID: \$40
TYPE CODE: G MAX RATE: 2,100.00 G (MI) MAX VOLUME: 2,240.00 AF/YEAR MAX ACRES: 0.00

OWNERS: * (M) C ROUNDUP, CITY OF
CITY OFFICE

ROUNDUP MT 59072

SOURCES:	WL 01	WELL	LOT BLK	QTR	SEC	SEC	TWP	RGE	CO	YIELD RATE	2,100 G
USE:	MC 01			NWSENW	24	08N	25E	MU			
PERCELS:	001	0.00	19	12	08N	25E	MU				
	002	0.00	14	08N	25E	MU					
	003	0.00	24	08N	25E	MU					
	004	0.00	11	08N	25E	MU					
	005	0.00	13	08N	25E	MU					
	006	0.00	23	08N	25E	MU					
TOTAL		0.00									

ADDENDUMS: YES NO (_DVR_ _RSRV_ _POU_ _RMRK_ _OWNR_) COMMENTS
SUPPLEMENTAL IF REF. RIGHT, MAX COMBINED VOLUME FOR ALL RIGHTS _'_____' AF MAX COMBINED ACRES FOR ALL RIGHTS _'_____'
RIGHTS: IF SUPPLEMENTAL RIGHT, PURPOSE ID _'_____' AND CLAIM ID _'_____' OF REF. RIGHT
***** FIELD VERIFICATION FORM *****
COMPARISON STATISTICS: VOLUME BASED ON FLOW RATE AND PERIOD OF USE 3,416.000 AF/YR - OVER CLAIMED VOLUME
BASIN OK: YES NO COMMENTS
SOURCE NAME OK: YES NO (FROM: _USGS TOPO MAP_ , _WR SURVEY) COMMENTS
TYPE CD (S/G) OK: YES NO COMMENTS
POD OK: WL 01 YES NO APPEARS CORRECT UNVERIFIED (FROM: _CLMNTS MAP _GRID ON FLNG) COMMENTS

DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
ABSTRACT OF CLAIM FOR EXISTING WATER RIGHTS

04/09/84

CLAIM ID 40C -W-204046-00 (CONTINUED)

PROOF OF USE: CLAIMED FLOW RATE OK: ☒ YES ☒ NO ☐ NONE GIVEN COMMENTS

CLAIMED PRY DATE OK: ☒ YES ☒ NO COMMENTS

FLOW RATE OK: ☒ YES ☒ NO COMMENTS

VOLUME OK: ☒ YES ☒ NO COMMENTS

PRIORITY DATE OK: ☒ YES ☒ NO (APPLIED LAST MONTH OF YR ☒ APPLIED LAST DAY OF MONTH) COMMENTS

PERIOD OF USE OK: ☒ YES ☒ NO COMMENTS

AIR PHOTO VERIFICATION OF DEVELOPMENT: PHOTO PHOTO PHOTO PHOTO DATE DATE DATE DATE

TELEPHONE CONTACT: ☒ YES ☒ NO DATE COMPLETED ☒ ☒ BY ☒ COMMENTS

LETTER CONTACT: ☒ YES ☒ NO DATE COMPLETED ☒ ☒ BY ☒ COMMENTS

OWNERSHIP: ☒ YES ☒ NO DATE COMPLETED ☒ ☒ BY ☒ COMMENTS

INTERVIEW: ☒ YES ☒ NO DATE COMPLETED ☒ ☒ BY ☒ COMMENTS

FIELD INVESTIGATION: ☒ YES ☒ NO APPROVED BY ☒ DATE CHECKED ☒ ☒ BY ☒ COMMENTS

GENERAL REMARKS:

INVESTIGATED BY Gene E. Johnson DATE 10/29/84
REVIEWED BY _____ DATE 11/1/84

REVIEW COPY, TEMPORARY PRELIMINARY DECREE
MUSSELSHELL RIVER BELOW ROUNDUP
BASIN 40C
ABSTRACT OF WATER RIGHT

10/24/89

WATER RIGHT NUMBER 40C -W-204046-00

OWNERS: ROUNDUP, CITY OF
CITY OFFICE
ROUNDUP

MT

59072

PRIORITY DATE: DEC 31, 1907

FLOW RATE: 2,100.00 GPM

VOLUME: 2,240.00 ACRE FEET PER YEAR

SOURCE: WELL

PURPOSE (USE): MUNICIPAL

PERIOD OF USE: JAN 1 TO DEC 31

POINTS OF DIVERSION AND MEANS OF DIVERSION:

LOT BLK QTR SEC SEC TWP RGE COUNTY

NWSENW 24 08N 25E MUSSELSHELL WELL

PLACE OF USE FOR MUNICIPAL

ACRES LOT BLK QTR SEC SEC TWP RGE COUNTY

001	12	08N	25E	MUSSELSHELL
002	14	08N	25E	MUSSELSHELL
003	24	08N	25E	MUSSELSHELL
004	11	08N	25E	MUSSELSHELL
005	13	08N	25E	MUSSELSHELL
006	23	08N	25E	MUSSELSHELL

A FULL UNDERSTANDING OF YOUR WATER RIGHT CAN BE OBTAINED ONLY BY COMPARING YOUR PRIORITY DATE WITH THE PRIORITY DATES OF OTHER WATER RIGHTS IN THE BASIN THAT MAY AFFECT THE USE OF YOUR RIGHT. ALSO, YOUR WATER RIGHT MAY BE SUBJECT TO WATER RIGHTS IN ADJOINING BASINS OR SUB-BASINS AS WELL AS BEING SUBJECT TO OTHER WATER RIGHTS ON YOUR SOURCE OF SUPPLY. FINALLY, YOUR WATER RIGHT MAY BE SUBJECT TO INDIAN AND FEDERAL WATER RIGHTS.

SEE GENERAL FINDINGS OF FACT AND CONCLUSIONS OF LAW FOR FURTHER DELINEATION OF THIS RIGHT.

ADJ



UPDATE TO FILE



STATEMENT OF CLAIM



*40C *



204046



00

Current File Location: **ADJUDICATION OFFICE**

As of : 12/23/2015

Status: **IN**

Box Bar Code: 13455

File Bar Code: 240749

6/27/2016

REVIEW ABSTRACT OF WATER RIGHT CLAIM

IMPORTANT NOTICE

AN ASTERISK (*) HAS BEEN PLACED NEXT TO EACH ITEM CHANGED IN ACCORDANCE WITH THE SUPREME COURT RULES GOVERNING THE EXAMINATION OF THIS CLAIM.

Water Right Number: 40C 204046-00 STATEMENT OF CLAIM
Version: 2 -- REEXAMINED
Status: ACTIVE

Owners: ROUNDUP, CITY OF
PO BOX 660
ROUNDUP, MT 59072-0660

Priority Date: DECEMBER 31, 1907
Enforceable Priority Date: DECEMBER 31, 1907

Type of Historical Right: USE

Purpose (use): MUNICIPAL

Flow Rate: 4.68 CFS

Volume: 2,240.00 AC-FT

Source: GROUNDWATER

Source Type: GROUNDWATER

Point of Diversion and Means of Diversion:

<u>ID</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1		NWSE	24	8N	25E	MUSSELSHELL

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

<u>ID</u>	<u>Acres</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1				12	8N	25E	MUSSELSHELL
2				14	8N	25E	MUSSELSHELL
3				24	8N	25E	MUSSELSHELL
4				11	8N	25E	MUSSELSHELL
5				13	8N	25E	MUSSELSHELL
6				23	8N	25E	MUSSELSHELL

Remarks:

STARTING IN 2008, PERIOD OF DIVERSION WAS ADDED TO MOST CLAIM ABSTRACTS, INCLUDING THIS ONE.

5/24/2016 City Attorney for Roundup, Lance Lundvall, called regarding water right claims 40C 204046-00 and 40C 204047-00; there are no underlined statements (no issues to resolve) and no asterisks. He asked how these claims relate to the City's Deadman's Basin water; the City of Roundup's water rights in basin 40C are from wells. I explained the basin 40C reexamination process is not dealing with the Deadman's Basin water (water from shares? in basin 40A). RfR

DEPARTMENT OF NATURAL RESOURCES
AND CONSERVATION

WATER ADJUDICATION BUREAU • 910 Helena Avenue, Helena, MT 59601
(406) 444-0560 Telefax (406) 444-0569



STEVE BULLOCK, GOVERNOR

STATE OF MONTANA

DIRECTOR'S OFFICE (406) 444-2074
FAX NUMBER (406) 444-2684

PO BOX 201601
HELENA, MONTANA 59620-1601

April 18, 2016

CITY OF ROUNDUP
PO BOX 660
ROUNDUP, MT 59072-0660

Water Right Claim Number(s):

40C 204046-00

40C 204047-00

Dear Claimant,

The Montana Water Court has begun the preliminary work necessary to issue an updated water rights decree in Basin 40C, the Musselshell River below Roundup, drainage. At the request of the Water Court, the Department of Natural Resources and Conservation (DNRC) staff are reviewing all water right Statements of Claim in the basin for compliance with the Water Court's Order Addressing Reexamination issued December 14, 2012 and the current Montana Supreme Court Rules. Updates to the previous decree regarding your water right claim(s) listed above have been made in accordance with the Order Addressing Reexamination.

Please review the enclosed abstract(s) which contain changes to your water rights. Asterisks next to a water right element indicate changes made by the Water Court or DNRC since the issuance of the last decree on 02/06/1990. Remarks on your abstracts may be informational or issue related. Issue remarks are underlined. These remarks, if present, are a combination of the previous decree and updates added during the reexamination process. Please read them carefully. At this time, the DNRC may be able to resolve certain Issue remarks before the next decree or gather information to resolve Issues in the future during Water Court Proceedings.

Please call me at **406-444-1410** or email me at rfreller@mt.gov **within the next 30 days** if you have questions or wish to discuss these claims. Thank you for your assistance.

Sincerely,

A handwritten signature in cursive script, appearing to read "Roxa Reller".

Roxa Reller, DNRC Water Adjudication Bureau

Enc: Review Abstract(s)

CENTRALIZED SERVICES
DIVISION
(406) 444-2074

CONSERVATION & RESOURCE
DEVELOPMENT DIVISION
(406) 444-6667

FORESTRY
DIVISION
(406) 542-4300

RESERVED WATER RIGHTS
COMPACT COMMISSION
(406) 444-6675

OIL & GAS
DIVISION
(406) 444-2074

TRUST LAND
MANAGEMENT DIVISION
(406) 444-2074

Reller, Roxa French

406 204046-08
406 204047-00

From: Lance Lundvall <lance@lundvalllaw.com>
Sent: Tuesday, May 24, 2016 10:38 AM
To: Reller, Roxa French
Subject: RE: Water Rights Claims for Roundup

rf

Thanks for the response. I just tried to call. I suspect you are still on your call. you can reach me at 406-698-3386. Thank you.

From: Reller, Roxa French [mailto:RFeller@mt.gov]
Sent: Tuesday, May 24, 2016 10:00 AM
To: Lance Lundvall
Subject: RE: Water Rights Claims for Roundup

Lance: I will be on the phone or away from my desk for the next half hour (10:00-10:30), then available 10:30-12:30 and 1:30-5:00 today.

Thanks,
Roxa Reller

From: Reller, Roxa French
Sent: Tuesday, May 24, 2016 9:44 AM
To: 'Lance Lundvall'
Subject: RE: Water Rights Claims for Roundup

Good Morning, Lance,

Thank you for your contact. Now is a good time to visit over the phone as well as later today and Friday; I will be out tomorrow and Thursday (25th and 26th).

Best regards,

Roxa Reller | Water Resource Specialist | P: 406-444-1410 | rfeller@mt.gov
DNRC - Water Rights Adjudication
910 Helena Ave. | PO Box 201602, Helena, MT 59620-1602

From: Lance Lundvall [mailto:lance@lundvalllaw.com]
Sent: Monday, May 23, 2016 4:09 PM
To: Reller, Roxa French
Subject: Water Rights Claims for Roundup

Hello-

I am the City Attorney for Roundup. I am in receipt of your letter to the City of Roundup regarding their water rights claims. I would like to set up a time to visit with you over the phone. Can you please let me know when would be a good time?

Thank you.

Lance

LUNDVALL LAW OFFICE, PLLC
2722 3rd Avenue North
Ste. 400
Billings, MT 59101
Lance@LundvallLaw.com
406.294.0515 (voice)
406.248.4770 (fax)

*Notes from the conversation are typed on page 2
of the May 24, 2016 Review Abstract. rfr.*

REVIEW ABSTRACT OF WATER RIGHT CLAIM

IMPORTANT NOTICE

AN ASTERISK (*) HAS BEEN PLACED NEXT TO EACH ITEM CHANGED IN ACCORDANCE WITH THE SUPREME COURT RULES GOVERNING THE EXAMINATION OF THIS CLAIM.

Water Right Number: 40C 204046-00 STATEMENT OF CLAIM
Version: 2 -- REEXAMINED
Status: ACTIVE

Owners: ROUNDUP, CITY OF
PO BOX 660
ROUNDUP, MT 59072-0660

Priority Date: DECEMBER 31, 1907
Enforceable Priority Date: DECEMBER 31, 1907

Type of Historical Right: USE

Purpose (use): MUNICIPAL

Flow Rate: 4.68 CFS

Volume: 2,240.00 AC-FT

Source Name: GROUNDWATER
Source Type: GROUNDWATER

Point of Diversion and Means of Diversion:

<u>ID</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1		NWSE	24	8N	25E	MUSSELSHELL

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

<u>ID</u>	<u>Acres</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1				11	8N	25E	MUSSELSHELL
2				12	8N	25E	MUSSELSHELL
3				13	8N	25E	MUSSELSHELL
4				14	8N	25E	MUSSELSHELL
5				23	8N	25E	MUSSELSHELL
6				24	8N	25E	MUSSELSHELL

Remarks:

STARTING IN 2008, PERIOD OF DIVERSION WAS ADDED TO MOST CLAIM ABSTRACTS, INCLUDING THIS ONE.



UPDATE TO FILE



STATEMENT OF CLAIM



***40C ***



204046



00

Current File Location: NEW STORAGE

As of: 1/24/2017

Box Bar Code _____

File Bar Code _____

Date/Initials _____

Series: ADJ

**PRELIMINARY DECREE
MUSSELSHELL RIVER, BELOW ROUNDUP
BASIN 40C
ABSTRACT OF WATER RIGHT CLAIM
IMPORTANT NOTICE**

YOUR WATER RIGHT AS SHOWN ON THIS ABSTRACT MAY HAVE CHANGES FROM YOUR WATER RIGHT AS CLAIMED OR AMENDED. AN ASTERISK (*) HAS BEEN PLACED NEXT TO EACH ITEM CHANGED BY THE MONTANA WATER COURT AFTER ISSUANCE OF THE TEMPORARY PRELIMINARY DECREE OR BY THE DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION (DNRC) DURING THE PREPARATION OF THIS PRELIMINARY DECREE. THESE CHANGES ARE AUTHORIZED BY THE MONTANA SUPREME COURT WATER RIGHT CLAIMS EXAMINATION RULES OR BY ORDER OF THE WATER COURT.

OBJECTIONS MAY BE FILED ACCORDING TO THE PROCEDURES OUTLINED IN THE DOCUMENT ENTITLED "NOTICE OF ENTRY OF PRELIMINARY DECREE AND NOTICE OF AVAILABILITY."

Water Right Number: 40C 204046-00 STATEMENT OF CLAIM

Version: 2 -- REEXAMINED

Status: ACTIVE

Owners: ROUNDUP, CITY OF
PO BOX 660
ROUNDUP, MT 59072 0660

Priority Date: DECEMBER 31, 1907

Type of Historical Right: USE

Purpose(use): MUNICIPAL

Flow Rate: 4.68 CFS

Volume: 2,240.00 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

Point of Diversion and Means of Diversion:

<u>ID</u>	<u>Govt Lot</u>	<u>Qtr</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1		NWSE	24	8N	25E	MUSSELSHELL

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

Period of Use: JANUARY 1 TO DECEMBER 31

Place of Use:

<u>ID</u>	<u>Acres</u>	<u>Govt Lot</u>	<u>Qtr</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1				11	8N	25E	MUSSELSHELL
2				12	8N	25E	MUSSELSHELL
3				13	8N	25E	MUSSELSHELL
4				14	8N	25E	MUSSELSHELL
5				23	8N	25E	MUSSELSHELL

Place of Use:

<u>ID</u>	<u>Acres</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
6				24	8N	25E	MUSSELSHELL

Remarks:

STARTING IN 2008, PERIOD OF DIVERSION WAS ADDED TO MOST CLAIM ABSTRACTS, INCLUDING THIS ONE.

THE DNRC EXAMINATION OF THIS CLAIM FOUND NO SIGNIFICANT FACTS, DATA, OR ISSUES TO REPORT TO THE WATER COURT.

A BETTER UNDERSTANDING OF YOUR CLAIMED WATER RIGHT CAN BE OBTAINED BY COMPARING YOUR RIGHT WITH OTHER CLAIMS IN THE BASIN. FOR EXAMPLE, COMPARE PRIORITY DATES, FLOW RATES, VOLUMES, OR ACRES IRRIGATED. ALSO, YOUR WATER RIGHT MAY BE SUBJECT TO WATER RIGHTS IN ADJOINING SUBBASINS OR BASINS AS WELL AS BEING SUBJECT TO OTHER RIGHTS ON YOUR SOURCE OF SUPPLY. FINALLY, YOUR WATER RIGHT MAY BE SUBJECT TO INDIAN RESERVED AND FEDERAL RESERVED WATER RIGHTS.

COMPLETE DETAILS REGARDING THE DNRC PREPARATION OF THIS PRELIMINARY DECREE AND RELATED MATERIALS CAN BE REVIEWED AT THE OFFICE LOCATIONS IDENTIFIED IN THE DOCUMENT ENTITLED "NOTICE OF ENTRY OF PRELIMINARY DECREE AND NOTICE OF AVAILABILITY."

SEE GENERAL FINDINGS OF FACT AND CONCLUSIONS OF LAW FOR FURTHER EXPLANATION OF YOUR CLAIMED WATER RIGHT. THESE FINDINGS CAN BE FOUND AS INDICATED IN THE DOCUMENT ENTITLED "NOTICE OF ENTRY OF PRELIMINARY DECREE AND NOTICE OF AVAILABILITY." IF YOU NEED OBJECTION FORMS, OR HAVE QUESTIONS ABOUT WATER COURT PROCEDURES OR CHANGES TO YOUR RIGHT, YOU CAN CONTACT THE WATER COURT BY CALLING 1-800-624-3270 (WITHIN MONTANA ONLY) OR 1-406-586-4364, OR BY WRITING TO P.O. BOX 1389, BOZEMAN, MT 59771-1389.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
1424 9TH AVENUE P.O. BOX 201601 HELENA, MONTANA 59620-1601
GENERAL ABSTRACT

Water Right Number: 40C 204046-00 STATEMENT OF CLAIM
Version: 2 -- REEXAMINED

Version Status: ACTIVE

Owners: ROUNDUP, CITY OF
PO BOX 660
ROUNDUP, MT 59072-0660

Priority Date: DECEMBER 31, 1907

Enforceable Priority Date: DECEMBER 31, 1907

Type of Historical Right: USE

Purpose (use): MUNICIPAL

Maximum Flow Rate: 4.68 CFS

Maximum Volume: 2,240.00 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

Point of Diversion and Means of Diversion:

<u>ID</u>	<u>Govt Lot</u>	<u>Qtr</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1		NWSE	24	8N	25E	MUSSELSHELL

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

<u>ID</u>	<u>Acres</u>	<u>Govt Lot</u>	<u>Qtr</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1				11	8N	25E	MUSSELSHELL
2				12	8N	25E	MUSSELSHELL
3				13	8N	25E	MUSSELSHELL
4				14	8N	25E	MUSSELSHELL
5				23	8N	25E	MUSSELSHELL
6				24	8N	25E	MUSSELSHELL

Remarks:

STARTING IN 2008, PERIOD OF DIVERSION WAS ADDED TO MOST CLAIM ABSTRACTS, INCLUDING THIS ONE.

STATE OF MONTANA
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

GENERAL ABSTRACT

Water Right Number: 40C 204047-00 STATEMENT OF CLAIM

Version: 2 -- REEXAMINED

Version Status: ACTIVE

Owners:

ROUNDUP, CITY OF
PO BOX 660
ROUNDUP, MT 59072-0660

Priority Date: DECEMBER 31, 1907

Enforceable Priority Date: DECEMBER 31, 1907

Type of Historical Right: USE

Purpose (use): MUNICIPAL

Maximum Flow Rate: 4.68 CFS

Maximum Volume: 2,240.00 AC-FT

Source Name: GROUNDWATER

Source Type: GROUNDWATER

Point of Diversion and Means of Diversion:

<u>ID</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1		NENENW	24	8N	25E	MUSSELSHELL

Period of Diversion: JANUARY 1 TO DECEMBER 31

Diversion Means: WELL

Period of Use: JANUARY 1 to DECEMBER 31

Place of Use:

<u>ID</u>	<u>Acres</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1				11	8N	25E	MUSSELSHELL
2				12	8N	25E	MUSSELSHELL
3				13	8N	25E	MUSSELSHELL
4				14	8N	25E	MUSSELSHELL
5				23	8N	25E	MUSSELSHELL
6				24	8N	25E	MUSSELSHELL

Remarks:

STARTING IN 2008, PERIOD OF DIVERSION WAS ADDED TO MOST CLAIM ABSTRACTS, INCLUDING THIS ONE.

MONTANA WELL LOG REPORT**Other Options**

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

[Go to GWIC website](#)
[Plot this site in State Library Digital Atlas](#)
[Plot this site in Google Maps](#)
[View scanned well log \(6/6/2017 1:11:25 PM\)](#)

Site Name: CITY OF ROUNDUP
GWIC Id: 21151

Section 7: Well Test Data

Total Depth: 40
 Static Water Level: 8
 Water Temperature:

Section 1: Well Owner(s)

1) CITY OF ROUNDUP (MAIL)

N/A

ROUNDUP MT 59072 [09/05/1962]

Unknown Test Method *

Yield 5000 gpm.
 Pumping water level _ feet.
 Time of recovery _ hours.
 Recovery water level _ feet.

Section 2: Location

Township	Range	Section	Quarter Sections
08N	25E	24	NE¼ NW¼
County			Geocode

MUSSELSHELL

Latitude	Longitude	Geomethod	Datum
46.438962109	-108.541086813	TRS-SEC	NAD83
Ground Surface Altitude	Ground Surface Method	Datum	Date

* During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

Addition

Block

Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method:

Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Wednesday, January 1, 1919

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

There are no casing strings assigned to this well.

There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

There are no annular space records assigned to this well.

Section 8: Remarks

WELL IS APPROXIMATE 40' AND HAS DRAINAGE PIPE TO IT FROM NORTH, SOUTH, WEST, AND EAST.

Section 9: Well Log**Geologic Source**

Unassigned

Lithology Data

There are no lithologic details assigned to this well.

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:

Company:

License No: -

Date Completed: 1/1/1919

MONTANA WELL LOG REPORT**Other Options**

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

[Go to GWIC website](#)
[Plot this site in State Library Digital Atlas](#)
[Plot this site in Google Maps](#)
[View field visits for this site](#)
[View water quality for this site](#)
[View scanned well log \(9/22/2009 3:31:16 PM\)](#)

Site Name: CITY OF ROUNDUP
GWIC Id: 21149

Section 7: Well Test Data**Section 1: Well Owner(s)**

1) CITY OF ROUNDUP (MAIL)
 N/A
 ROUNDUP MT 59072 [No Date]

Total Depth: 93
 Static Water Level: 14
 Water Temperature:

Unknown Test Method ***Section 2: Location**

Township	Range	Section	Quarter Sections
08N	25E	24	SE¼ NW¼ NW¼ NE¼
County			Geocode

Yield _ gpm.
 Pumping water level _ feet.
 Time of recovery _ hours.
 Recovery water level _ feet.

MUSSELSHELL

Latitude	Longitude	Geomethod	Datum
46.4386	-108.5358	UNKNOWN	NAD27

* During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

Ground Surface Altitude	Ground Surface Method	Datum	Date
3190			

Addition	Block	Lot

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method:
 Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Sunday, January 1, 1950

Section 6: Well Construction Details**Borehole dimensions**

From	To	Diameter
0	93	13.375

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	22	13.375				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
22	22	13.375			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	22	CEMENT	

Section 8: Remarks**Section 9: Well Log****Geologic Source**

125FRUN - FORT UNION FORMATION

From	To	Description
0	11	TOPSOIL
11	16	SAND AND GRAVEL
16	32	GRAY SANDSTONE
32	38	GREEN SHALE-HARD
38	48	GRAY SANDSTONE
48	62	GRAY SANDY SHALE
62	68	COAL BED
68	69	GRAY SANDY SHALE
69	75	GRAY SANDSTONE
75	84	GREEN SHALE-DARK
84	93	GRAY SANDSTONE

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company:
License No: -
Date Completed: 1/1/1950

MONTANA WELL LOG REPORT**Other Options**

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

[Go to GWIC website](#)
[Plot this site in State Library Digital Atlas](#)
[Plot this site in Google Maps](#)
[View field visits for this site](#)
[View water quality for this site](#)
[View scanned well log \(4/11/2011 5:18:50 PM\)](#)

Site Name: CITY OF ROUNDUP
GWIC Id: 1643

Section 7: Well Test Data**Section 1: Well Owner(s)**

1) CITY OF ROUNDUP (MAIL)
 N/A
 ROUNDUP MT N/A [09/01/1977]

Total Depth: 95
 Static Water Level: 28
 Water Temperature:

Unknown Test Method *

Yield _ gpm.
 Pumping water level _ feet.
 Time of recovery _ hours.
 Recovery water level _ feet.

Section 2: Location

Township	Range	Section	Quarter Sections	Geocode
08N	25E	24	SW¼ NW¼ NW¼ NE¼	
County				

MUSSELSHELL

Latitude	Longitude	Geomethod	Datum
46.4391	-108.5372	UNKNOWN	NAD27
Ground Surface Altitude	Ground Surface Method	Datum	Date
3200			

Addition	Block	Lot

* During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 8: Remarks

DRILLED INTO MINE

Section 4: Type of Work

Drilling Method: ROTARY
 Status: NEW WELL

Section 9: Well Log**Geologic Source**

125FRUN - FORT UNION FORMATION

Section 5: Well Completion Date

Date well completed: Thursday, September 1, 1977

Section 6: Well Construction Details**Borehole dimensions**

From	To	Diameter
0	32	24
32	95	16

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	32	21				CASING (TYPE UNKNOWN)
0	81	12				CASING (TYPE UNKNOWN)

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
81	95	16			OPEN HOLE

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
81	81	CEMENT	

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: MERLE E. HUNT**Company:** HUNT DRILLING**License No.:** -**Date Completed:** 9/1/1977

Site Name: CITY OF ROUNDUP
GWIC Id: 1643
Additional Lithology Records

From	To	Description
69	71	HARD SHALE
71	95	BLUE GRAY SHALE

Appendix G:

Sanitary Survey



February 16, 2017

ROUNDUP WATER DEPARTMENT
ATTN: TANYA LANTER
PO BOX 660
ROUNDUP, MT 59072

SUBJECT: Sanitary Survey: Roundup Water Department Public Water Supply (PWSID: MT0000321), Musselshell County

Dear Ms. Lanter:

I would like to thank Lon Sibley for his assistance with the subject sanitary survey that was conducted by the Montana Department of Environmental Quality (DEQ) on February 15, 2017. The DEQ provides this service as an opportunity to meet with system owners and operators and to help identify problems that may impact water quality or quantity. As a Community Public Water Supply (PWS), your facility is required to have a sanitary survey every 3 years in accordance with the Administrative Rules of Montana (ARM 17.38.231).

Below is a brief description of your public water supply (PWS) as it was observed during this survey. Any deficiencies that were noted, and the DEQ recommendations or requirements based on those deficiencies, are listed after the system description.

PWS SYSTEM DESCRIPTION

1. Water Source: The water source for this PWS is groundwater. Groundwater is drawn from the following facility:

Facility Name	SDWIS ID# ¹	GWIC ID# ²
Mine Shaft Wells	(WL003)	21149, 1643

¹Safe Drinking Water Information System (SDWIS) Data Base Identification Number

²Montana Groundwater Information Center (GWIC) Data Base Identification Number

Additional information regarding well construction and aquifer characteristics is provided in the attached Well Log and Sanitary Survey Form.

2. Treatment (TP001): Treatment consists of gaseous chlorine disinfection.

3. Distribution System (DS001): Distribution is mostly through PVC pipe that has replaced the older galvanized and AC pipe. System pressure is maintained by the water level in the storage facility. The system is flushed through fire hydrants every spring.

4. Finished Water Storage (ST001): Storage consists of a partially buried, 2 million gallon, concrete tank. The tank is inspected by a qualified structural engineer every 3-5 years and cleaned as need. The access hatch and vent screen were not inspected during this survey but Mr. Sibley stated that the hatch gasket and vent screen have been checked and are in good condition.

5. Pumps, Pump Facilities and Controls: The two, 125 HP, vertical turbine pumps that draw water from the mine shaft are controlled by a water level sensor in the storage facility. Water level/pressure data is transmitted by radio telemetry.

6. Monitoring/Reporting/Data Verification: In the two years prior to this survey the system has received one DBP violation. This violation has been resolved (DEQ SDWIS Database, 2017).

7. Management and Operation: This PWS appears to be very well managed and operated. The DEQ commends the system for the recent upgrades to the pump house and distribution system.

8. Operator Compliance with State Regulations: Lon Sibley, Russell Glenwood, Thomas Gabel, and Lee Butler are certified operators for this PWS and in good standing with the DEQ Operator Certification Program.

SIGNIFICANT DEFICIENCIES and ACTIONS REQUIRED:

No significant deficiencies were observed.

RECOMMENDATIONS:

1. As mentioned in previous sanitary surveys (2014, 2011, 2008), the DEQ recommends that a security fence be constructed around the storage tank to help prevent unauthorized access.

Please feel free to contact me if you have questions or comments about this report.

Sincerely,



Monte Smith
DEQ Billings Office
Phone: 406-247-4438
Email: msmith4@mt.gov

Attachments: System Photos
Sanitary Survey Form
Well Logs

Cc: Musselshell County Sanitarian
Helena PWS File
Billings PWS File

Roundup Water Department
PWSID MT0000321
Sanitary Survey Photos (2/15/2017)



Pump house containing well pumps, telemetry pump controls, and treatment plant. The common header is buried on west side of building.



Storage facility (ST001)



Pumps for the two wells completed in the flooded Republic #1 coal mine (Inventoried as one source, WL003)



Storage tank overflow pipe and portable ladder access point to upper hatch and vent (ST001)



Treatment plant (TP001)



Storage tank drain and overflow pipe (ST001)

**Roundup Water Department
PWSID MT0000321
Sanitary Survey Photos (2/15/2017)**



Antenna for radio controls between water level sensor in storage facility and well pumps

SANITARY SURVEY FORM - INVENTORY

Page 1 of 8

1/2016

PWSID **MT0000321**

SYSTEM NAME **Roundup Water Department**

DATE OF SURVEY **2/15/2017**

COUNTY **Musselshell**

SURVEYOR NAME **Monte Smith**

(SYSTEM REPRESENTATIVE) **Lon Sibley**

(OTHER REPRESENTATIVE) _____

SYSTEM ADDRESS - ADMINISTRATIVE CONTACT

Addressee **Tanya Lanter**

Primary Address

Street **PO Box 660**

City **Roundup** State **MT** Zip **59072**

System Phone **(406) 323-2804** Fax ()

SYSTEM OWNER

Addressee **City of Roundup**

Owners Address

Street **PO Box 660**

City **Roundup** State **MT** Zip **59072**

Owner Phone **(406) 323-2804** Fax ()

LOCATION OF SYSTEM

Nearest City **Roundup**

Description or Physical Address **Roundup**

- ☐ seasonal operation
dates: _____ to _____
☒ year round operation

OPERATOR OF SYSTEM

Name **Ron Sibley**

Certified Operator? ☒ Yes ☐ No ☐ Not required

Copy of Certificate? ☐ Yes ☐ No Certification # **6338**

Phone # **(406) 323-2804** Cell Phone # ()

Fax # ()

ALTERNATE OPERATOR OF SYSTEM

Name **Lee Butler 8352, Thomas Gabel 7787, Russel Glenwood 7634**

Certified Operator? ☒ Yes ☐ No ☐ Not required

Copy of Certificate? ☐ Yes ☐ No Certification # _____

Phone # **(406) 323-2804** Cell Phone # ()

SYSTEM STATUS

- ☒ A = Active ☐ P = Proposed (Add New System)
☐ I = Inactive

SYSTEM CLASS

- ☒ C = Community ☐ NTNC = Non-Transient Non-Community
☐ TNC = Transient Non-Community

Total Service Connections: Residential / Non-Transient: **839**
Transient: _____

Total Active Connections: Residential / Non-Transient: **839**
Transient: _____

Service Connections Metered? ☒ Yes ☐ No
Percent Metered **100 %**

Resident Population **1,900**
(Number of permanent residents utilizing PWS daily)

Non-Transient Population _____
(Maximum number of non-transient persons utilizing PWS daily)

Transient Population _____
(Maximum number of transient persons served by PWS daily)

OWNER TYPE

- ☐ 1 Federal Government ☒ 4 Local Government Authority, Commission, District, Municipality, City, etc.
☐ 2 Private Subdivision, Investor, Trust, Cooperative, Water Association, etc. ☐ 5 Mixed Public/Private
☐ 3 State Government ☐ 6 Native American

SERVICE AREA CHARACTERISTICS LIST

- | | |
|---|---|
| ☐ BR Bar | ☐ PA Recreation Areas |
| ☐ DC Day Care Center | ☐ RA Residential Area |
| ☐ DI Dispenser | ☐ RE Retail Employees |
| ☐ HS Head Start | ☐ RS Restaurant |
| ☐ HA Homeowners Assoc. | ☐ RV RV Park |
| ☐ HM Hotel/Motel | ☐ SC School |
| ☐ HR Highway Rest Area | ☐ SI Sanitary Improvement District |
| ☐ IA Industrial/Agricultural | ☐ SK Summer Camp |
| ☐ IC Interstate Carrier | ☐ SR Secondary Residences |
| ☐ IN Institution | ☐ SS Service Station |
| ☐ MF Medical Facility | ☐ SU Subdivision |
| ☐ MH Mobile Home Park | ☐ WB Water Bottler |
| ☒ MU Municipality | ☐ WH Wholesaler (Sells Water) |
| ☐ OA Other Area | |
| ☐ ON Other Non-Transient Area (Average Daily Visitors TNC) | |
| ☐ OR Other Residential Area | |
| ☐ OT Other Transient Area | |

Comments:

Service Category Description _____

SANITARY SURVEY FORM – WATER SYSTEM FACILITIES

Page 2 of 8

PWSID	SYSTEM NAME
-------	-------------

Water System Facilities (WSF) numbers are WSF Type Codes plus an assigned number. (i.e. source facility numbering starts with 002 and all non-source facilities start with 001). See instruction sheet for a list of WSF Type Codes. When a source is operational it is considered *Active*, this includes systems that are seasonal. *Inactive* sources are those which are shut down but can return to active status, such as a system out of business. *Proposed* sources are those that have been identified through the Plan Review process, but are not connected to the water system.

A water source facility is a well, spring, intake, infiltration gallery or consecutive connections from which a system draws or purchases water:

Total Number of Source Facilities 1

WATER SYSTEM FACILITIES SUMMARY (WSF)

[illegible]

Description of Water System Facility flow: WL003 > TP001 > CH001 > ST001 > DS001

Notes: _____

(Example: WL002 and WL003 > CH001 > TP001 > ST001 > PC001 > DS001)

*(A)Active, (I)Inactive, (P)Proposed

EMERGENCY POWER

Does the system have emergency power? ☐ Yes ☒ No

If yes, what type: _____

Record of primary power failures: _____ in last year

Comments:

Frequency of testing: _____

Switchover: ☐ Automatic ☐ Manual

SANITARY SURVEY FORM – WELLS & WELL PUMPS

Page 3 of 8

PWSID

SYSTEM NAME

(Please copy this sheet for additional wells & pumps)

COMPLETE ONE PAGE FOR EACH SOURCE

STATUS OF SOURCE ☒ (A)ctive ☐ (I)nactive ☐ (P)roposed

WSF ID WL003 Entry Point ID EP502
These are State assigned identification numbers

Source Name Mine Shaft Wells GWIC 1643, 21149
Example: Well 1 or South Well, etc.

Location of Water Source (TRS or street address) T8N, S25E S24

Entry Point Name EP for Mine Shaft Wells
Example: EP for North Well 1 & South Well 2

Entry Point is at WSF ID CH001
EP is at the first water system facility with finished water.

Available ☒ Perm ☐ Emerg ☐ Interim ☐ Seasonal ☐ Other
If seasonal: _____ to _____

GWUDISW PA completed with this inspection ☐ Yes ☒ No

Log Available? ☒ Yes ☐ No

Average Production Unk
indicate units

Maximum Production Unk
indicate units

Date Drilled 9/1/1977, 1/1/1950
If well, date drilled

Casing Size 21, 16, 13, 12 in
size of casing installed in well

Case Depth 22 and 81 ft
depth of casing installed in well

Well Depth 95 and 93 ft
depth of well expressed in feet

Grout Depth 22 and 81 ft
depth of grout used to seal well walls

Log SWL 28 and 14 ft
(static) expressed in feet below ground elevation

Log PWL Unk
(pumping) expressed in feet below ground elevation
Test Pump Rate Unk
expressed in gallons per min

Intake Type Open bottom
example: screen, slots, perforations, open

Intake Interval 81-95 and 22-93 ft
expressed in feet below ground elevation

Well Yield Unk
pump tested in gallons per minute

Latitude 46.43886°
in decimal degrees

Longitude -108.53675°
in decimal degrees

WELLS

Is well metered? Yes No Unk N/A
☒ ☐ ☐ ☐

Is well site protected from flooding? ☒ ☐ ☐ ☐

Is well protected from potential sources of pollution (includes: surface water, known chemical spills, agricultural use, etc.)? ☐ ☐ ☒ ☐

If no, explain _____

Does casing extend at least
☐ 18 inches above outside ground level;
☒ 12 inches above finished floor inside well house; and
☐ 3 feet above 100 year flood elevation?
(Check for appropriate distance)

Is top of the well casing properly sealed? (sanitary seal) ☒ ☐ ☐ ☐

Is well vented? ☐ ☒ ☐ ☐
Is well vent properly screened and terminated in a downward position? ☐ ☐ ☐ ☒

Does well have suitable sampling tap? Raw Water ☒ ☐ ☐ ☐
Treated ☒ ☐ ☐ ☐

Are check valves, blow-off valves and water meters maintained and operating properly? ☐ ☐ ☒ ☐

Is upper termination of well protected (housed or fenced)? ☒ ☐ ☐ ☐

Is intake located below the maximum drawdown? ☐ ☐ ☒ ☐

PUMPS

Type Two 125 HP Vertical Turbine
(example: 30 hp line shaft turbine)
Rated Capacity Unk

Yes No Unk N/A

Are pumps operable? ☒ ☐ ☐ ☐

How frequently are pump(s) replaced? _____ ☒ ☐

Are backup pumps/motors provided? ☐ ☐ ☒ ☐

Are controls functioning properly and adequately protected? ☒ ☐ ☐ ☐

Do underground compartments have a drain? ☐ ☐ ☐ ☒

Is facility properly protected against trespassing and vandalism? ☒ ☐ ☐ ☐

Are pump records maintained (amp, drawdown, discharge, pressure, maintenance schedule, manuals, etc.)? ☐ ☐ ☒ ☐

Is the plumbing adequately painted to prevent excessive corrosion? ☒ ☐ ☐ ☐

Are adequate heating, lighting, and ventilation provided? ☒ ☐ ☐ ☐

Is a preventive maintenance program in operation? ☒ ☐ ☐ ☐

Are recommended spare parts on hand? ☐ ☐ ☒ ☐

Cross connection protection provided? ☐ ☐ ☐ ☒

Comment: Two wells that draw water from the same flooded well shaft source.

Explain Controls: Water level sensor in storage tank

Comment: _____

SANITARY SURVEY FORM - TREATMENT

Page 4 of 8

PWSID

SYSTEM NAME

Treatment Objective

B = Disinfection Byproduct Control
C = Corrosion Control
D = Disinfection
E = Dechlorination
F = Iron Removal
I = Inorganics Removal
M = Manganese Removal
O = Organics Removal
P = Particulate Removal
R = Radionuclides Removal
S = Softening (Hardness Removal)
T = Taste / Odor Control
Z = Other _____

WATER TREATMENT FACILITIES

WSF ID Treatment Plant Name Treatment Objectives and Code

TP001	Treatment Plant	D401

WSF ID Location Record in decimal degrees

TP001	Latitude 46.43872°	Longitude -108.53667°
	Latitude _____°	Longitude _____°
	Latitude _____°	Longitude _____°
	Latitude _____°	Longitude _____°
	Latitude _____°	Longitude _____°

Treatment plant description: Gaseous chlorine disinfection

FOR SYSTEMS EMPLOYING FULL-TIME DISINFECTION

What disinfectant is used? Gaseous chlorine Yes No Unk N/A

Is the disinfectant used NSF approved? ☒ ☐ ☐ ☐

Is the amount of disinfectant used recorded? ☒ ☐ ☐ ☐
If Yes, amount used: _____ lbs/day _____ ppm _____ other

Is the amount of disinfectant used compared to water pumped to verify concentration? ☒ ☐ ☐ ☐

Is chemical storage adequate and safe? ☒ ☐ ☐ ☐
If No, explain _____

Is disinfectant residual being monitored daily? ☒ ☐ ☐ ☐

Are residual reports submitted monthly? ☒ ☐ ☐ ☐

Is 4-log removal (D361) required? ☐ ☒ ☐ ☐
(D361) Minimum free chlorine residual concentration = _____ mg/L

Is minimum free chlorine residual maintained? ☒ ☐ ☐ ☐

Is the disinfection equipment being operated and maintained properly? ☒ ☐ ☐ ☐

Is operational standby equipment provided? ☐ ☐ ☒ ☐

If not, are critical spare parts on hand? ☐ ☐ ☒ ☐

Has disinfection system been free from failure during the past year – no interruption? ☐ ☐ ☒ ☐

If No, give dates of interruptions _____

Describe provisions for providing contact time between disinfection point and the first point of use: Distribution main

IF USING GAS CHLORINATION

	Yes	No	Unk	N/A
Is a manifold provided to allow feeding gas from more than one cylinder?	☒	☐	☐	☐
Is there automatic switchover from cylinder to cylinder?	☒	☐	☐	☐
Are scales provided for weighing of containers?	☒	☐	☐	☐
Are chlorine storage and use areas isolated from other work areas?	☒	☐	☐	☐
Are stored cylinders capped and labeled?	☒	☐	☐	☐
Is room vented to the outdoors with suction located no more than 6 inches above the floor level?	☐	☐	☐	☒
Is vent inlet near the ceiling?	☐	☐	☐	☒
Is room containing chlorination treatment labeled sufficiently (DANGER signs, etc.)?	☐	☒	☐	☐
Is a view port provided into the room storing chlorine?	☐	☐	☐	☒
Is a means of leak detection provided? Type? _____	☐	☐	☒	☐
Is a self-contained breathing apparatus available for use during repair of leaks? Where? <u>Pumphouse</u>	☒	☐	☐	☐
Are personnel trained to use apparatus?	☒	☐	☐	☐
Are all doors hinged outward and equipped with panic bars?	☐	☐	☐	☒
Are all gas cylinders restrained near the top and about half way down by chaining to wall or by other means?	☒	☐	☐	☐

Comment: Closet-type chlorine enclosure

SANITARY SURVEY FORM - STORAGE

Page 5 of 8

PWSID

SYSTEM NAME

COMPLETE ONE SECTION FOR EACH STORAGE FACILITY

Total storage provided 2 million gallons

Total treated storage provided 2 million gallons

Storage provides _____ days of water reserve

STORAGE FACILITY

WSF ID ST001

Location On hill north of town

Description Partially buried concrete

Latitude: 46.46036^o in decimal degrees

Longitude: -108.54764^o in decimal degrees

Storage Volume 2 million gallons

Year constructed: 1983

Condition: ☒ Good ☐ Fair ☐ Poor ☐ Not accessible

Does surface runoff and underground drainage drain away? ☐ Yes ☐ No ☒ Unk ☐ N/A

Is the site protected against flooding? ☒ Yes ☐ No ☐ Unk ☐ N/A

Is the site protected against trespass/vandalism? ☐ Yes ☒ No ☐ Unk ☐ N/A

Ladders caged and locked? ☐ Yes ☐ No ☐ Unk ☒ N/A

Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface? ☒ Yes ☐ No ☐ Unk ☐ N/A

Overflow pad? ☐ Yes ☒ No ☐ Unk ☐ N/A

Is access hatch sealed properly and locked? ☐ Yes ☐ No ☒ Unk ☐ N/A

Are surface coatings in contact with water ANSI / NSF approved? ☐ Yes ☐ No ☒ Unk ☐ N/A

Is tank protected against icing and corrosion? ☒ Yes ☐ No ☐ Unk ☐ N/A

Can tank be isolated from system? ☒ Yes ☐ No ☐ Unk ☐ N/A

Is all treated water storage covered? ☒ Yes ☐ No ☐ Unk ☐ N/A

Are tanks disinfected after repairs are made? ☒ Yes ☐ No ☐ Unk ☐ N/A

What is cleaning frequency for tanks? As needed

Is tank inspected every 5 years by a structural engineer for structural integrity? ☒ Yes ☐ No ☐ Unk ☐ N/A

Date of last inspection By whom Liquid Engineering, Billings

Comments: Recommend security fence

STORAGE FACILITY

WSF ID _____

Location _____

Description _____

Latitude: _____^o in decimal degrees

Longitude: _____^o in decimal degrees

Storage Volume _____ gallons

Year constructed: _____

Condition: ☐ Good ☐ Fair ☐ Poor ☐ Not accessible

Does surface runoff and underground drainage drain away? ☐ Yes ☐ No ☐ Unk ☐ N/A

Is the site protected against flooding? ☐ Yes ☐ No ☐ Unk ☐ N/A

Is the site protected against trespass/vandalism? ☐ Yes ☐ No ☐ Unk ☐ N/A

Ladders caged and locked? ☐ Yes ☐ No ☐ Unk ☐ N/A

Are overflow lines, air vents, drainage lines or clean out pipes turned downward or covered, screened and terminated a minimum of 3 diameters above the ground or storage tank surface? ☐ Yes ☐ No ☐ Unk ☐ N/A

Overflow pad? ☐ Yes ☐ No ☐ Unk ☐ N/A

Is access hatch sealed properly and locked? ☐ Yes ☐ No ☐ Unk ☐ N/A

Are surface coatings in contact with water ANSI / NSF approved? ☐ Yes ☐ No ☐ Unk ☐ N/A

Is tank protected against icing and corrosion? ☐ Yes ☐ No ☐ Unk ☐ N/A

Can tank be isolated from system? ☐ Yes ☐ No ☐ Unk ☐ N/A

Is all treated water storage covered? ☐ Yes ☐ No ☐ Unk ☐ N/A

Are tanks disinfected after repairs are made? ☐ Yes ☐ No ☐ Unk ☐ N/A

What is cleaning frequency for tanks? _____

Is tank inspected every 5 years by a structural engineer for structural integrity? ☐ Yes ☐ No ☐ Unk ☐ N/A

Date of last inspection By whom _____

Comments: _____

SANITARY SURVEY FORM - MISCELLANEOUS

Page 6 of 8

PWSID

SYSTEM NAME

DISTRIBUTION SYSTEM EVALUATION

WSF ID DS001

	Yes	No	Unk	N/A
System drawings available?	☒	☐	☐	☐
Accurate As-Built drawing(s) on-site?	☐	☐	☒	☐
Lines adequately sized?	☒	☐	☐	☐
Adequate pressure maintained?	☒	☐	☐	☐
Mains protected from freezing?	☒	☐	☐	☐
Distribution system free of leaks?	☒	☐	☐	☐
Asbestos concrete pipe used?	☒	☐	☐	☐
Fire hydrants?	☒	☐	☐	☐
Dead end lines minimized by looping mains?	☒	☐	☐	☐
Flushing program?	☒	☐	☐	☐
Pressure reducing stations? Number <u> </u>	☐	☒	☐	☐
Booster stations? Number <u> </u>	☐	☒	☐	☐
Are individual booster pumps on any service lines? (see DEQ-1 6.4.4)	☐	☐	☒	☐
Were cross connections observed?	☐	☒	☐	☐
Describe distribution: <u>PVC, cast iron, AC</u>				
Comments: <u> </u>				

SAFETY

Were confined spaces observed?

Yes No Unk N/A
☒ ☐ ☐ ☐

Describe any confined spaces observed Storage tank

Confined space safety adequate?

☐ ☐ ☐ ☐

Fall risks adequately mitigated?

☐ ☐ ☐ ☐

Note all safety deficiencies (consider items such as ladders, tank supports, guards on rotating electrical equipment, lightning protection for pumps, etc.)

MONITORING AND RECORDKEEPING EVALUATION

	Yes	No	Unk	N/A
Does the system have a current Monitoring Schedule?	☒	☐	☐	☐
Bacti monitoring records maintained? (5 years)	☒	☐	☐	☐
Bacti Sample Site Plan submitted?	☒	☐	☐	☐
Familiar with repeat sampling?	☒	☐	☐	☐
Chemical monitoring records maintained? (10 years)	☒	☐	☐	☐
System specific records / plans maintained? (DBP, PB/CU, treatments, waivers, violations, etc.)	☒	☐	☐	☐
Familiar with Public Notice requirements?	☒	☐	☐	☐
Did Surveyor take a bacteriological sample?	☐	☒	☐	☐
If Yes, date of Sample: <u> </u> Time of Sample: <u> </u>				
Comments: <u> </u>				

MANAGEMENT

	Yes	No	Unk	N/A
Are there sufficient personnel?	☒	☐	☐	☐
Are operators properly certified?	☒	☐	☐	☐
Are personnel adequately trained?	☒	☐	☐	☐
Is there a current O&M manual on-site?	☐	☐	☒	☐
Is an emergency plan on-site and workable?	☐	☐	☒	☐
Has system addressed concerns from previous sanitary survey(s) or technical visit(s)?	☒	☐	☐	☐
Budget exists?	☒	☐	☐	☐
Does system maintain an emergency fund?	☐	☐	☒	☐
Does system contribute to facility replacement fund?	☐	☐	☒	☐
Are abandoned wells present?	☐	☒	☐	☐
Do abandoned wells appear to be properly abandoned? (see ARM 36.21.670)	☐	☐	☐	☒
Comments: <u> </u>				

REPORT SUMMARY

Page 7 of 8

PWSID

SYSTEM NAME

The State, or an authorized agent, must conduct sanitary surveys for all public water supply systems in Montana. DEQ believes that periodic sanitary surveys, along with appropriate corrective actions, are indispensable for assuring the long-term quality and safety of drinking water. When properly conducted, sanitary surveys can provide important information on a water system's design and operations and can identify minor and significant deficiencies for correction before they become major problems.

Minor deficiencies do not pose serious health threats. However, corrective action of minor deficiencies can be critical in the long-term operation and safety of a public water system. Minor deficiencies are generally described as suggested or recommended corrections in the letter to system owner(s).

Significant deficiencies can be defined as a defective water supply component(s) having or likely to have an adverse influence on public health. Significant deficiencies require immediate corrective action in efforts to protect consumers.

EPA and ASDWA guidance identifies eight broad components that should be covered in a sanitary survey. Using these eight broad components as a guide, minor and significant deficiencies should be described in the letter to system owner(s).

- | | |
|---------------------------|--|
| 1) Source | 5) Pumps, pump facilities, and controls |
| 2) Treatment | 6) Monitoring and reporting, and data verification |
| 3) Distribution system | 7) System management and operation |
| 4) Finished water storage | 8) Operator compliance with State requirements |

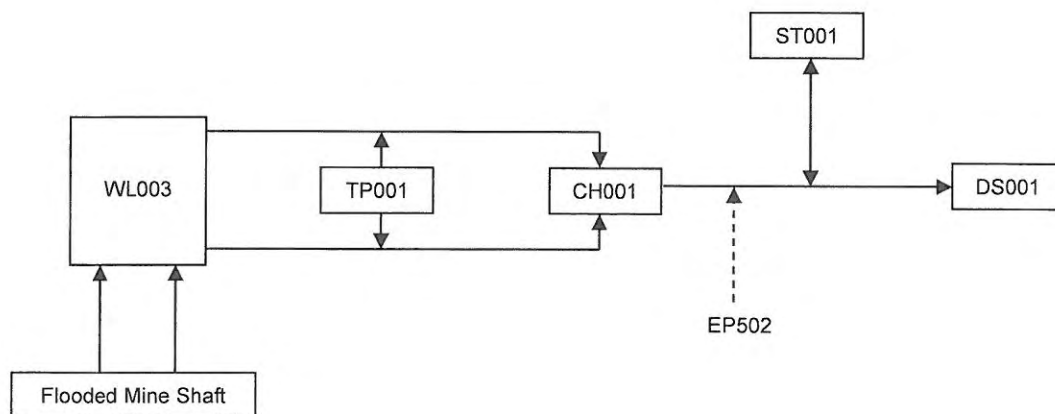
With consideration that significant deficiencies may influence regulatory decisions and monitoring requirements, please list all significant deficiencies observed and corrective action(s) taken below.

Comments: No significant deficiencies were observed.

PWSID

SYSTEM NAME

Please insert schematics, diagrams and maps as needed. Additional sheets may be added.



MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Site Name: CITY OF ROUNDUP
GWIC Id: 1643

Section 1: Well Owner(s)

1) CITY OF ROUNDUP (MAIL)
N/A
ROUNDUP MT N/A [09/01/1977]

Section 2: Location

Township	Range	Section	Quarter Sections
08N	25E	24	SW¼ NW¼ NW¼ NE¼
County			Geocode

MUSSELSHELL

Latitude	Longitude	Geomethod	Datum
46.4391	-108.5372	UNKNOWN	NAD27

Ground Surface Altitude	Ground Surface Method	Datum Date
3200		

Addition

Block

Lot

Section 3: Proposed Use of Water
PUBLIC WATER SUPPLY (1)

Section 4: Type of Work
Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date
Date well completed: Thursday, September 01, 1977

Section 6: Well Construction Details

Other Options

[Return to menu](#)
[Plot this site in State Library Digital Atlas](#)
[Plot this site in Google Maps](#)
[View field visits for this site](#)
[View water quality for this site](#)
[View scanned well log \(4/11/2011 5:18:50 PM\)](#)

Section 7: Well Test Data

Total Depth: 95
Static Water Level: 28
Water Temperature:

Unknown Test Method *

Yield _ gpm.
Pumping water level _ feet.
Time of recovery _ hours.
Recovery water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks
DRILLED INTO MINE

Section 9: Well Log
Geologic Source
125FRUN - FORT UNION
FORMATION

From	To	Description
0	10	TOPSOIL, BROWN SANDY SOIL

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	32	21				CASING (TYPE UNKNOWN)
0	81	12				CASING (TYPE UNKNOWN)

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
81	95	16			OPEN HOLE

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
81	81	CEMENT	

10	14	GRAVEL
14	17	SANDY BENTONITE
17	21	SAND
21	29	BLUE GRAY SHALE
29	30	HARD GRAY SHALE
30	35	BLUE GRAY SHALE
35	36	HARD GRAY SAND
36	40	BLUE GRAY SHALE
40	42	DIRTY COAL, BLACK
42	50	BLUE GRAY SHALE AND BENTONITE
50	51	SAND
51	60	BLUE GRAY SHALE
60	62	COAL
62	69	BLUE GRAY SHALE AND BENTONITE

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: MERLE E. HUNT

Company: HUNT DRILLING

License No: -

Date Completed: 9/1/1977

Site Name: CITY OF ROUNDUP
GWIC Id: 1643
Additional Lithology Records

From	To	Description
69	71	HARD SHALE
71	95	BLUE GRAY SHALE

MONTANA WELL LOG REPORT

Other Options

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

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[View water quality for this site](#)
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Site Name: CITY OF ROUNDUP
GWIC Id: 21149

Section 7: Well Test Data

Section 1: Well Owner(s)

1) CITY OF ROUNDUP (MAIL)
N/A
ROUNDUP MT 59072 [No Date]

Total Depth: 93
Static Water Level: 14
Water Temperature:

Unknown Test Method *

Section 2: Location

Township	Range	Section	Quarter Sections
08N	25E	24	SE¼ NW¼ NW¼ NE¼
County			Geocode

MUSSELSHELL

Latitude	Longitude	Geomethod	Datum
46.4386	-108.5358	UNKNOWN	NAD27

Ground Surface Altitude	Ground Surface Method	Datum Date
3190		

Yield _ gpm.
Pumping water level _ feet.
Time of recovery _ hours.
Recovery water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Addition

Block

Lot

Section 8: Remarks

Section 3: Proposed Use of Water

PUBLIC WATER SUPPLY (1)

Section 4: Type of Work

Drilling Method:
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Sunday, January 01, 1950

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	22	13.375				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description

Section 9: Well Log

Geologic Source

125FRUN - FORT UNION FORMATION

From	To	Description
0	11	TOPSOIL
11	16	SAND AND GRAVEL
16	32	GRAY SANDSTONE
32	38	GREEN SHALE-HARD
38	48	GRAY SANDSTONE
48	62	GRAY SANDY SHALE
62	68	COAL BED
68	69	GRAY SANDY SHALE
69	75	GRAY SANDSTONE
75	84	GREEN SHALE-DARK
84	93	GRAY SANDSTONE

22	22	13.375		OPEN BOTTOM
----	----	--------	--	----------------

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	22	CEMENT	

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:

Company:

License No: -

Date

Completed: 1/1/1950

Appendix H:

Water Treatment Rules

Menu



Related Topics: [Your Drinking Water](#)

Table of Regulated Drinking Water Contaminants

Related Info

- [Regulation Development for Drinking Water Contaminants](#)
- [Code of Federal Regulations: Title 40 - Protection of the Environment \(full publication\)](#)

The National Primary Drinking Water Regulations (NPDWRs or primary standards) are legally enforceable standards that apply to public water systems. Primary standards protect public health by limiting the levels of contaminants in drinking water. Visit the list below of regulated contaminants for details.

On this page:

- [Microorganisms](#)
- [Disinfectants](#)
- [Disinfection Byproducts](#)
- [Inorganic Chemicals](#)
- [Organic Chemicals](#)
- [Radionuclides](#)

Microorganisms

Contaminant	MCLG ¹ (mg/L) ²	MCL or TT ¹ (mg/L) ²	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
<i>Cryptosporidium</i>	zero	TT ³	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)	Human and animal fecal waste

Contaminant	MCLG ¹ (mg/L) ²	MCL or TT ¹ (mg/L) ²	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
<i>Giardia lamblia</i>	zero	TT ³	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)	Human and animal fecal waste
Heterotrophic plate count (HPC)	n/a	TT ³	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment
<i>Legionella</i>	zero	TT ³	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems
Total Coliforms (including fecal coliform and <i>E. Coli</i>)	zero	5.0% ⁴	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present ⁵	Coliforms are naturally present in the environment; as well as feces; fecal coliforms and <i>E. coli</i> only come from human and animal fecal waste.
Turbidity	n/a	TT ³	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (such as whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff
Viruses (enteric)	zero	TT ³	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)	Human and animal fecal waste

Disinfection Byproducts

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L)²	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Bromate	zero	0.010	Increased risk of cancer	Byproduct of drinking water disinfection
Chlorite	0.8	1.0	Anemia; infants and young children: nervous system effects	Byproduct of drinking water disinfection
Haloacetic acids (HAA5)	n/a ⁶	0.060 ⁷	Increased risk of cancer	Byproduct of drinking water disinfection
Total Trihalomethanes (TTHMs)	⁷ ----- >--> n/a ⁶	----- >--> 0.080 ⁷	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection

Disinfectants

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L)²	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Chloramines (as Cl ₂)	MRDLG=4 ¹	MRDL=4.0 ¹	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes
Chlorine (as Cl ₂)	MRDLG=4 ¹	MRDL=4.0 ¹	Eye/nose irritation; stomach discomfort	Water additive used to control microbes
Chlorine dioxide (as ClO ₂)	MRDLG=0.8 ¹	MRDL=0.8 ¹	Anemia; infants and young children: nervous system effects	Water additive used to control microbes

Inorganic Chemicals

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L)²	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
--------------------	--	---	--	---

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L)²	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Antimony	0.006	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic	0	0.010 as of 01/23/06	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards, runoff from glass and electronics production wastes
Asbestos (fiber > 10 micrometers)	7 million fibers per liter (MFL)	7 MFL	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits
Barium	2	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beryllium	0.004	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
Cadmium	0.005	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium (total)	0.1	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L)²	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Copper	1.3	TT ⁷ ; Action Level=1.3	Short term exposure: Gastrointestinal distress Long term exposure: Liver or kidney damage People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits
Cyanide (as free cyanide)	0.2	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Fluoride	4.0	4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories
Lead	zero	TT ⁷ ; Action Level=0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits
Mercury (inorganic)	0.002	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L)²	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Nitrate (measured as Nitrogen)	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural deposits
Nitrite (measured as Nitrogen)	1	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural deposits
Selenium	0.05	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines
Thallium	0.0005	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories

Organic Chemicals

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L) ²	Potential Health Effects from Long- Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Acrylamide	zero	TT ⁸	Nervous system or blood problems; increased risk of cancer	Added to water during sewage/wastewater treatment

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L) ²	Potential Health Effects from Long- Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Alachlor	zero	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops
Atrazine	0.003	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops
Benzene	zero	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills
Benzo(a)pyrene (PAHs)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines
Carbofuran	0.04	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa
Carbon tetrachloride	zero	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities
Chlordane	zero	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide
Chlorobenzene	0.1	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L)²	Potential Health Effects from Long- Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
2,4-D	0.07	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops
Dalapon	0.2	0.2	Minor kidney changes	Runoff from herbicide used on rights of way
1,2-Dibromo-3-chloropropane (DBCP)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
o-Dichlorobenzene	0.6	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories
p-Dichlorobenzene	0.075	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories
1,2-Dichloroethane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
1,1-Dichloroethylene	0.007	0.007	Liver problems	Discharge from industrial chemical factories
cis-1,2-Dichloroethylene	0.07	0.07	Liver problems	Discharge from industrial chemical factories
trans-1,2-Dichloroethylene	0.1	0.1	Liver problems	Discharge from industrial chemical factories

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L)²	Potential Health Effects from Long- Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Dichloromethane	zero	0.005	Liver problems; increased risk of cancer	Discharge from drug and chemical factories
1,2-Dichloropropane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
Di(2-ethylhexyl) adipate	0.4	0.4	Weight loss, liver problems, or possible reproductive difficulties.	Discharge from chemical factories
Di(2-ethylhexyl) phthalate	zero	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories
Dinoseb	0.007	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables
Dioxin (2,3,7,8-TCDD)	zero	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories
Diquat	0.02	0.02	Cataracts	Runoff from herbicide use
Endothall	0.1	0.1	Stomach and intestinal problems	Runoff from herbicide use
Endrin	0.002	0.002	Liver problems	Residue of banned insecticide

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L) ²	Potential Health Effects from Long- Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Epichlorohydrin	zero	TT ⁸	Increased cancer risk, and over a long period of time, stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals
Ethylbenzene	0.7	0.7	Liver or kidneys problems	Discharge from petroleum refineries
Ethylene dibromide	zero	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries
Glyphosate	0.7	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use
Heptachlor	zero	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide
Heptachlor epoxide	zero	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor
Hexachlorobenzene	zero	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories
Hexachlorocyclopentadiene	0.05	0.05	Kidney or stomach problems	Discharge from chemical factories

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L)²	Potential Health Effects from Long- Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Lindane	0.0002	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens
Methoxychlor	0.04	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Oxamyl (Vydate)	0.2	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes
Polychlorinated biphenyls (PCBs)	zero	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals
Pentachlorophenol	zero	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood preserving factories
Picloram	0.5	0.5	Liver problems	Herbicide runoff
Simazine	0.004	0.004	Problems with blood	Herbicide runoff
Styrene	0.1	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills

Contaminant	MCLG¹ (mg/L)²	MCL or TT¹ (mg/L) ²	Potential Health Effects from Long- Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Tetrachloroethylene	zero	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners
Toluene	1	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories
Toxaphene	zero	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle
2,4,5-TP (Silvex)	0.05	0.05	Liver problems	Residue of banned herbicide
1,2,4-Trichlorobenzene	0.07	0.07	Changes in adrenal glands	Discharge from textile finishing factories
1,1,1-Trichloroethane	0.20	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories
1,1,2-Trichloroethane	0.003	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories
Trichloroethylene	zero	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories
Vinyl chloride	zero	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories

Contaminant	MCLG ¹ (mg/L) ²	MCL or TT ¹ (mg/L) ²	Potential Health Effects from Long- Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Xylenes (total)	10	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories

Radionuclides

Contaminant	MCLG ¹ (mg/L) ²	MCL or TT ¹ (mg/L) ²	Potential Health Effects from Long- Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Alpha particles	none ⁷ ---- ----- zero	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation
Beta particles and photon emitters	none ⁷ ---- ----- zero	4 millirems per year	Increased risk of cancer	Decay of natural and man- made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation
Radium 226 and Radium 228 (combined)	none ⁷ ---- ----- zero	5 pCi/L	Increased risk of cancer	Erosion of natural deposits
Uranium	zero	30 ug/L as of 12/08/03	Increased risk of cancer, kidney toxicity	Erosion of natural deposits

Notes

¹Definitions:

- Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
- Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- Treatment Technique (TT) - A required process intended to reduce the level of a contaminant in drinking water.
- Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

² Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (PPM).

³ EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to

- a. Disinfect their water, and
 - b. Filter their water, or
 - c. Meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:
- *Cryptosporidium*: Unfiltered systems are required to include *Cryptosporidium* in their existing watershed control provisions
 - *Giardia lamblia*: 99.9% removal/inactivation.
 - Viruses: 99.99% removal/inactivation.
 - *Legionella*: No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, according to the treatment techniques in the Surface Water Treatment Rule, *Legionella* will also be controlled.
 - Turbidity: For systems that use conventional or direct filtration, at no time can turbidity (cloudiness of water) go higher than 1 Nephelometric Turbidity Unit (NTU), and samples for turbidity must be less than or equal to 0.3 NTUs in at least 95 percent of the samples in any month. Systems that use filtration other than the conventional or direct filtration must follow state limits, which must include turbidity at no time exceeding 5 NTUs.
 - Heterotrophic Plate Count (HPC): No more than 500 bacterial colonies per milliliter.
 - Long Term 1 Enhanced Surface Water Treatment: Surface water systems or groundwater under the direct influence (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (such

as turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).

- Long Term 2 Enhanced Surface Water Treatment Rule: This rule applies to all surface water systems or ground water systems under the direct influence of surface water. The rule targets additional *Cryptosporidium* treatment requirements for higher risk systems and includes provisions to reduce risks from uncovered finished water storage facilities and to ensure that the systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts.
- Filter Backwash Recycling: This rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

⁴ No more than 5.0% samples total coliform-positive (TC-positive) in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or *E. coli* if two consecutive TC-positive samples, and one is also positive for *E. coli* fecal coliforms, system has an acute MCL violaton.

⁵ Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

⁶ Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L); chloroform (0.07 mg/L).
- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.02 mg/L); monochloroacetic acid (0.07mg/L). Bromoacetic acid and dibromoacetic acid are regulated with this group but have no MCLGs.

⁷ Lead and copper are regulated by a treatment technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.

⁸ Each water system must certify, in writing, to the state (using third-party or manufacturer's certification) that when acrylamide and epichlorohydrin are used to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows:

- Acrylamide = 0.05% dosed at 1 mg/L (or equivalent)
- Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent)

Last updated on December 8, 2015

Menu



Related Topics: Drinking Water Contaminants – Standards and Regulations

Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals

On This Page:

- What are secondary standards?
- Why set secondary standards?
- What problems are caused by these contaminants?
- Table of secondary drinking water standards
- How can these problems be corrected?
- What can you do?

What are secondary standards?

EPA has established National Primary Drinking Water Regulations (NPDWRs (National Primary Drinking Water Regulations)) that set mandatory water quality standards for drinking water contaminants. These are enforceable standards called "maximum contaminant levels" (MCLs) which are established to protect the public against consumption of drinking water contaminants that present a risk to human health. An MCL (Maximum Contaminant Level) is the maximum allowable amount of a contaminant in drinking water which is delivered to the consumer.

In addition, EPA has established National Secondary Drinking Water Regulations (NSDWRs (National Secondary Drinking Water Regulations)) that set non-mandatory water quality standards for 15 contaminants. EPA does not enforce these "secondary maximum contaminant levels" (SMCLs). (Secondary Maximum Contaminant Levels) They are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. These contaminants are not considered to present a risk to human health at the SMCL (Secondary Maximum Contaminant Level).

Why set secondary standards?

These contaminants are not health threatening at the SMCL. P (Secondary Maximum Contaminant Level) public water systems only need to test for them on a voluntary basis. Then why it is necessary to set secondary standards?

EPA believes that if these contaminants are present in your water at levels above these standards, the contaminants may cause the water to appear cloudy or colored, or to taste or smell bad. This may cause a great number of people to stop using water from their public water system even though the water is actually safe to drink.

Secondary standards are set to give public water systems some guidance on removing these chemicals to levels that are below what most people will find to be noticeable.

What problems are caused by these contaminants?

There are a wide variety of problems related to secondary contaminants.

These problems can be grouped into three categories:

- Aesthetic effects — undesirable tastes or odors;
- Cosmetic effects — effects which do not damage the body but are still undesirable
- Technical effects — damage to water equipment or reduced effectiveness of treatment for other contaminants

The SMCLs (Secondary Maximum Contaminant Level) related to each of these effects are shown in the table below.

Aesthetic effects

Odor and taste are useful indicators of water quality even though odor-free water is not necessarily safe to drink. Odor is also an indicator of the effectiveness of different kinds of treatment.

However, present methods of measuring taste and odor are still fairly subjective and the task of identifying an unacceptable level for each chemical in different waters requires more study. Also, some contaminant odors are noticeable even when present in extremely small amounts. It is usually very expensive and often impossible to identify, much less remove, the odor-producing substance.

- Standards related to odor and taste: Chloride, Copper, Foaming Agents, Iron, Manganese pH, Sulfate, Threshold Odor Number (TON (Threshold Odor Number)), Total Dissolved Solids, Zinc

Color may be indicative of dissolved organic material, inadequate treatment, high disinfectant demand, and the potential for the production of excess amounts of disinfectant by-products.

Inorganic contaminants such as metals are also common causes of color. In general, the point of consumer complaint is variable over a range from five to 30 color units. Most people find color objectionable over 15 color units. Rapid changes in color levels may provoke more citizen complaints than a relatively high, constant color level.

- Standards related to color: Aluminum, Color, Copper, Iron, Manganese, Total Dissolved Solids.

Foaming is usually caused by detergents and similar substances when water has been agitated or aerated as in many faucets. An off-taste described as oily, fishy, or perfume-like is commonly associated with foaming. However, these tastes and odors may be due to the breakdown of waste products rather than the detergents themselves.

- Standards related to foaming: Foaming Agents

Cosmetic effects

Skin discoloration is a cosmetic effect related to silver ingestion. This effect, called argyria, does not impair body function. It has never been found to be caused by drinking water in the United States. A standard has been set, however, because silver is used as an antibacterial agent in many home water treatment devices and so presents a potential problem which deserves attention.

- Standard related to this effect: Silver

Tooth discoloration and/or pitting is caused by excess fluoride exposures during the formative period prior to eruption of the teeth in children. The secondary standard of 2.0 mg/L (Milligrams per Liter) is intended as a guideline for an upper boundary level in areas which have high levels of naturally occurring fluoride. The level of the SMCL (Maximum Contaminant Level) was set based upon a balancing of the beneficial effects of protection from tooth decay and the undesirable effects of excessive exposures leading to discoloration. Information about the Centers for Disease Control's (CDC) recommendations regarding optimal fluoridation levels and the beneficial effects for protection from tooth decay can be found on CDC's Community Water Fluoridation page.

- Standard related to this effect: Fluoride

Technical effects

Corrosivity, and staining related to corrosion, not only affect the aesthetic quality of water, but may also have significant economic implications. Other effects of corrosive water, such as the corrosion of iron and copper, may stain household fixtures and impart objectionable metallic taste and red or blue-green color to the water supply. Corrosion of distribution system pipes can reduce water flow.

- Standards related to corrosion and staining: Chloride, Copper, Corrosivity, Iron, Manganese, pH, Total Dissolved Solids, Zinc

Scaling and sedimentation are other processes which have economic impacts. Scale is a mineral deposit which builds up on the insides of hot water pipes, boilers, and heat exchangers, restricting or even blocking water flow. Sediments are loose deposits in the distribution system or home plumbing.

- Standards related to scale and sediments: Iron, pH, Total Dissolved Solids, Aluminum

Table of Secondary Drinking Water Standards

Contaminant	Secondary MCL (Maximum Contaminant Level)	Noticeable Effects above the Secondary MCL (Maximum Contaminant Level) (Maximum Contaminant Level)
Aluminum	0.05 to 0.2 mg/L (Milligrams per Liter)* (Milligrams per Liter)	colored water
Chloride	250 mg/L (Milligrams per Liter)	salty taste
Color	15 color units	visible tint
Copper	1.0 mg/L (Milligrams per Liter)	metallic taste; blue-green staining
Corrosivity	Non-corrosive	metallic taste; corroded pipes/ fixtures staining
Fluoride	2.0 mg/L (Milligrams per Liter)	tooth discoloration
Foaming agents	0.5 mg/L (Milligrams per Liter)	frothy, cloudy; bitter taste; odor
Iron	0.3 mg/L (Milligrams per Liter)	rusty color; sediment; metallic taste; reddish or orange staining
Manganese	0.05 mg/L (Milligrams per Liter)	black to brown color; black staining; bitter metallic taste
Odor	3 TON (threshold odor number)	"rotten-egg", musty or chemical smell
pH	6.5 - 8.5	low pH: bitter metallic taste; corrosion high pH: slippery feel; soda taste; deposits
Silver	0.1 mg/L (Milligrams per Liter)	skin discoloration; graying of the white part of the eye
Sulfate	250 mg/L (Milligrams per Liter)	salty taste
Total Dissolved Solids (TDS (Total Dissolved Solids))	500 mg/L (Milligrams per Liter)	hardness; deposits; colored water; staining; salty taste
Zinc	5 mg/L (Milligrams per Liter)	metallic taste

*mg/L (Milligrams per Liter) is milligrams of substance per liter of water.

How can these problems be corrected?

Although state health agencies and public water systems often decide to monitor and treat their supplies for secondary contaminants, federal regulations do not require them to do this. Where secondary contaminants are a problem, the types of removal technologies discussed below are corrective actions which the water supplier can take. They are usually effective depending upon the overall nature of the water supply.

Corrosion control is perhaps the single most cost-effective method a system can use to treat for iron, copper, and zinc due to the significant benefits in:

- Reduction of contaminants at the consumer's tap
- Cost savings due to extending the useful life of water mains and service lines
- Energy savings from transporting water more easily through smoother, uncorroded pipes
- Reduced water losses through leaking or broken mains or other plumbing

This treatment is used to control the acidity, alkalinity, or other water qualities which affect pipes and equipment used to transport water. By controlling these factors, the public water system can reduce the leaching of metals such as copper, iron, and zinc from pipes or fixtures, as well as the color and taste associated with these contaminants. It should be noted that corrosion control is not used to remove metals from contaminated source waters.

Conventional treatments will remove a variety of secondary contaminants. Coagulation (or flocculation) and filtration removes metals like iron, manganese and zinc. Aeration removes odors, iron, and manganese. Granular activated carbon will remove most of the contaminants which cause odors, color, and foaming.

Non-conventional treatments like distillation, reverse osmosis, and electrodialysis are effective for removal of chloride, total dissolved solids, and other inorganic substances. However, these are fairly expensive technologies and may be impractical for smaller systems.

Non-treatment options include blending water from the principal source with uncontaminated water from an alternative source.

What can you do?

If you are concerned about the presence of secondary contaminants in your drinking water supply, here are a few suggestions:

- **First**, identify your local public water system. If you pay a water bill, the name, address, and telephone number of your supplier should be on the bill. If you do not pay a water bill, then contact your landlord, building manager, or the local health department — they should know.
- **Second**, contact your local public water system. Inquire about your supplier's monitoring for secondary contaminants. Ask for the list of secondary contaminants which are being monitored in your water supply. Does the water being delivered to the public meet these SMCLs (Secondary Maximum Contaminant Levels)? If you have not yet received notice from your supplier, ask how you can get a copy of the monitoring results.
- **Third**, if you receive a public notice from your local public water system regarding other drinking water standards — **read it carefully** — and follow any instructions closely. If you

have questions or concerns, contact the person from the water system who is indicated in the notice. If that person is unavailable, contact either the state drinking water program or your local health department.

- **Fourth**, contact your state drinking water program if your water supplier is unable to provide the information you need. Ask if your water supplier is consistently in compliance with *both* primary and secondary drinking water regulations. Request a copy of monitoring results that were submitted to the state by your supplier. Your state drinking water program is usually located in the state capital (or another major city) and is often part of the department of health or environmental regulation. Consult the blue "government pages" of your local phone book for the proper address and phone number or call the Safe Drinking Water Hotline at 1-800-426-4791.
 - **Fifth**, support rate increases for your local water supplier, where necessary, to upgrade your supplier's treatment facilities to meet drinking water standards.
 - **Finally**, if you have a private well and you think that the well may be near a source of contamination or may have been contaminated—**have your water tested by a certified laboratory**. A list of certified labs is available from your state's laboratory certification officer. A list of the certification officers can be obtained from the calling the Safe Drinking Water Hotline.
-

For more information

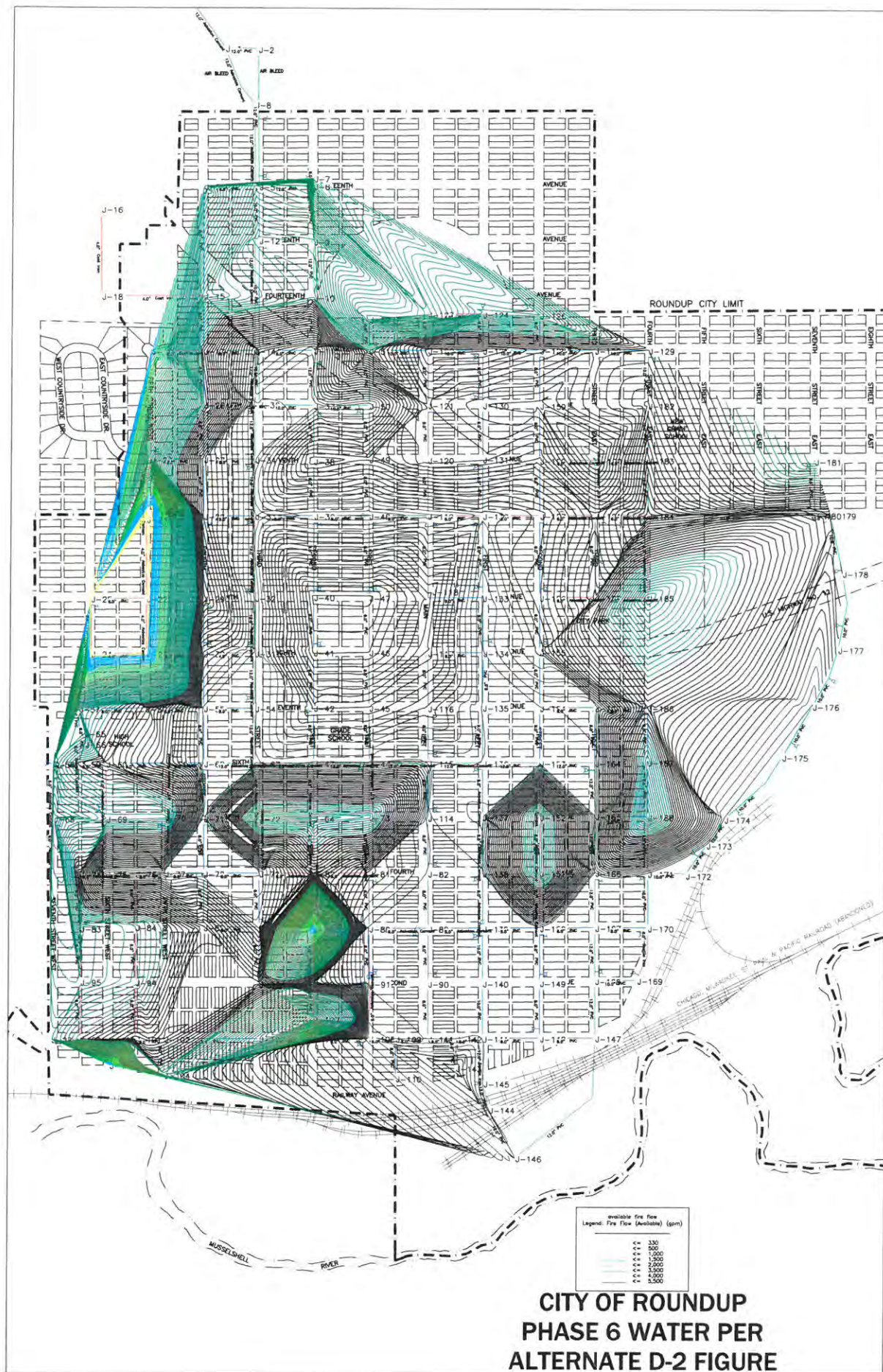
For more information on secondary contaminants contact the Safe Drinking Water Hotline at 1-800-426-4791. Ask:

- For a list of the primary and secondary contaminants
- About monitoring requirements for these contaminants
- For a list of the health advisories available for these contaminants

Last updated on November 23, 2015

Appendix I:

Water Modeling Results



Scenario: Phase 6 Alt D-2 Maximum Day
Current Time Step: 0.000 h
Fire Flow Node FlexTable: Fire Flow Report

Label	Satisfies Fire Flow Constraints?	Fire Flow (Available) (gpm)	Fire Flow (Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Is Fire Flow Run Balanced?
J-1	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-2	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-3	True	2,026	500	2,029	20	10	True
J-4	True	2,868	500	2,871	20	8	True
J-5	True	2,851	500	2,855	20	8	True
J-6	True	2,674	500	2,677	20	8	True
J-7	True	1,809	500	1,809	20	11	True
J-8	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-9	True	3,231	500	3,234	20	7	True
J-10	True	3,356	500	3,359	20	6	True
J-11	True	4,547	500	4,555	20	2	True
J-12	True	3,305	500	3,308	20	7	True
J-13	True	4,337	500	4,340	20	3	True
J-14	True	4,514	500	4,517	20	3	True
J-15	True	2,875	500	2,879	20	8	True
J-16	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-17	True	3,566	500	3,573	20	6	True
J-18	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-19	True	1,369	500	1,373	20	11	True
J-20	True	2,723	500	2,726	20	8	True
J-21	True	643	500	646	20	12	True
J-22	True	848	500	852	20	12	True
J-23	True	957	500	961	20	12	True
J-24	True	832	500	835	20	12	True
J-25	True	798	500	801	20	12	True
J-26	True	3,421	500	3,424	20	6	True
J-27	True	4,154	500	4,161	20	4	True
J-28	True	4,135	500	4,139	20	4	True
J-29	True	3,855	500	3,858	20	5	True
J-30	True	4,345	500	4,352	20	3	True
J-31	True	4,609	500	4,613	26	2	True
J-32	True	4,610	500	4,613	24	2	True
J-33	True	4,611	500	4,617	22	2	True
J-34	True	4,612	500	4,618	21	2	True
J-35	True	4,612	500	4,616	21	2	True
J-36	True	4,607	500	4,615	21	2	True
J-37	True	4,593	500	4,600	22	2	True
J-38	True	3,940	500	3,943	20	5	True
J-39	True	4,605	500	4,613	20	2	True
J-40	True	3,731	500	3,732	20	5	True
J-41	True	3,837	500	3,840	20	5	True
J-42	True	4,233	500	4,236	20	3	True
J-43	True	4,608	500	4,614	30	2	True
J-44	True	4,607	500	4,614	31	2	True
J-45	True	4,245	500	4,248	20	3	True
J-46	True	3,845	500	3,848	20	5	True
J-47	True	3,728	500	3,731	20	5	True
J-48	True	4,604	500	4,611	20	2	True
J-49	True	4,017	500	4,020	20	4	True
J-50	True	4,599	500	4,603	20	2	True
J-51	True	3,399	500	3,406	20	6	True
J-52	True	2,360	500	2,360	20	9	True
J-54	True	4,609	500	4,612	28	2	True
J-55	True	4,609	500	4,616	27	2	True

J-56	True	3,776	500	3,779	20	5	True
J-57	True	3,105	500	3,108	20	7	True
J-58	True	3,114	500	3,117	20	7	True
J-59	True	3,516	500	3,519	20	6	True
J-60	True	3,678	500	3,682	20	5	True
J-61	True	4,178	500	4,182	20	4	True
J-62	True	4,608	500	4,616	29	2	True
J-63	True	4,608	500	4,612	29	2	True
J-64	True	3,003	500	3,006	20	8	True
J-65	True	3,087	500	3,087	20	7	True
J-66	True	3,085	500	3,086	20	7	True
J-67	True	4,608	500	4,616	29	2	True
J-68	True	2,720	500	2,723	20	8	True
J-69	True	3,065	500	3,068	20	7	True
J-70	True	3,082	500	3,085	20	7	True
J-71	True	4,583	500	4,586	20	2	True
J-72	True	2,970	500	2,973	20	8	True
J-73	True	3,122	500	3,125	20	7	True
J-74	True	3,727	500	3,731	20	5	True
J-75	True	4,570	500	4,573	20	2	True
J-76	True	4,608	500	4,612	22	2	True
J-77	True	4,608	500	4,612	22	2	True
J-78	True	4,608	500	4,617	25	2	True
J-79	True	4,608	500	4,615	22	2	True
J-80	True	3,903	500	3,908	20	5	True
J-81	True	4,419	500	4,422	20	3	True
J-82	True	4,607	500	4,610	21	2	True
J-83	True	2,955	500	2,958	20	8	True
J-84	True	3,166	500	3,169	20	7	True
J-85	True	3,826	500	3,829	20	5	True
J-86	True	4,505	500	4,509	20	2	True
J-87	True	1,286	500	1,289	20	11	True
J-88	True	4,607	500	4,611	25	2	True
J-89	True	4,607	500	4,614	34	2	True
J-90	True	4,607	500	4,610	25	2	True
J-91	True	4,607	500	4,611	22	2	True
J-92	True	3,942	500	3,949	20	5	True
J-93	True	3,875	500	3,878	20	5	True
J-94	True	3,185	500	3,188	20	7	True
J-95	True	2,978	500	2,981	20	8	True
J-98	True	3,153	500	3,154	20	7	True
J-99	True	3,509	500	3,510	20	6	True
J-100	True	3,701	500	3,702	20	5	True
J-101	True	3,889	500	3,890	20	5	True
J-102	True	3,915	500	3,916	20	5	True
J-103	True	1,257	500	1,257	20	11	True
J-104	True	3,331	500	3,331	20	7	True
J-105	True	4,137	500	4,140	20	4	True
J-106	True	4,294	500	4,297	20	3	True
J-107	True	2,134	500	2,138	20	10	True
J-108	True	4,567	500	4,570	20	2	True
J-109	True	4,607	500	4,610	23	2	True
J-110	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-111	True	4,606	500	4,610	30	2	True
J-114	True	4,607	500	4,610	21	2	True
J-115	True	4,607	500	4,615	33	2	True
J-116	True	4,400	500	4,403	20	3	True
J-117	True	4,157	500	4,160	20	4	True
J-118	True	4,064	500	4,067	20	4	True
J-119	True	4,544	500	4,551	20	2	True
J-120	True	3,795	500	3,798	20	5	True
J-121	True	3,797	500	3,800	20	5	True
J-122	True	4,107	500	4,114	20	4	True
J-123	True	2,325	500	2,325	20	9	True
J-124	True	2,827	500	2,827	20	8	True
J-125	True	4,083	500	4,090	20	4	True
J-126	True	2,801	500	2,801	20	8	True

J-128	True	3,946	500	3,950	20	5	True
J-129	True	3,793	500	3,796	20	5	True
J-130	True	3,838	500	3,841	20	5	True
J-131	True	3,645	500	3,649	20	6	True
J-132	True	3,825	500	3,828	20	5	True
J-133	True	4,471	500	4,478	20	3	True
J-134	True	4,605	500	4,608	21	2	True
J-135	True	4,605	500	4,609	23	2	True
J-136	True	4,606	500	4,609	21	2	True
J-137	True	4,606	500	4,614	33	2	True
J-138	True	4,574	500	4,574	20	2	True
J-139	True	4,606	500	4,607	22	2	True
J-140	True	4,606	500	4,614	39	2	True
J-141	True	4,606	500	4,609	38	2	True
J-142	True	4,606	500	4,614	42	2	True
J-143	True	4,607	500	4,607	33	2	True
J-144	True	4,314	500	4,314	20	3	True
J-145	True	4,606	500	4,607	41	2	True
J-146	True	4,606	500	4,606	42	2	True
J-147	True	4,606	500	4,606	41	2	True
J-148	True	4,606	500	4,610	42	2	True
J-149	True	4,606	500	4,610	38	2	True
J-150	True	4,606	500	4,609	31	2	True
J-151	True	4,606	500	4,614	36	2	True
J-152	True	3,062	500	3,065	20	7	True
J-153	True	3,073	500	3,076	20	7	True
J-154	True	4,606	500	4,614	34	2	True
J-155	True	4,605	500	4,609	27	2	True
J-156	True	4,426	500	4,429	20	3	True
J-157	True	4,299	500	4,303	20	3	True
J-158	True	4,369	500	4,377	20	3	True
J-159	True	3,956	500	3,960	20	4	True
J-160	True	3,613	500	3,616	20	6	True
J-161	True	3,392	500	3,395	20	6	True
J-162	True	4,019	500	4,028	20	4	True
J-163	True	3,886	500	3,890	20	5	True
J-164	True	4,606	500	4,609	20	2	True
J-165	True	4,606	500	4,615	28	2	True
J-166	True	4,606	500	4,608	31	2	True
J-167	True	4,606	500	4,608	40	2	True
J-168	True	4,606	500	4,609	41	2	True
J-169	True	4,606	500	4,609	42	2	True
J-170	True	4,606	500	4,607	39	2	True
J-171	True	4,606	500	4,609	39	2	True
J-172	True	4,606	500	4,609	35	2	True
J-173	True	4,605	500	4,605	33	2	True
J-174	True	4,605	500	4,606	30	2	True
J-175	True	4,605	500	4,605	28	2	True
J-176	True	4,605	500	4,605	25	2	True
J-177	True	4,605	500	4,605	22	2	True
J-178	True	4,267	500	4,267	20	3	True
J-179	True	4,148	500	4,148	20	4	True
J-180	True	4,150	500	4,150	20	4	True
J-181	True	4,127	500	4,127	20	4	True
J-182	True	3,012	500	3,012	20	8	True
J-183	True	4,053	500	4,056	20	4	True
J-184	True	4,287	500	4,291	20	3	True
J-185	True	4,463	500	4,471	20	3	True
J-186	True	2,805	500	2,808	20	8	True
J-187	True	3,709	500	3,709	20	5	True
J-188	True	3,205	500	3,206	20	7	True
J-188	True	2,916	500	2,917	20	8	True

J:\2-13125 - Roundup On-Call 2013\TO-19 Phase 5 Water\CADD 2-13125 TO19\WaterCAD\2-13125-TO19 Hydraulic Model.wtg

Scenario: Phase 6 Alt D-2 Maximum Day
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	3,336.00	0	3,365.55	13
32	J-2	3,335.00	0	3,365.49	13
33	J-3	3,300.00	3	3,365.27	28
34	J-4	3,300.00	4	3,365.31	28
35	J-5	3,300.00	4	3,365.27	28
37	J-6	3,300.00	4	3,365.24	28
38	J-7	3,300.00	0	3,365.24	28
40	J-8	3,318.00	0	3,365.44	21
49	J-9	3,292.00	3	3,365.21	32
50	J-10	3,290.00	3	3,365.18	33
51	J-11	3,272.00	7	3,365.15	40
52	J-12	3,289.00	3	3,365.23	33
53	J-13	3,274.00	4	3,365.15	39
54	J-14	3,274.00	4	3,365.16	39
55	J-15	3,281.00	4	3,365.19	36
56	J-16	3,300.00	1	3,365.18	28
64	J-17	3,279.00	7	3,365.16	37
66	J-18	3,293.00	0	3,365.19	31
72	J-19	3,280.00	4	3,365.15	37
73	J-20	3,271.00	4	3,365.08	41
74	J-21	3,279.00	3	3,365.02	37
75	J-22	3,252.00	4	3,364.97	49
76	J-23	3,246.00	4	3,364.97	51
77	J-24	3,247.00	3	3,364.97	51
78	J-25	3,255.00	3	3,364.97	48
91	J-26	3,273.00	3	3,365.12	40
92	J-27	3,267.00	7	3,365.08	42
93	J-28	3,263.00	4	3,365.04	44
94	J-29	3,249.00	3	3,365.00	50
95	J-30	3,241.00	7	3,364.98	54
96	J-31	3,242.00	4	3,364.98	53
97	J-32	3,249.00	3	3,365.00	50
98	J-33	3,259.00	6	3,365.04	46
99	J-34	3,264.00	6	3,365.08	44
100	J-35	3,270.00	4	3,365.13	41
101	J-36	3,270.00	7	3,365.13	41
102	J-37	3,265.00	7	3,365.11	43
103	J-38	3,262.00	3	3,365.07	45
104	J-39	3,257.00	7	3,365.02	47
105	J-40	3,246.00	1	3,365.00	51
106	J-41	3,239.00	3	3,364.98	55
107	J-42	3,234.00	3	3,364.96	57
108	J-43	3,231.00	6	3,364.94	58
109	J-44	3,228.00	7	3,364.94	59
110	J-45	3,232.00	3	3,364.95	58
111	J-46	3,237.00	3	3,364.96	55
112	J-47	3,244.00	3	3,364.97	52
113	J-48	3,252.00	7	3,365.00	49
114	J-49	3,255.00	3	3,365.02	48
115	J-50	3,259.00	4	3,365.04	46
116	J-51	3,278.00	7	3,365.00	38
117	J-52	3,282.00	0	3,365.00	36
143	J-54	3,238.00	4	3,364.96	55
144	J-55	3,232.00	7	3,364.96	58
145	J-56	3,240.00	3	3,364.95	54
146	J-57	3,253.00	3	3,364.95	48
147	J-58	3,253.00	3	3,364.94	48

148	J-59	3,252.00	3	3,364.94	49
149	J-60	3,251.00	4	3,364.94	49
150	J-61	3,246.00	4	3,364.94	51
151	J-62	3,232.00	7	3,364.94	58
152	J-63	3,235.00	4	3,364.95	56
158	J-64	3,228.00	3	3,364.93	59
168	J-65	3,252.50	1	3,364.94	49
169	J-66	3,252.50	1	3,364.94	49
182	J-67	3,235.00	7	3,364.95	56
186	J-68	3,223.00	3	3,364.93	61
187	J-69	3,220.00	3	3,364.93	63
188	J-70	3,224.00	3	3,364.93	61
189	J-71	3,228.00	3	3,364.93	59
190	J-72	3,234.00	3	3,364.93	57
191	J-73	3,224.00	3	3,364.93	61
192	J-74	3,211.00	4	3,364.92	67
193	J-75	3,210.00	4	3,364.92	67
194	J-76	3,213.00	4	3,364.92	66
195	J-77	3,221.00	4	3,364.93	62
196	J-78	3,226.00	9	3,364.93	60
197	J-79	3,226.00	7	3,364.93	60
198	J-80	3,223.00	5	3,364.92	61
199	J-81	3,219.00	4	3,364.92	63
200	J-82	3,214.00	3	3,364.92	65
201	J-83	3,203.00	3	3,364.92	70
202	J-84	3,202.00	3	3,364.92	70
203	J-85	3,243.00	3	3,364.92	53
204	J-86	3,228.00	4	3,364.92	59
205	J-87	3,227.00	3	3,364.92	60
206	J-88	3,217.00	4	3,364.92	64
207	J-89	3,208.00	7	3,364.92	68
208	J-90	3,208.00	3	3,364.92	68
209	J-91	3,216.00	4	3,364.92	64
210	J-92	3,234.00	7	3,364.92	57
211	J-93	3,235.00	3	3,364.92	56
212	J-94	3,191.00	3	3,364.92	75
213	J-95	3,195.00	3	3,364.92	74
254	J-98	3,192.00	1	3,364.92	75
255	J-99	3,193.00	1	3,364.92	74
256	J-100	3,191.00	1	3,364.92	75
257	J-101	3,191.00	1	3,364.92	75
258	J-102	3,189.00	1	3,364.92	76
259	J-103	3,191.00	0	3,364.92	75
260	J-104	3,190.00	0	3,364.92	76
261	J-105	3,187.00	3	3,364.92	77
262	J-106	3,196.00	3	3,364.92	73
263	J-107	3,234.00	4	3,364.92	57
264	J-108	3,215.00	4	3,364.92	65
265	J-109	3,211.00	3	3,364.92	67
266	J-110	3,209.00	0	3,364.92	67
267	J-111	3,207.00	4	3,364.92	68
292	J-114	3,217.00	3	3,364.93	64
293	J-115	3,222.00	9	3,364.93	62
294	J-116	3,227.00	3	3,364.93	60
295	J-117	3,232.00	3	3,364.93	58
296	J-118	3,238.00	3	3,364.95	55
297	J-119	3,245.00	7	3,364.97	52
298	J-120	3,248.00	3	3,364.97	51
299	J-121	3,249.00	3	3,364.97	50
300	J-122	3,261.00	7	3,364.97	45
301	J-123	3,273.00	0	3,364.96	40
302	J-124	3,273.00	0	3,364.96	40
303	J-125	3,259.00	7	3,364.95	46
319	J-126	3,262.00	0	3,364.94	45
320	J-127	3,257.00	4	3,364.94	47
321	J-128	3,254.00	3	3,364.94	48
322	J-129	3,249.00	3	3,364.93	50

	J-130	3,251.00	4	3,364.95	49
324	J-131	3,243.00	3	3,364.95	53
325	J-132	3,239.00	7	3,364.95	54
326	J-133	3,233.00	3	3,364.95	57
327	J-134	3,226.00	4	3,364.93	60
328	J-135	3,224.00	3	3,364.93	61
329	J-136	3,220.00	7	3,364.93	63
330	J-137	3,213.00	1	3,364.92	66
331	J-138	3,204.00	1	3,364.92	70
332	J-139	3,197.00	7	3,364.92	73
333	J-140	3,195.00	3	3,364.92	74
334	J-141	3,190.00	7	3,364.92	76
335	J-142	3,200.00	0	3,364.92	71
336	J-143	3,199.00	1	3,364.92	72
337	J-144	3,187.00	1	3,364.92	77
338	J-145	3,187.00	0	3,364.92	77
339	J-146	3,186.00	0	3,364.92	77
340	J-147	3,189.00	4	3,364.92	76
341	J-148	3,190.00	4	3,364.92	76
342	J-149	3,192.00	3	3,364.92	75
343	J-150	3,199.00	7	3,364.92	72
344	J-151	3,206.00	3	3,364.92	69
345	J-152	3,207.00	3	3,364.92	68
346	J-153	3,215.00	7	3,364.92	65
347	J-154	3,217.00	4	3,364.92	64
348	J-155	3,221.00	3	3,364.92	62
349	J-156	3,229.00	4	3,364.93	59
350	J-157	3,235.00	7	3,364.93	56
351	J-158	3,242.00	4	3,364.93	53
352	J-159	3,250.00	3	3,364.94	50
353	J-160	3,239.00	4	3,364.93	54
354	J-161	3,232.00	9	3,364.93	58
355	J-162	3,223.00	4	3,364.93	61
356	J-163	3,225.00	3	3,364.92	61
357	J-164	3,226.00	9	3,364.92	60
358	J-165	3,217.00	2	3,364.92	64
359	J-166	3,197.00	2	3,364.92	73
360	J-167	3,196.00	3	3,364.92	73
361	J-168	3,191.00	3	3,364.92	75
362	J-169	3,184.00	1	3,364.92	78
363	J-170	3,181.00	3	3,364.92	80
364	J-171	3,184.00	3	3,364.92	78
365	J-172	3,181.00	0	3,364.92	80
366	J-173	3,182.00	1	3,364.92	79
367	J-174	3,183.00	0	3,364.92	79
368	J-175	3,183.00	0	3,364.92	79
369	J-176	3,189.00	0	3,364.92	76
370	J-177	3,208.00	0	3,364.92	68
371	J-178	3,215.00	0	3,364.92	65
372	J-179	3,218.00	0	3,364.93	64
373	J-180	3,220.00	0	3,364.93	63
374	J-181	3,223.00	0	3,364.93	61
446	J-182	3,241.00	3	3,364.93	54
447	J-183	3,235.00	4	3,364.93	56
448	J-184	3,228.00	9	3,364.93	59
449	J-185	3,222.00	3	3,364.93	62
450	J-186	3,216.00	1	3,364.92	64
451	J-187	3,214.00	1	3,364.92	65
452	J-188	3,212.00	1	3,364.92	66

J:\2-13125 - Roundup On-Call 2013\TO-19 Phase 5 Water\CADD 2-13125 TO19\WaterCAD\2-13125-TO19 Hydraulic Model.wtg

Scenario: Phase 6 Alt D-2 Maximum Day
Current Time Step: 0.000 h
FlexTable: Pipe Table

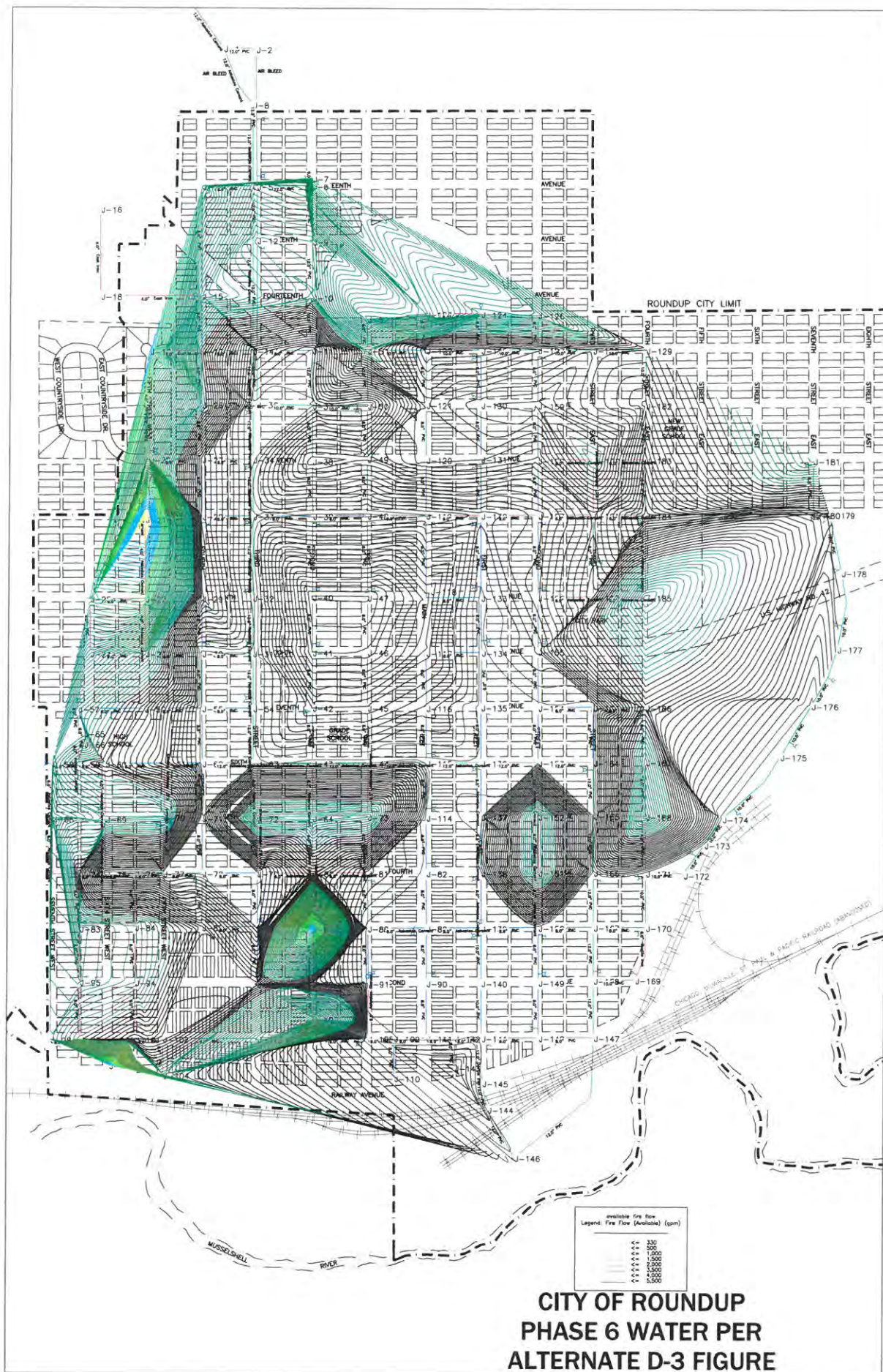
ID	Label	Length (Scaled) (ft)	Material	Start Node	Stop Node	Diameter (in)	Hazen- Williams C	Flow (gpm)	Velocity (ft/s)
41	P-1	467	Asbestos Cement	T-1	J-1	12.0	135.0	619	1.76
46	P-6	426	Asbestos Cement	J-1	J-8	12.0	135.0	293	0.83
47	P-7	542	Asbestos Cement	J-8	J-4	12.0	135.0	293	0.83
63	P-15	1,092	Asbestos Cement	J-4	J-14	12.0	135.0	214	0.61
84	P-22	720	Asbestos Cement	J-19	J-20	4.0	135.0	10	0.25
85	P-23	401	Asbestos Cement	J-20	J-21	4.0	135.0	12	0.32
86	P-24	526	Asbestos Cement	J-21	J-22	4.0	135.0	10	0.24
90	P-28	366	Asbestos Cement	J-22	J-23	4.0	135.0	1	0.03
127	P-38	368	Asbestos Cement	J-31	J-32	12.0	135.0	-141	0.40
129	P-39	544	Asbestos Cement	J-32	J-33	12.0	135.0	-144	0.41
133	P-43	376	Asbestos Cement	J-33	J-34	12.0	135.0	-186	0.53
134	P-44	366	Asbestos Cement	J-34	J-35	12.0	135.0	-204	0.58
136	P-46	356	Asbestos Cement	J-35	J-14	12.0	135.0	-183	0.52
159	P-58	366	Asbestos Cement	J-43	J-64	6.0	135.0	16	0.18
170	P-67	146	Asbestos Cement	J-59	J-66	6.0	135.0	-18	0.21
176	P-73	366	Asbestos Cement	J-31	J-54	12.0	135.0	134	0.38
177	P-74	365	Asbestos Cement	J-54	J-63	12.0	135.0	108	0.31
181	P-78	340	Asbestos Cement	J-62	J-63	12.0	135.0	-37	0.11
183	P-79	29	Asbestos Cement	J-63	J-67	12.0	135.0	67	0.19
184	P-80	363	Asbestos Cement	J-67	J-43	12.0	135.0	43	0.12
185	P-81	369	Asbestos Cement	J-43	J-44	12.0	135.0	64	0.18
214	P-82	364	Asbestos Cement	J-58	J-68	6.0	135.0	11	0.13
215	P-83	545	Asbestos Cement	J-68	J-74	6.0	135.0	8	0.09
216	P-84	366	Asbestos Cement	J-60	J-69	6.0	135.0	12	0.14
217	P-85	366	Asbestos Cement	J-69	J-75	6.0	135.0	9	0.11
218	P-86	172	Asbestos Cement	J-74	J-75	6.0	135.0	-4	0.05
221	P-89	357	Asbestos Cement	J-61	J-70	6.0	135.0	13	0.15
222	P-90	374	Asbestos Cement	J-70	J-77	6.0	135.0	10	0.12
229	P-96	365	Asbestos Cement	J-67	J-72	6.0	135.0	16	0.19
230	P-97	366	Asbestos Cement	J-72	J-79	6.0	135.0	13	0.15
231	P-98	368	Asbestos Cement	J-79	J-80	6.0	135.0	2	0.03
232	P-99	366	Asbestos Cement	J-64	J-80	6.0	135.0	13	0.14
233	P-100	363	Asbestos Cement	J-80	J-81	6.0	135.0	7	0.07
234	P-101	359	Asbestos Cement	J-44	J-73	6.0	135.0	14	0.16
235	P-102	373	Asbestos Cement	J-73	J-81	6.0	135.0	11	0.13
245	P-112	369	Asbestos Cement	J-80	J-87	4.0	135.0	3	0.08
246	P-113	365	Asbestos Cement	J-87	J-92	4.0	135.0	0	0.01
284	P-134	365	Asbestos Cement	J-91	J-108	6.0	135.0	4	0.05
291	P-141	390	Asbestos Cement	J-88	J-89	8.0	135.0	4	0.03
306	P-144	387	Asbestos Cement	J-44	J-115	12.0	135.0	77	0.22
383	P-165	364	Asbestos Cement	J-89	J-139	8.0	135.0	5	0.03
384	P-166	366	Asbestos Cement	J-139	J-138	8.0	135.0	-13	0.08
385	P-167	376	Asbestos Cement	J-138	J-137	8.0	135.0	-14	0.09
386	P-168	356	Asbestos Cement	J-137	J-136	8.0	135.0	-15	0.09
387	P-169	364	Asbestos Cement	J-115	J-136	12.0	135.0	54	0.15
403	P-185	369	Asbestos Cement	J-158	J-160	6.0	135.0	8	0.09
406	P-188	366	Asbestos Cement	J-157	J-161	6.0	135.0	8	0.09
408	P-190	366	Asbestos Cement	J-156	J-162	6.0	135.0	-1	0.01
415	P-197	358	Asbestos Cement	J-153	J-152	6.0	135.0	7	0.08
416	P-198	371	Asbestos Cement	J-152	J-151	6.0	135.0	4	0.05
417	P-199	367	Asbestos Cement	J-151	J-150	6.0	135.0	1	0.02
459	P-233	348	Asbestos Cement	J-162	J-185	6.0	135.0	1	0.01
461	P-235	545	Asbestos Cement	J-185	J-184	6.0	135.0	-2	0.03
462	P-236	349	Asbestos Cement	J-161	J-184	6.0	135.0	-1	0.01
464	P-238	366	Asbestos Cement	J-161	J-160	6.0	135.0	-6	0.06
466	P-240	345	Asbestos Cement	J-160	J-183	6.0	135.0	-2	0.02

67	P-17	672	Cast iron	J-15	J-18	4.0	100.0	1	0.04
68	P-18	578	Cast iron	J-18	J-16	4.0	100.0	1	0.04
83	P-21	345	Ductile Iron	J-17	J-19	6.0	130.0	14	0.15
377	P-159	299	Ductile Iron	J-145	J-141	12.0	130.0	6	0.02
432	P-214	362	Ductile Iron	J-169	J-170	6.0	130.0	-3	0.03
42	P-2	217	PVC	J-1	J-2	12.0	150.0	326	0.92
43	P-3	909	PVC	J-2	J-5	12.0	150.0	326	0.92
44	P-4	366	PVC	J-5	J-6	12.0	150.0	189	0.54
45	P-5	51	PVC	J-6	J-7	6.0	150.0	0	0.00
48	P-8	336	PVC	J-4	J-3	8.0	150.0	76	0.48
57	P-9	368	PVC	J-6	J-9	12.0	150.0	186	0.53
58	P-10	371	PVC	J-9	J-10	12.0	150.0	183	0.52
59	P-11	353	PVC	J-10	J-11	12.0	150.0	180	0.51
60	P-12	366	PVC	J-11	J-13	8.0	150.0	-22	0.14
61	P-13	733	PVC	J-13	J-12	10.0	150.0	-130	0.53
62	P-14	358	PVC	J-12	J-5	10.0	150.0	-133	0.54
65	P-16	726	PVC	J-3	J-15	8.0	150.0	73	0.46
81	P-19	366	PVC	J-15	J-17	8.0	150.0	68	0.43
82	P-20	339	PVC	J-14	J-17	8.0	150.0	27	0.17
87	P-25	366	PVC	J-22	J-25	6.0	150.0	5	0.05
88	P-26	365	PVC	J-25	J-24	6.0	150.0	2	0.02
89	P-27	366	PVC	J-24	J-23	4.0	150.0	-1	0.03
118	P-29	357	PVC	J-17	J-26	8.0	150.0	74	0.47
119	P-30	364	PVC	J-26	J-27	8.0	150.0	71	0.45
120	P-31	348	PVC	J-20	J-27	8.0	150.0	-6	0.04
121	P-32	341	PVC	J-27	J-34	8.0	150.0	-12	0.08
122	P-33	377	PVC	J-27	J-28	8.0	150.0	69	0.44
123	P-34	546	PVC	J-28	J-29	8.0	150.0	59	0.38
124	P-35	365	PVC	J-29	J-30	8.0	150.0	56	0.36
125	P-36	378	PVC	J-23	J-30	4.0	150.0	-4	0.10
126	P-37	339	PVC	J-30	J-31	4.0	150.0	-4	0.11
130	P-40	340	PVC	J-28	J-33	8.0	150.0	7	0.04
131	P-41	393	PVC	J-33	J-39	8.0	150.0	42	0.27
132	P-42	364	PVC	J-39	J-48	8.0	150.0	60	0.38
135	P-45	27	PVC	J-35	J-36	10.0	150.0	-25	0.10
137	P-47	356	PVC	J-13	J-36	10.0	150.0	104	0.43
138	P-48	366	PVC	J-36	J-37	10.0	150.0	72	0.29
139	P-49	366	PVC	J-11	J-37	12.0	150.0	194	0.55
140	P-50	366	PVC	J-37	J-50	10.0	150.0	180	0.74
141	P-51	366	PVC	J-50	J-51	10.0	150.0	123	0.50
142	P-52	209	PVC	J-51	J-52	8.0	150.0	0	0.00
153	P-53	367	PVC	J-37	J-38	8.0	150.0	78	0.50
154	P-54	365	PVC	J-38	J-39	8.0	150.0	75	0.48
155	P-55	538	PVC	J-39	J-40	8.0	150.0	50	0.32
156	P-56	368	PVC	J-41	J-42	8.0	150.0	46	0.29
157	P-57	368	PVC	J-42	J-43	8.0	150.0	43	0.27
160	P-59	368	PVC	J-44	J-45	8.0	150.0	-35	0.22
161	P-60	369	PVC	J-45	J-46	8.0	150.0	-38	0.24
162	P-61	362	PVC	J-46	J-47	8.0	150.0	-41	0.26
163	P-62	544	PVC	J-47	J-48	8.0	150.0	-44	0.28
164	P-63	377	PVC	J-48	J-49	8.0	150.0	-51	0.32
165	P-64	354	PVC	J-49	J-50	8.0	150.0	-54	0.34
166	P-65	174	PVC	J-58	J-59	8.0	150.0	-14	0.09
167	P-66	174	PVC	J-59	J-60	8.0	150.0	1	0.01
171	P-68	71	PVC	J-66	J-65	8.0	150.0	-19	0.12
172	P-69	179	PVC	J-65	J-57	8.0	150.0	-20	0.13
173	P-70	440	PVC	J-57	J-56	8.0	150.0	-23	0.14
174	P-71	340	PVC	J-55	J-54	8.0	150.0	-22	0.14
175	P-72	366	PVC	J-55	J-30	8.0	150.0	-49	0.31
178	P-75	396	PVC	J-60	J-61	8.0	150.0	-15	0.10
179	P-76	248	PVC	J-61	J-62	8.0	150.0	-32	0.20
180	P-77	366	PVC	J-62	J-55	8.0	150.0	-38	0.24
219	P-87	193	PVC	J-75	J-76	8.0	150.0	1	0.01
220	P-88	191	PVC	J-76	J-77	8.0	150.0	-12	0.07
223	P-91	260	PVC	J-77	J-78	8.0	150.0	-5	0.03
224	P-92	365	PVC	J-62	J-71	8.0	150.0	35	0.23
225	P-93	367	PVC	J-71	J-78	8.0	150.0	32	0.21

236	P-95	367	PVC	J-78	J-79	8.0	150.0	8	0.05
237	P-103	363	PVC	J-74	J-83	6.0	150.0	9	0.10
238	P-104	353	PVC	J-83	J-95	6.0	150.0	6	0.07
239	P-105	354	PVC	J-76	J-84	6.0	150.0	9	0.10
240	P-106	367	PVC	J-84	J-94	6.0	150.0	6	0.07
241	P-107	357	PVC	J-78	J-85	8.0	150.0	11	0.07
242	P-108	370	PVC	J-85	J-86	8.0	150.0	8	0.05
243	P-109	357	PVC	J-79	J-86	8.0	150.0	11	0.07
244	P-110	376	PVC	J-86	J-93	8.0	150.0	15	0.10
249	P-111	366	PVC	J-93	J-92	8.0	150.0	12	0.08
250	P-115	369	PVC	J-92	J-91	8.0	150.0	2	0.01
251	P-116	367	PVC	J-81	J-88	8.0	150.0	14	0.09
252	P-117	366	PVC	J-88	J-91	8.0	150.0	6	0.04
253	P-118	384	PVC	J-56	J-55	8.0	150.0	-26	0.16
258	P-119	368	PVC	J-40	J-41	8.0	150.0	49	0.31
268	P-120	382	PVC	J-95	J-99	6.0	150.0	3	0.03
269	P-121	194	PVC	J-98	J-99	8.0	150.0	-1	0.00
270	P-122	193	PVC	J-99	J-100	8.0	150.0	1	0.01
273	P-124	172	PVC	J-100	J-103	4.0	150.0	0	0.00
274	P-125	173	PVC	J-100	J-101	8.0	150.0	1	0.00
275	P-126	377	PVC	J-94	J-101	6.0	150.0	3	0.04
276	P-127	188	PVC	J-101	J-102	8.0	150.0	3	0.02
277	P-128	240	PVC	J-102	J-104	8.0	150.0	0	0.00
280	P-130	631	PVC	J-102	J-105	8.0	150.0	3	0.02
281	P-131	363	PVC	J-105	J-106	8.0	150.0	0	0.00
282	P-132	236	PVC	J-92	J-107	6.0	150.0	4	0.04
283	P-133	367	PVC	J-106	J-108	8.0	150.0	-3	0.02
285	P-135	175	PVC	J-108	J-109	8.0	150.0	-3	0.02
286	P-136	264	PVC	J-109	J-110	8.0	150.0	0	0.00
287	P-137	215	PVC	J-109	J-111	8.0	150.0	-6	0.04
288	P-138	365	PVC	J-111	J-90	8.0	150.0	-5	0.03
289	P-139	365	PVC	J-90	J-89	8.0	150.0	-8	0.05
290	P-140	365	PVC	J-89	J-82	8.0	150.0	-16	0.10
304	P-142	370	PVC	J-82	J-114	8.0	150.0	-19	0.12
305	P-143	363	PVC	J-114	J-115	8.0	150.0	-22	0.14
307	P-145	365	PVC	J-115	J-116	8.0	150.0	-7	0.04
308	P-146	367	PVC	J-116	J-117	8.0	150.0	-10	0.06
309	P-147	545	PVC	J-118	J-119	8.0	150.0	-34	0.22
310	P-148	389	PVC	J-48	J-119	8.0	150.0	59	0.38
311	P-149	372	PVC	J-119	J-120	8.0	150.0	-6	0.04
312	P-150	363	PVC	J-120	J-121	8.0	150.0	-9	0.06
313	P-151	363	PVC	J-121	J-122	8.0	150.0	-12	0.08
314	P-152	390	PVC	J-51	J-122	10.0	150.0	115	0.47
315	P-153	240	PVC	J-122	J-123	6.0	150.0	15	0.17
316	P-154	364	PVC	J-123	J-124	6.0	150.0	15	0.17
317	P-155	241	PVC	J-124	J-125	8.0	150.0	15	0.10
318	P-156	365	PVC	J-122	J-125	10.0	150.0	81	0.33
375	P-157	367	PVC	J-146	J-144	12.0	150.0	6	0.02
376	P-158	178	PVC	J-144	J-145	12.0	150.0	6	0.02
378	P-160	186	PVC	J-111	J-142	8.0	150.0	-5	0.03
379	P-161	177	PVC	J-142	J-141	8.0	150.0	-5	0.03
380	P-162	196	PVC	J-142	J-143	8.0	150.0	1	0.00
381	P-163	366	PVC	J-141	J-140	10.0	150.0	-5	0.02
382	P-164	366	PVC	J-140	J-139	10.0	150.0	-8	0.03
388	P-170	369	PVC	J-136	J-135	8.0	150.0	-18	0.11
389	P-171	362	PVC	J-135	J-134	8.0	150.0	-21	0.13
390	P-172	367	PVC	J-117	J-134	8.0	150.0	-13	0.08
391	P-173	366	PVC	J-134	J-133	8.0	150.0	-38	0.24
392	P-174	364	PVC	J-118	J-133	8.0	150.0	31	0.20
393	P-175	545	PVC	J-133	J-132	8.0	150.0	-10	0.06
394	P-176	365	PVC	J-119	J-132	6.0	150.0	24	0.28
395	P-177	377	PVC	J-132	J-131	8.0	150.0	-13	0.09
396	P-178	359	PVC	J-131	J-130	8.0	150.0	-16	0.10
397	P-179	363	PVC	J-130	J-125	8.0	150.0	-20	0.13
398	P-180	377	PVC	J-125	J-127	10.0	150.0	68	0.28
399	P-181	233	PVC	J-126	J-127	8.0	150.0	0	0.00
400	P-182	362	PVC	J-127	J-128	10.0	150.0	39	0.16

	P-183	368	PVC	J-127	J-159	8.0	150.0	26	0.16
402	P-184	364	PVC	J-159	J-158	8.0	150.0	23	0.15
404	P-186	366	PVC	J-158	J-157	8.0	150.0	11	0.07
405	P-187	378	PVC	J-132	J-157	6.0	150.0	21	0.23
407	P-189	545	PVC	J-157	J-156	8.0	150.0	17	0.11
409	P-191	358	PVC	J-156	J-155	8.0	150.0	14	0.09
410	P-192	374	PVC	J-155	J-154	8.0	150.0	11	0.07
411	P-193	366	PVC	J-154	J-163	8.0	150.0	10	0.06
412	P-194	366	PVC	J-154	J-153	8.0	150.0	-3	0.02
413	P-195	378	PVC	J-136	J-153	12.0	150.0	50	0.14
414	P-196	364	PVC	J-153	J-164	12.0	150.0	32	0.09
418	P-200	378	PVC	J-139	J-150	8.0	150.0	2	0.01
419	P-201	366	PVC	J-150	J-167	8.0	150.0	-8	0.05
420	P-202	365	PVC	J-150	J-149	8.0	150.0	4	0.03
421	P-203	368	PVC	J-149	J-148	8.0	150.0	1	0.01
422	P-204	378	PVC	J-148	J-141	8.0	150.0	2	0.01
423	P-205	366	PVC	J-148	J-147	8.0	150.0	-5	0.03
424	P-206	1,047	PVC	J-146	J-147	12.0	150.0	-6	0.02
425	P-207	381	PVC	J-147	J-168	12.0	150.0	-15	0.04
426	P-208	278	PVC	J-168	J-169	10.0	150.0	-2	0.01
427	P-209	353	PVC	J-168	J-167	12.0	150.0	-16	0.04
428	P-210	364	PVC	J-167	J-166	12.0	150.0	-22	0.06
429	P-211	378	PVC	J-166	J-165	12.0	150.0	-24	0.07
430	P-212	352	PVC	J-165	J-164	12.0	150.0	-26	0.07
431	P-213	366	PVC	J-164	J-163	8.0	150.0	-3	0.02
433	P-215	347	PVC	J-167	J-170	8.0	150.0	-5	0.03
434	P-216	362	PVC	J-170	J-171	10.0	150.0	-11	0.04
435	P-217	254	PVC	J-171	J-172	10.0	150.0	-12	0.05
436	P-218	245	PVC	J-172	J-173	10.0	150.0	-12	0.05
437	P-219	210	PVC	J-173	J-174	10.0	150.0	-13	0.05
438	P-220	567	PVC	J-174	J-175	10.0	150.0	-13	0.05
439	P-221	392	PVC	J-175	J-176	10.0	150.0	-13	0.05
440	P-222	413	PVC	J-176	J-177	10.0	150.0	-13	0.05
441	P-223	515	PVC	J-177	J-178	10.0	150.0	-13	0.05
442	P-224	397	PVC	J-178	J-179	10.0	150.0	-13	0.05
443	P-225	357	PVC	J-181	J-180	8.0	150.0	0	0.00
444	P-226	101	PVC	J-179	J-180	10.0	150.0	-13	0.05
445	P-227	356	PVC	J-128	J-129	10.0	150.0	36	0.15
453	P-228	377	PVC	J-171	J-188	4.0	150.0	-2	0.04
456	P-230	362	PVC	J-188	J-187	8.0	150.0	-2	0.02
457	P-231	362	PVC	J-187	J-186	8.0	150.0	-3	0.02
458	P-232	348	PVC	J-186	J-163	8.0	150.0	-4	0.03
460	P-234	544	PVC	J-162	J-161	8.0	150.0	-5	0.03
463	P-237	1,104	PVC	J-184	J-180	10.0	150.0	13	0.05
465	P-239	367	PVC	J-184	J-183	10.0	150.0	-24	0.10
467	P-241	364	PVC	J-183	J-182	10.0	150.0	-30	0.12
468	P-242	365	PVC	J-182	J-129	10.0	150.0	-33	0.13
516	P-244	348	PVC	J-188	J-165	8.0	150.0	(N/A)	(N/A)

J:\2-13125 - Roundup On-Call 2013\TO-19 Phase 5 Water\CADD 2-13125 TO19\WaterCAD\2-13125-TO19 Hydraulic Model.wtg



Scenario: Phase 6 Alt D-3 Maximum Day
Current Time Step: 0.000 h
Fire Flow Node FlexTable: Fire Flow Report

Label	Satisfies Fire Flow Constraints?	Fire Flow (Available) (gpm)	Fire Flow (Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Is Fire Flow Run Balanced?
J-1	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-2	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-3	True	2,027	500	2,030	20	10	True
J-4	True	2,868	500	2,871	20	8	True
J-5	True	2,851	500	2,855	20	8	True
J-6	True	2,674	500	2,677	20	8	True
J-7	True	1,809	500	1,809	20	11	True
J-8	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-9	True	3,231	500	3,234	20	7	True
J-10	True	3,356	500	3,359	20	6	True
J-11	True	4,547	500	4,555	20	2	True
J-12	True	3,305	500	3,308	20	7	True
J-13	True	4,337	500	4,340	20	3	True
J-14	True	4,514	500	4,517	20	3	True
J-15	True	2,876	500	2,880	20	8	True
J-16	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-17	True	3,567	500	3,574	20	6	True
J-18	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-19	True	1,370	500	1,373	20	11	True
J-20	True	2,747	500	2,751	20	8	True
J-21	True	718	500	721	20	12	True
J-22	True	1,731	500	1,735	20	11	True
J-23	True	3,123	500	3,126	20	7	True
J-24	True	2,583	500	2,586	20	9	True
J-25	True	1,837	500	1,840	20	10	True
J-26	True	3,423	500	3,426	20	6	True
J-27	True	4,163	500	4,171	20	4	True
J-28	True	4,156	500	4,159	20	4	True
J-29	True	4,013	500	4,016	20	4	True
J-30	True	4,610	500	4,617	23	2	True
J-31	True	4,609	500	4,613	27	2	True
J-32	True	4,610	500	4,613	24	2	True
J-33	True	4,611	500	4,617	22	2	True
J-34	True	4,612	500	4,618	21	2	True
J-35	True	4,612	500	4,616	21	2	True
J-36	True	4,607	500	4,615	21	2	True
J-37	True	4,593	500	4,600	22	2	True
J-38	True	3,940	500	3,943	20	5	True
J-39	True	4,605	500	4,613	20	2	True
J-40	True	3,731	500	3,733	20	5	True
J-41	True	3,837	500	3,840	20	5	True
J-42	True	4,233	500	4,236	20	3	True
J-43	True	4,608	500	4,614	30	2	True
J-44	True	4,607	500	4,615	31	2	True
J-45	True	4,246	500	4,249	20	3	True
J-46	True	3,845	500	3,848	20	5	True
J-47	True	3,728	500	3,731	20	5	True
J-48	True	4,604	500	4,611	20	2	True
J-49	True	4,018	500	4,021	20	4	True
J-50	True	4,599	500	4,603	20	2	True
J-51	True	3,399	500	3,407	20	6	True
J-52	True	2,360	500	2,360	20	9	True
J-54	True	4,609	500	4,613	28	2	True
J-55	True	4,608	500	4,616	28	2	True

J-56	True	3,782	500	3,785	20	5	True
J-57	True	3,107	500	3,110	20	7	True
J-58	True	3,116	500	3,119	20	7	True
J-59	True	3,518	500	3,521	20	6	True
J-60	True	3,680	500	3,683	20	5	True
J-61	True	4,180	500	4,183	20	4	True
J-62	True	4,608	500	4,616	29	2	True
J-63	True	4,608	500	4,612	29	2	True
J-64	True	3,004	500	3,007	20	8	True
J-65	True	3,089	500	3,090	20	7	True
J-66	True	3,087	500	3,088	20	7	True
J-67	True	4,608	500	4,616	29	2	True
J-68	True	2,721	500	2,724	20	8	True
J-69	True	3,065	500	3,068	20	7	True
J-70	True	3,083	500	3,086	20	7	True
J-71	True	4,585	500	4,588	20	2	True
J-72	True	2,971	500	2,974	20	8	True
J-73	True	3,123	500	3,126	20	7	True
J-74	True	3,728	500	3,732	20	5	True
J-75	True	4,571	500	4,575	20	2	True
J-76	True	4,608	500	4,612	22	2	True
J-77	True	4,608	500	4,612	22	2	True
J-78	True	4,608	500	4,617	25	2	True
J-79	True	4,608	500	4,615	22	2	True
J-80	True	3,904	500	3,909	20	5	True
J-81	True	4,419	500	4,423	20	3	True
J-82	True	4,607	500	4,610	21	2	True
J-83	True	2,955	500	2,958	20	8	True
J-84	True	3,167	500	3,170	20	7	True
J-85	True	3,827	500	3,830	20	5	True
J-86	True	4,507	500	4,510	20	2	True
J-87	True	1,286	500	1,289	20	11	True
J-88	True	4,607	500	4,611	25	2	True
J-89	True	4,607	500	4,614	34	2	True
J-90	True	4,607	500	4,610	25	2	True
J-91	True	4,607	500	4,611	22	2	True
J-92	True	3,943	500	3,950	20	5	True
J-93	True	3,876	500	3,879	20	5	True
J-94	True	3,185	500	3,188	20	7	True
J-95	True	2,978	500	2,981	20	8	True
J-98	True	3,153	500	3,154	20	7	True
J-99	True	3,509	500	3,510	20	6	True
J-100	True	3,702	500	3,702	20	5	True
J-101	True	3,890	500	3,890	20	5	True
J-102	True	3,916	500	3,916	20	5	True
J-103	True	1,257	500	1,257	20	11	True
J-104	True	3,331	500	3,331	20	7	True
J-105	True	4,137	500	4,140	20	4	True
J-106	True	4,294	500	4,297	20	3	True
J-107	True	2,134	500	2,138	20	10	True
J-108	True	4,567	500	4,571	20	2	True
J-109	True	4,607	500	4,610	23	2	True
J-110	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-111	True	4,606	500	4,610	30	2	True
J-114	True	4,607	500	4,610	21	2	True
J-115	True	4,607	500	4,616	33	2	True
J-116	True	4,401	500	4,404	20	3	True
J-117	True	4,158	500	4,161	20	4	True
J-118	True	4,065	500	4,068	20	4	True
J-119	True	4,545	500	4,552	20	2	True
J-120	True	3,796	500	3,799	20	5	True
J-121	True	3,798	500	3,801	20	5	True
J-122	True	4,107	500	4,114	20	4	True
J-123	True	2,326	500	2,326	20	9	True
J-124	True	2,828	500	2,828	20	8	True
J-125	True	4,083	500	4,091	20	4	True
J-126	True	2,801	500	2,801	20	8	True

J-128	True	3,947	500	3,951	20	5	True
J-129	True	3,793	500	3,796	20	5	True
J-130	True	3,839	500	3,842	20	5	True
J-131	True	3,645	500	3,649	20	6	True
J-132	True	3,826	500	3,829	20	5	True
J-133	True	4,471	500	4,479	20	3	True
J-134	True	4,605	500	4,608	21	2	True
J-135	True	4,605	500	4,609	23	2	True
J-136	True	4,606	500	4,609	21	2	True
J-137	True	4,606	500	4,614	33	2	True
J-138	True	4,574	500	4,575	20	2	True
J-139	True	4,606	500	4,607	22	2	True
J-140	True	4,607	500	4,614	39	2	True
J-141	True	4,606	500	4,609	38	2	True
J-142	True	4,606	500	4,614	42	2	True
J-143	True	4,607	500	4,607	33	2	True
J-144	True	4,314	500	4,315	20	3	True
J-145	True	4,606	500	4,607	41	2	True
J-146	True	4,606	500	4,606	42	2	True
J-147	True	4,606	500	4,606	41	2	True
J-148	True	4,606	500	4,610	42	2	True
J-149	True	4,606	500	4,610	38	2	True
J-150	True	4,606	500	4,609	31	2	True
J-151	True	4,606	500	4,614	36	2	True
J-152	True	3,062	500	3,065	20	7	True
J-153	True	3,073	500	3,076	20	7	True
J-154	True	4,606	500	4,614	34	2	True
J-155	True	4,606	500	4,609	27	2	True
J-156	True	4,427	500	4,430	20	3	True
J-157	True	4,300	500	4,304	20	3	True
J-158	True	4,370	500	4,377	20	3	True
J-159	True	3,957	500	3,961	20	4	True
J-160	True	3,613	500	3,616	20	6	True
J-161	True	3,392	500	3,396	20	6	True
J-162	True	4,020	500	4,029	20	4	True
J-163	True	3,887	500	3,890	20	5	True
J-164	True	4,606	500	4,609	20	2	True
J-165	True	4,606	500	4,615	28	2	True
J-166	True	4,606	500	4,608	31	2	True
J-167	True	4,606	500	4,608	40	2	True
J-168	True	4,606	500	4,609	41	2	True
J-169	True	4,606	500	4,609	42	2	True
J-170	True	4,606	500	4,607	39	2	True
J-171	True	4,606	500	4,609	39	2	True
J-172	True	4,606	500	4,609	35	2	True
J-173	True	4,606	500	4,606	33	2	True
J-174	True	4,605	500	4,606	30	2	True
J-175	True	4,605	500	4,605	28	2	True
J-176	True	4,605	500	4,605	25	2	True
J-177	True	4,605	500	4,605	22	2	True
J-178	True	4,268	500	4,268	20	3	True
J-179	True	4,149	500	4,149	20	4	True
J-180	True	4,150	500	4,150	20	4	True
J-181	True	4,127	500	4,127	20	4	True
J-182	True	3,012	500	3,012	20	8	True
J-183	True	4,053	500	4,056	20	4	True
J-184	True	4,287	500	4,291	20	3	True
J-185	True	4,463	500	4,472	20	3	True
J-186	True	2,805	500	2,808	20	8	True
J-187	True	3,709	500	3,710	20	5	True
J-188	True	3,205	500	3,206	20	7	True
J-188	True	2,916	500	2,917	20	8	True

J:\2-13125 - Roundup On-Call 2013\TO-19 Phase 5 Water\CADD 2-13125 TO19\WaterCAD\2-13125-TO19 Hydraulic Model.wtg

Scenario: Phase 6 Alt D-3 Maximum Day
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	3,336.00	0	3,365.55	13
32	J-2	3,335.00	0	3,365.49	13
33	J-3	3,300.00	3	3,365.27	28
34	J-4	3,300.00	4	3,365.31	28
35	J-5	3,300.00	4	3,365.27	28
37	J-6	3,300.00	4	3,365.24	28
38	J-7	3,300.00	0	3,365.24	28
40	J-8	3,318.00	0	3,365.44	21
49	J-9	3,292.00	3	3,365.21	32
50	J-10	3,290.00	3	3,365.18	33
51	J-11	3,272.00	7	3,365.15	40
52	J-12	3,289.00	3	3,365.23	33
53	J-13	3,274.00	4	3,365.15	39
54	J-14	3,274.00	4	3,365.16	39
55	J-15	3,281.00	4	3,365.19	36
56	J-16	3,300.00	1	3,365.18	28
64	J-17	3,279.00	7	3,365.16	37
66	J-18	3,293.00	0	3,365.19	31
72	J-19	3,280.00	4	3,365.15	37
73	J-20	3,271.00	4	3,365.08	41
74	J-21	3,279.00	3	3,365.02	37
75	J-22	3,252.00	4	3,364.98	49
76	J-23	3,246.00	4	3,364.98	51
77	J-24	3,247.00	3	3,364.98	51
78	J-25	3,255.00	3	3,364.98	48
91	J-26	3,273.00	3	3,365.12	40
92	J-27	3,267.00	7	3,365.08	42
93	J-28	3,263.00	4	3,365.04	44
94	J-29	3,249.00	3	3,365.00	50
95	J-30	3,241.00	7	3,364.98	54
96	J-31	3,242.00	4	3,364.98	53
97	J-32	3,249.00	3	3,365.00	50
98	J-33	3,259.00	6	3,365.04	46
99	J-34	3,264.00	6	3,365.08	44
100	J-35	3,270.00	4	3,365.13	41
101	J-36	3,270.00	7	3,365.13	41
102	J-37	3,265.00	7	3,365.11	43
103	J-38	3,262.00	3	3,365.07	45
104	J-39	3,257.00	7	3,365.02	47
105	J-40	3,246.00	1	3,364.99	51
106	J-41	3,239.00	3	3,364.98	55
107	J-42	3,234.00	3	3,364.96	57
108	J-43	3,231.00	6	3,364.94	58
109	J-44	3,228.00	7	3,364.94	59
110	J-45	3,232.00	3	3,364.95	58
111	J-46	3,237.00	3	3,364.96	55
112	J-47	3,244.00	3	3,364.97	52
113	J-48	3,252.00	7	3,365.00	49
114	J-49	3,255.00	3	3,365.02	48
115	J-50	3,259.00	4	3,365.04	46
116	J-51	3,278.00	7	3,365.00	38
117	J-52	3,282.00	0	3,365.00	36
143	J-54	3,238.00	4	3,364.96	55
144	J-55	3,232.00	7	3,364.96	58
145	J-56	3,240.00	3	3,364.95	54
146	J-57	3,253.00	3	3,364.95	48
147	J-58	3,253.00	3	3,364.94	48

148	J-59	3,252.00	3	3,364.94	49
149	J-60	3,251.00	4	3,364.94	49
150	J-61	3,246.00	4	3,364.94	51
151	J-62	3,232.00	7	3,364.94	58
152	J-63	3,235.00	4	3,364.95	56
158	J-64	3,228.00	3	3,364.93	59
168	J-65	3,252.50	1	3,364.94	49
169	J-66	3,252.50	1	3,364.94	49
182	J-67	3,235.00	7	3,364.95	56
186	J-68	3,223.00	3	3,364.93	61
187	J-69	3,220.00	3	3,364.93	63
188	J-70	3,224.00	3	3,364.93	61
189	J-71	3,228.00	3	3,364.93	59
190	J-72	3,234.00	3	3,364.93	57
191	J-73	3,224.00	3	3,364.93	61
192	J-74	3,211.00	4	3,364.92	67
193	J-75	3,210.00	4	3,364.92	67
194	J-76	3,213.00	4	3,364.92	66
195	J-77	3,221.00	4	3,364.93	62
196	J-78	3,226.00	9	3,364.93	60
197	J-79	3,226.00	7	3,364.92	60
198	J-80	3,223.00	5	3,364.92	61
199	J-81	3,219.00	4	3,364.92	63
200	J-82	3,214.00	3	3,364.92	65
201	J-83	3,203.00	3	3,364.92	70
202	J-84	3,202.00	3	3,364.92	70
203	J-85	3,243.00	3	3,364.92	53
204	J-86	3,228.00	4	3,364.92	59
205	J-87	3,227.00	3	3,364.92	60
206	J-88	3,217.00	4	3,364.92	64
207	J-89	3,208.00	7	3,364.92	68
208	J-90	3,208.00	3	3,364.92	68
209	J-91	3,216.00	4	3,364.92	64
210	J-92	3,234.00	7	3,364.92	57
211	J-93	3,235.00	3	3,364.92	56
212	J-94	3,191.00	3	3,364.92	75
213	J-95	3,195.00	3	3,364.92	74
254	J-98	3,192.00	1	3,364.92	75
255	J-99	3,193.00	1	3,364.92	74
256	J-100	3,191.00	1	3,364.92	75
257	J-101	3,191.00	1	3,364.92	75
258	J-102	3,189.00	1	3,364.92	76
259	J-103	3,191.00	0	3,364.92	75
260	J-104	3,190.00	0	3,364.92	76
261	J-105	3,187.00	3	3,364.92	77
262	J-106	3,196.00	3	3,364.92	73
263	J-107	3,234.00	4	3,364.92	57
264	J-108	3,215.00	4	3,364.92	65
265	J-109	3,211.00	3	3,364.92	67
266	J-110	3,209.00	0	3,364.92	67
267	J-111	3,207.00	4	3,364.92	68
292	J-114	3,217.00	3	3,364.93	64
293	J-115	3,222.00	9	3,364.93	62
294	J-116	3,227.00	3	3,364.93	60
295	J-117	3,232.00	3	3,364.93	58
296	J-118	3,238.00	3	3,364.95	55
297	J-119	3,245.00	7	3,364.97	52
298	J-120	3,248.00	3	3,364.97	51
299	J-121	3,249.00	3	3,364.97	50
300	J-122	3,261.00	7	3,364.97	45
301	J-123	3,273.00	0	3,364.96	40
302	J-124	3,273.00	0	3,364.96	40
303	J-125	3,259.00	7	3,364.95	46
319	J-126	3,262.00	0	3,364.94	45
320	J-127	3,257.00	4	3,364.94	47
321	J-128	3,254.00	3	3,364.94	48
322	J-129	3,249.00	3	3,364.93	50

	J-130	3,251.00	4	3,364.95	49
324	J-131	3,243.00	3	3,364.95	53
325	J-132	3,239.00	7	3,364.95	54
326	J-133	3,233.00	3	3,364.95	57
327	J-134	3,226.00	4	3,364.93	60
328	J-135	3,224.00	3	3,364.93	61
329	J-136	3,220.00	7	3,364.93	63
330	J-137	3,213.00	1	3,364.92	66
331	J-138	3,204.00	1	3,364.92	70
332	J-139	3,197.00	7	3,364.92	73
333	J-140	3,195.00	3	3,364.92	74
334	J-141	3,190.00	7	3,364.92	76
335	J-142	3,200.00	0	3,364.92	71
336	J-143	3,199.00	1	3,364.92	72
337	J-144	3,187.00	1	3,364.92	77
338	J-145	3,187.00	0	3,364.92	77
339	J-146	3,186.00	0	3,364.92	77
340	J-147	3,189.00	4	3,364.92	76
341	J-148	3,190.00	4	3,364.92	76
342	J-149	3,192.00	3	3,364.92	75
343	J-150	3,199.00	7	3,364.92	72
344	J-151	3,206.00	3	3,364.92	69
345	J-152	3,207.00	3	3,364.92	68
346	J-153	3,215.00	7	3,364.92	65
347	J-154	3,217.00	4	3,364.92	64
348	J-155	3,221.00	3	3,364.92	62
349	J-156	3,229.00	4	3,364.93	59
350	J-157	3,235.00	7	3,364.93	56
351	J-158	3,242.00	4	3,364.93	53
352	J-159	3,250.00	3	3,364.94	50
353	J-160	3,239.00	4	3,364.93	54
354	J-161	3,232.00	9	3,364.93	58
355	J-162	3,223.00	4	3,364.93	61
356	J-163	3,225.00	3	3,364.92	61
357	J-164	3,226.00	9	3,364.92	60
358	J-165	3,217.00	2	3,364.92	64
359	J-166	3,197.00	2	3,364.92	73
360	J-167	3,196.00	3	3,364.92	73
361	J-168	3,191.00	3	3,364.92	75
362	J-169	3,184.00	1	3,364.92	78
363	J-170	3,181.00	3	3,364.92	80
364	J-171	3,184.00	3	3,364.92	78
365	J-172	3,181.00	0	3,364.92	80
366	J-173	3,182.00	1	3,364.92	79
367	J-174	3,183.00	0	3,364.92	79
368	J-175	3,183.00	0	3,364.92	79
369	J-176	3,189.00	0	3,364.92	76
370	J-177	3,208.00	0	3,364.92	68
371	J-178	3,215.00	0	3,364.92	65
372	J-179	3,218.00	0	3,364.93	64
373	J-180	3,220.00	0	3,364.93	63
374	J-181	3,223.00	0	3,364.93	61
446	J-182	3,241.00	3	3,364.93	54
447	J-183	3,235.00	4	3,364.93	56
448	J-184	3,228.00	9	3,364.93	59
449	J-185	3,222.00	3	3,364.93	62
450	J-186	3,216.00	1	3,364.92	64
451	J-187	3,214.00	1	3,364.92	65
452	J-188	3,212.00	1	3,364.92	66

J:\2-13125 - Roundup On-Call 2013\TO-19 Phase 5 Water\CADD 2-13125 TO19\WaterCAD\2-13125-TO19 Hydraulic Model.wtg

Scenario: Phase 6 Alt D-3 Maximum Day
Current Time Step: 0.000 h
FlexTable: Pipe Table

ID	Label	Length (Scaled) (ft)	Material	Start Node	Stop Node	Diameter (in)	Hazen- Williams C	Flow (gpm)	Velocity (ft/s)
41	P-1	467	Asbestos Cement	T-1	J-1	12.0	135.0	619	1.76
46	P-6	426	Asbestos Cement	J-1	J-8	12.0	135.0	293	0.83
47	P-7	542	Asbestos Cement	J-8	J-4	12.0	135.0	293	0.83
63	P-15	1,092	Asbestos Cement	J-4	J-14	12.0	135.0	214	0.61
84	P-22	720	Asbestos Cement	J-19	J-20	4.0	135.0	10	0.25
85	P-23	401	Asbestos Cement	J-20	J-21	4.0	135.0	12	0.31
86	P-24	526	Asbestos Cement	J-21	J-22	4.0	135.0	9	0.23
90	P-28	366	Asbestos Cement	J-22	J-23	4.0	135.0	1	0.03
127	P-38	368	Asbestos Cement	J-31	J-32	12.0	135.0	-143	0.41
129	P-39	544	Asbestos Cement	J-32	J-33	12.0	135.0	-146	0.42
133	P-43	376	Asbestos Cement	J-33	J-34	12.0	135.0	-186	0.53
134	P-44	366	Asbestos Cement	J-34	J-35	12.0	135.0	-204	0.58
136	P-46	356	Asbestos Cement	J-35	J-14	12.0	135.0	-183	0.52
159	P-58	366	Asbestos Cement	J-43	J-64	6.0	135.0	16	0.18
170	P-67	146	Asbestos Cement	J-59	J-66	6.0	135.0	-18	0.21
176	P-73	366	Asbestos Cement	J-31	J-54	12.0	135.0	130	0.37
177	P-74	365	Asbestos Cement	J-54	J-63	12.0	135.0	107	0.30
181	P-78	340	Asbestos Cement	J-62	J-63	12.0	135.0	-36	0.10
183	P-79	29	Asbestos Cement	J-63	J-67	12.0	135.0	67	0.19
184	P-80	363	Asbestos Cement	J-67	J-43	12.0	135.0	43	0.12
185	P-81	369	Asbestos Cement	J-43	J-44	12.0	135.0	64	0.18
214	P-82	364	Asbestos Cement	J-58	J-68	6.0	135.0	11	0.13
215	P-83	545	Asbestos Cement	J-68	J-74	6.0	135.0	8	0.09
216	P-84	366	Asbestos Cement	J-60	J-69	6.0	135.0	12	0.14
217	P-85	366	Asbestos Cement	J-69	J-75	6.0	135.0	9	0.11
218	P-86	172	Asbestos Cement	J-74	J-75	6.0	135.0	-4	0.05
221	P-89	357	Asbestos Cement	J-61	J-70	6.0	135.0	13	0.15
222	P-90	374	Asbestos Cement	J-70	J-77	6.0	135.0	10	0.12
229	P-96	365	Asbestos Cement	J-67	J-72	6.0	135.0	16	0.19
230	P-97	366	Asbestos Cement	J-72	J-79	6.0	135.0	13	0.15
231	P-98	368	Asbestos Cement	J-79	J-80	6.0	135.0	2	0.03
232	P-99	366	Asbestos Cement	J-64	J-80	6.0	135.0	13	0.14
233	P-100	363	Asbestos Cement	J-80	J-81	6.0	135.0	7	0.07
234	P-101	359	Asbestos Cement	J-44	J-73	6.0	135.0	14	0.16
235	P-102	373	Asbestos Cement	J-73	J-81	6.0	135.0	11	0.13
245	P-112	369	Asbestos Cement	J-80	J-87	4.0	135.0	3	0.08
246	P-113	365	Asbestos Cement	J-87	J-92	4.0	135.0	0	0.01
284	P-134	365	Asbestos Cement	J-91	J-108	6.0	135.0	4	0.05
291	P-141	390	Asbestos Cement	J-88	J-89	8.0	135.0	4	0.03
306	P-144	387	Asbestos Cement	J-44	J-115	12.0	135.0	77	0.22
383	P-165	364	Asbestos Cement	J-89	J-139	8.0	135.0	5	0.03
384	P-166	366	Asbestos Cement	J-139	J-138	8.0	135.0	-13	0.08
385	P-167	376	Asbestos Cement	J-138	J-137	8.0	135.0	-14	0.09
386	P-168	356	Asbestos Cement	J-137	J-136	8.0	135.0	-15	0.09
387	P-169	364	Asbestos Cement	J-115	J-136	12.0	135.0	53	0.15
403	P-185	369	Asbestos Cement	J-158	J-160	6.0	135.0	8	0.09
406	P-188	366	Asbestos Cement	J-157	J-161	6.0	135.0	8	0.09
408	P-190	366	Asbestos Cement	J-156	J-162	6.0	135.0	-1	0.01
415	P-197	358	Asbestos Cement	J-153	J-152	6.0	135.0	7	0.08
416	P-198	371	Asbestos Cement	J-152	J-151	6.0	135.0	4	0.05
417	P-199	367	Asbestos Cement	J-151	J-150	6.0	135.0	1	0.02
459	P-233	348	Asbestos Cement	J-162	J-185	6.0	135.0	1	0.01
461	P-235	545	Asbestos Cement	J-185	J-184	6.0	135.0	-2	0.03
462	P-236	349	Asbestos Cement	J-161	J-184	6.0	135.0	-1	0.01
464	P-238	366	Asbestos Cement	J-161	J-160	6.0	135.0	-6	0.06
466	P-240	345	Asbestos Cement	J-160	J-183	6.0	135.0	-2	0.02

67	P-17	672	Cast iron	J-15	J-18	4.0	100.0	1	0.04
68	P-18	578	Cast iron	J-18	J-16	4.0	100.0	1	0.04
83	P-21	345	Ductile Iron	J-17	J-19	6.0	130.0	14	0.15
377	P-159	299	Ductile Iron	J-145	J-141	12.0	130.0	6	0.02
432	P-214	362	Ductile Iron	J-169	J-170	6.0	130.0	-3	0.03
42	P-2	217	PVC	J-1	J-2	12.0	150.0	326	0.92
43	P-3	909	PVC	J-2	J-5	12.0	150.0	326	0.92
44	P-4	366	PVC	J-5	J-6	12.0	150.0	189	0.54
45	P-5	51	PVC	J-6	J-7	6.0	150.0	0	0.00
48	P-8	336	PVC	J-4	J-3	8.0	150.0	76	0.48
57	P-9	368	PVC	J-6	J-9	12.0	150.0	186	0.53
58	P-10	371	PVC	J-9	J-10	12.0	150.0	183	0.52
59	P-11	353	PVC	J-10	J-11	12.0	150.0	180	0.51
60	P-12	366	PVC	J-11	J-13	8.0	150.0	-22	0.14
61	P-13	733	PVC	J-13	J-12	10.0	150.0	-130	0.53
62	P-14	358	PVC	J-12	J-5	10.0	150.0	-133	0.54
65	P-16	726	PVC	J-3	J-15	8.0	150.0	73	0.46
81	P-19	366	PVC	J-15	J-17	8.0	150.0	68	0.43
82	P-20	339	PVC	J-14	J-17	8.0	150.0	27	0.17
87	P-25	366	PVC	J-22	J-25	6.0	150.0	4	0.05
88	P-26	365	PVC	J-25	J-24	6.0	150.0	1	0.01
89	P-27	366	PVC	J-24	J-23	8.0	150.0	-2	0.01
118	P-29	357	PVC	J-17	J-26	8.0	150.0	74	0.47
119	P-30	364	PVC	J-26	J-27	8.0	150.0	71	0.45
120	P-31	348	PVC	J-20	J-27	8.0	150.0	-6	0.04
121	P-32	341	PVC	J-27	J-34	8.0	150.0	-12	0.08
122	P-33	377	PVC	J-27	J-28	8.0	150.0	69	0.44
123	P-34	546	PVC	J-28	J-29	8.0	150.0	57	0.37
124	P-35	365	PVC	J-29	J-30	8.0	150.0	54	0.35
125	P-36	378	PVC	J-23	J-30	8.0	150.0	-4	0.03
126	P-37	339	PVC	J-30	J-31	8.0	150.0	-10	0.06
130	P-40	340	PVC	J-28	J-33	8.0	150.0	8	0.05
131	P-41	393	PVC	J-33	J-39	8.0	150.0	42	0.27
132	P-42	364	PVC	J-39	J-48	8.0	150.0	60	0.38
135	P-45	27	PVC	J-35	J-36	10.0	150.0	-25	0.10
137	P-47	356	PVC	J-13	J-36	10.0	150.0	104	0.43
138	P-48	366	PVC	J-36	J-37	10.0	150.0	72	0.29
139	P-49	366	PVC	J-11	J-37	12.0	150.0	194	0.55
140	P-50	366	PVC	J-37	J-50	10.0	150.0	180	0.74
141	P-51	366	PVC	J-50	J-51	10.0	150.0	123	0.50
142	P-52	209	PVC	J-51	J-52	8.0	150.0	0	0.00
153	P-53	367	PVC	J-37	J-38	8.0	150.0	78	0.50
154	P-54	365	PVC	J-38	J-39	8.0	150.0	75	0.48
155	P-55	538	PVC	J-39	J-40	8.0	150.0	50	0.32
156	P-56	368	PVC	J-41	J-42	8.0	150.0	46	0.29
157	P-57	368	PVC	J-42	J-43	8.0	150.0	43	0.27
160	P-59	368	PVC	J-44	J-45	8.0	150.0	-35	0.22
161	P-60	369	PVC	J-45	J-46	8.0	150.0	-38	0.24
162	P-61	362	PVC	J-46	J-47	8.0	150.0	-41	0.26
163	P-62	544	PVC	J-47	J-48	8.0	150.0	-44	0.28
164	P-63	377	PVC	J-48	J-49	8.0	150.0	-51	0.32
165	P-64	354	PVC	J-49	J-50	8.0	150.0	-54	0.34
166	P-65	174	PVC	J-58	J-59	8.0	150.0	-14	0.09
167	P-66	174	PVC	J-59	J-60	8.0	150.0	1	0.01
171	P-68	71	PVC	J-66	J-65	8.0	150.0	-19	0.12
172	P-69	179	PVC	J-65	J-57	8.0	150.0	-20	0.13
173	P-70	440	PVC	J-57	J-56	8.0	150.0	-23	0.15
174	P-71	340	PVC	J-55	J-54	8.0	150.0	-19	0.12
175	P-72	366	PVC	J-55	J-30	8.0	150.0	-53	0.34
178	P-75	396	PVC	J-60	J-61	8.0	150.0	-15	0.10
179	P-76	248	PVC	J-61	J-62	8.0	150.0	-32	0.20
180	P-77	366	PVC	J-62	J-55	8.0	150.0	-38	0.25
219	P-87	193	PVC	J-75	J-76	8.0	150.0	1	0.01
220	P-88	191	PVC	J-76	J-77	8.0	150.0	-12	0.07
223	P-91	260	PVC	J-77	J-78	8.0	150.0	-5	0.03
224	P-92	365	PVC	J-62	J-71	8.0	150.0	35	0.23
225	P-93	367	PVC	J-71	J-78	8.0	150.0	32	0.21

236	P-95	367	PVC	J-78	J-79	8.0	150.0	8	0.05
237	P-103	363	PVC	J-74	J-83	6.0	150.0	9	0.10
238	P-104	353	PVC	J-83	J-95	6.0	150.0	6	0.07
239	P-105	354	PVC	J-76	J-84	6.0	150.0	9	0.10
240	P-106	367	PVC	J-84	J-94	6.0	150.0	6	0.07
241	P-107	357	PVC	J-78	J-85	8.0	150.0	11	0.07
242	P-108	370	PVC	J-85	J-86	8.0	150.0	8	0.05
243	P-109	357	PVC	J-79	J-86	8.0	150.0	11	0.07
244	P-110	376	PVC	J-86	J-93	8.0	150.0	15	0.10
249	P-111	366	PVC	J-93	J-92	8.0	150.0	12	0.08
250	P-115	369	PVC	J-92	J-91	8.0	150.0	2	0.01
251	P-116	367	PVC	J-81	J-88	8.0	150.0	14	0.09
252	P-117	366	PVC	J-88	J-91	8.0	150.0	6	0.04
253	P-118	384	PVC	J-56	J-55	8.0	150.0	-26	0.17
258	P-119	368	PVC	J-40	J-41	8.0	150.0	49	0.31
268	P-120	382	PVC	J-95	J-99	6.0	150.0	3	0.03
269	P-121	194	PVC	J-98	J-99	8.0	150.0	-1	0.00
270	P-122	193	PVC	J-99	J-100	8.0	150.0	1	0.01
273	P-124	172	PVC	J-100	J-103	4.0	150.0	0	0.00
274	P-125	173	PVC	J-100	J-101	8.0	150.0	1	0.00
275	P-126	377	PVC	J-94	J-101	6.0	150.0	3	0.04
276	P-127	188	PVC	J-101	J-102	8.0	150.0	3	0.02
277	P-128	240	PVC	J-102	J-104	8.0	150.0	0	0.00
280	P-130	631	PVC	J-102	J-105	8.0	150.0	3	0.02
281	P-131	363	PVC	J-105	J-106	8.0	150.0	0	0.00
282	P-132	236	PVC	J-92	J-107	6.0	150.0	4	0.04
283	P-133	367	PVC	J-106	J-108	8.0	150.0	-3	0.02
285	P-135	175	PVC	J-108	J-109	8.0	150.0	-3	0.02
286	P-136	264	PVC	J-109	J-110	8.0	150.0	0	0.00
287	P-137	215	PVC	J-109	J-111	8.0	150.0	-6	0.04
288	P-138	365	PVC	J-111	J-90	8.0	150.0	-5	0.03
289	P-139	365	PVC	J-90	J-89	8.0	150.0	-8	0.05
290	P-140	365	PVC	J-89	J-82	8.0	150.0	-16	0.10
304	P-142	370	PVC	J-82	J-114	8.0	150.0	-19	0.12
305	P-143	363	PVC	J-114	J-115	8.0	150.0	-22	0.14
307	P-145	365	PVC	J-115	J-116	8.0	150.0	-7	0.04
308	P-146	367	PVC	J-116	J-117	8.0	150.0	-10	0.06
309	P-147	545	PVC	J-118	J-119	8.0	150.0	-34	0.22
310	P-148	389	PVC	J-48	J-119	8.0	150.0	59	0.38
311	P-149	372	PVC	J-119	J-120	8.0	150.0	-6	0.04
312	P-150	363	PVC	J-120	J-121	8.0	150.0	-9	0.06
313	P-151	363	PVC	J-121	J-122	8.0	150.0	-12	0.08
314	P-152	390	PVC	J-51	J-122	10.0	150.0	116	0.47
315	P-153	240	PVC	J-122	J-123	6.0	150.0	15	0.17
316	P-154	364	PVC	J-123	J-124	6.0	150.0	15	0.17
317	P-155	241	PVC	J-124	J-125	8.0	150.0	15	0.10
318	P-156	365	PVC	J-122	J-125	10.0	150.0	81	0.33
375	P-157	367	PVC	J-146	J-144	12.0	150.0	6	0.02
376	P-158	178	PVC	J-144	J-145	12.0	150.0	6	0.02
378	P-160	186	PVC	J-111	J-142	8.0	150.0	-5	0.03
379	P-161	177	PVC	J-142	J-141	8.0	150.0	-5	0.03
380	P-162	196	PVC	J-142	J-143	8.0	150.0	1	0.00
381	P-163	366	PVC	J-141	J-140	10.0	150.0	-5	0.02
382	P-164	366	PVC	J-140	J-139	10.0	150.0	-8	0.03
388	P-170	369	PVC	J-136	J-135	8.0	150.0	-18	0.11
389	P-171	362	PVC	J-135	J-134	8.0	150.0	-21	0.13
390	P-172	367	PVC	J-117	J-134	8.0	150.0	-13	0.08
391	P-173	366	PVC	J-134	J-133	8.0	150.0	-38	0.24
392	P-174	364	PVC	J-118	J-133	8.0	150.0	31	0.20
393	P-175	545	PVC	J-133	J-132	8.0	150.0	-10	0.06
394	P-176	365	PVC	J-119	J-132	6.0	150.0	24	0.28
395	P-177	377	PVC	J-132	J-131	8.0	150.0	-13	0.09
396	P-178	359	PVC	J-131	J-130	8.0	150.0	-16	0.10
397	P-179	363	PVC	J-130	J-125	8.0	150.0	-20	0.13
398	P-180	377	PVC	J-125	J-127	10.0	150.0	68	0.28
399	P-181	233	PVC	J-126	J-127	8.0	150.0	0	0.00
400	P-182	362	PVC	J-127	J-128	10.0	150.0	39	0.16

	P-183	368	PVC	J-127	J-159	8.0	150.0	26	0.16
402	P-184	364	PVC	J-159	J-158	8.0	150.0	23	0.15
404	P-186	366	PVC	J-158	J-157	8.0	150.0	11	0.07
405	P-187	378	PVC	J-132	J-157	6.0	150.0	21	0.23
407	P-189	545	PVC	J-157	J-156	8.0	150.0	17	0.11
409	P-191	358	PVC	J-156	J-155	8.0	150.0	14	0.09
410	P-192	374	PVC	J-155	J-154	8.0	150.0	11	0.07
411	P-193	366	PVC	J-154	J-163	8.0	150.0	10	0.06
412	P-194	366	PVC	J-154	J-153	8.0	150.0	-3	0.02
413	P-195	378	PVC	J-136	J-153	12.0	150.0	50	0.14
414	P-196	364	PVC	J-153	J-164	12.0	150.0	32	0.09
418	P-200	378	PVC	J-139	J-150	8.0	150.0	2	0.01
419	P-201	366	PVC	J-150	J-167	8.0	150.0	-8	0.05
420	P-202	365	PVC	J-150	J-149	8.0	150.0	4	0.03
421	P-203	368	PVC	J-149	J-148	8.0	150.0	1	0.01
422	P-204	378	PVC	J-148	J-141	8.0	150.0	2	0.01
423	P-205	366	PVC	J-148	J-147	8.0	150.0	-5	0.03
424	P-206	1,047	PVC	J-146	J-147	12.0	150.0	-6	0.02
425	P-207	381	PVC	J-147	J-168	12.0	150.0	-15	0.04
426	P-208	278	PVC	J-168	J-169	10.0	150.0	-2	0.01
427	P-209	353	PVC	J-168	J-167	12.0	150.0	-16	0.04
428	P-210	364	PVC	J-167	J-166	12.0	150.0	-21	0.06
429	P-211	378	PVC	J-166	J-165	12.0	150.0	-24	0.07
430	P-212	352	PVC	J-165	J-164	12.0	150.0	-26	0.07
431	P-213	366	PVC	J-164	J-163	8.0	150.0	-3	0.02
433	P-215	347	PVC	J-167	J-170	8.0	150.0	-5	0.03
434	P-216	362	PVC	J-170	J-171	10.0	150.0	-11	0.04
435	P-217	254	PVC	J-171	J-172	10.0	150.0	-12	0.05
436	P-218	245	PVC	J-172	J-173	10.0	150.0	-12	0.05
437	P-219	210	PVC	J-173	J-174	10.0	150.0	-13	0.05
438	P-220	567	PVC	J-174	J-175	10.0	150.0	-13	0.05
439	P-221	392	PVC	J-175	J-176	10.0	150.0	-13	0.05
440	P-222	413	PVC	J-176	J-177	10.0	150.0	-13	0.05
441	P-223	515	PVC	J-177	J-178	10.0	150.0	-13	0.05
442	P-224	397	PVC	J-178	J-179	10.0	150.0	-13	0.05
443	P-225	357	PVC	J-181	J-180	8.0	150.0	0	0.00
444	P-226	101	PVC	J-179	J-180	10.0	150.0	-13	0.05
445	P-227	356	PVC	J-128	J-129	10.0	150.0	36	0.15
453	P-228	377	PVC	J-171	J-188	4.0	150.0	-2	0.04
456	P-230	362	PVC	J-188	J-187	8.0	150.0	-2	0.02
457	P-231	362	PVC	J-187	J-186	8.0	150.0	-3	0.02
458	P-232	348	PVC	J-186	J-163	8.0	150.0	-4	0.03
460	P-234	544	PVC	J-162	J-161	8.0	150.0	-5	0.03
463	P-237	1,104	PVC	J-184	J-180	10.0	150.0	13	0.05
465	P-239	367	PVC	J-184	J-183	10.0	150.0	-25	0.10
467	P-241	364	PVC	J-183	J-182	10.0	150.0	-30	0.12
468	P-242	365	PVC	J-182	J-129	10.0	150.0	-33	0.13
516	P-244	348	PVC	J-188	J-165	8.0	150.0	(N/A)	(N/A)

J:\2-13125 - Roundup On-Call 2013\TO-19 Phase 5 Water\CADD 2-13125 TO19\WaterCAD\2-13125-TO19 Hydraulic Model.wtg

Scenario: Phase 6 Alt D-4 Maximum Day
Current Time Step: 0.000 h
Fire Flow Node FlexTable: Fire Flow Report

Label	Satisfies Fire Flow Constraints?	Fire Flow (Available) (gpm)	Fire Flow (Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Is Fire Flow Run Balanced?
J-1	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-2	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-3	True	2,029	500	2,032	20	10	True
J-4	True	2,869	500	2,872	20	8	True
J-5	True	2,855	500	2,858	20	8	True
J-6	True	2,677	500	2,681	20	8	True
J-7	True	1,810	500	1,810	20	11	True
J-8	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-9	True	3,236	500	3,239	20	7	True
J-10	True	3,361	500	3,364	20	6	True
J-11	True	4,555	500	4,563	20	2	True
J-12	True	3,308	500	3,311	20	7	True
J-13	True	4,341	500	4,345	20	3	True
J-14	True	4,514	500	4,518	20	3	True
J-15	True	2,892	500	2,896	20	8	True
J-16	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-17	True	3,626	500	3,634	20	6	True
J-18	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-19	True	1,815	500	1,819	20	10	True
J-20	True	3,336	500	3,339	20	7	True
J-21	True	2,610	500	2,613	20	9	True
J-22	True	3,500	500	3,503	20	6	True
J-23	True	3,863	500	3,866	20	5	True
J-24	True	3,063	500	3,066	20	7	True
J-25	True	2,397	500	2,400	20	9	True
J-26	True	3,445	500	3,448	20	6	True
J-27	True	4,276	500	4,284	20	3	True
J-28	True	4,176	500	4,180	20	4	True
J-29	True	4,075	500	4,078	20	4	True
J-30	True	4,613	500	4,621	25	2	True
J-31	True	4,612	500	4,616	27	2	True
J-32	True	4,612	500	4,615	24	2	True
J-33	True	4,613	500	4,619	23	2	True
J-34	True	4,614	500	4,620	22	2	True
J-35	True	4,613	500	4,617	21	2	True
J-36	True	4,608	500	4,616	21	2	True
J-37	True	4,594	500	4,602	22	2	True
J-38	True	3,950	500	3,953	20	4	True
J-39	True	4,607	500	4,615	20	2	True
J-40	True	3,747	500	3,748	20	5	True
J-41	True	3,855	500	3,858	20	5	True
J-42	True	4,259	500	4,262	20	3	True
J-43	True	4,610	500	4,616	31	2	True
J-44	True	4,610	500	4,617	32	2	True
J-45	True	4,270	500	4,273	20	3	True
J-46	True	3,863	500	3,866	20	5	True
J-47	True	3,744	500	3,747	20	5	True
J-48	True	4,606	500	4,613	21	2	True
J-49	True	4,033	500	4,036	20	4	True
J-50	True	4,601	500	4,604	20	2	True
J-51	True	3,416	500	3,423	20	6	True
J-52	True	2,367	500	2,367	20	9	True
J-54	True	4,612	500	4,615	29	2	True
J-55	True	4,612	500	4,619	28	2	True

J-56	True	3,821	500	3,824	20	5	True
J-57	True	3,134	500	3,137	20	7	True
J-58	True	3,141	500	3,144	20	7	True
J-59	True	3,552	500	3,555	20	6	True
J-60	True	3,718	500	3,721	20	5	True
J-61	True	4,229	500	4,233	20	3	True
J-62	True	4,611	500	4,619	30	2	True
J-63	True	4,611	500	4,615	30	2	True
J-64	True	3,077	500	3,080	20	7	True
J-65	True	3,114	500	3,115	20	7	True
J-66	True	3,112	500	3,113	20	7	True
J-67	True	4,611	500	4,618	30	2	True
J-68	True	2,732	500	2,735	20	8	True
J-69	True	3,080	500	3,083	20	7	True
J-70	True	3,098	500	3,101	20	7	True
J-71	True	4,611	500	4,614	20	2	True
J-72	True	2,986	500	2,989	20	8	True
J-73	True	3,136	500	3,139	20	7	True
J-74	True	3,751	500	3,754	20	5	True
J-75	True	4,610	500	4,614	20	2	True
J-76	True	4,611	500	4,614	23	2	True
J-77	True	4,611	500	4,614	23	2	True
J-78	True	4,610	500	4,619	26	2	True
J-79	True	4,610	500	4,618	23	2	True
J-80	True	4,518	500	4,523	20	2	True
J-81	True	4,457	500	4,461	20	3	True
J-82	True	4,609	500	4,612	22	2	True
J-83	True	2,966	500	2,969	20	8	True
J-84	True	3,180	500	3,183	20	7	True
J-85	True	3,866	500	3,868	20	5	True
J-86	True	4,574	500	4,577	20	2	True
J-87	True	4,193	500	4,196	20	4	True
J-88	True	4,610	500	4,613	26	2	True
J-89	True	4,609	500	4,617	34	2	True
J-90	True	4,609	500	4,612	26	2	True
J-91	True	4,610	500	4,614	25	2	True
J-92	True	4,359	500	4,366	20	3	True
J-93	True	4,032	500	4,035	20	4	True
J-94	True	3,197	500	3,200	20	7	True
J-95	True	2,989	500	2,992	20	8	True
J-98	True	3,165	500	3,166	20	7	True
J-99	True	3,525	500	3,526	20	6	True
J-100	True	3,720	500	3,721	20	5	True
J-101	True	3,910	500	3,911	20	5	True
J-102	True	3,936	500	3,937	20	5	True
J-103	True	3,335	500	3,335	20	7	True
J-104	True	3,345	500	3,345	20	7	True
J-105	True	4,160	500	4,163	20	4	True
J-106	True	4,322	500	4,325	20	3	True
J-107	True	2,199	500	2,203	20	10	True
J-108	True	4,609	500	4,613	20	2	True
J-109	True	4,610	500	4,613	23	2	True
J-110	False	(N/A)	500	(N/A)	(N/A)	(N/A)	False
J-111	True	4,609	500	4,613	31	2	True
J-114	True	4,609	500	4,612	22	2	True
J-115	True	4,609	500	4,618	34	2	True
J-116	True	4,429	500	4,432	20	3	True
J-117	True	4,182	500	4,185	20	4	True
J-118	True	4,083	500	4,086	20	4	True
J-119	True	4,570	500	4,577	20	2	True
J-120	True	3,812	500	3,815	20	5	True
J-121	True	3,813	500	3,816	20	5	True
J-122	True	4,130	500	4,137	20	4	True
J-123	True	2,332	500	2,332	20	9	True
J-124	True	2,839	500	2,839	20	8	True
J-125	True	4,106	500	4,114	20	4	True
J-126	True	2,811	500	2,811	20	8	True

J-128	True	3,970	500	3,973	20	4	True
J-129	True	3,814	500	3,817	20	5	True
J-130	True	3,860	500	3,863	20	5	True
J-131	True	3,661	500	3,665	20	6	True
J-132	True	3,842	500	3,845	20	5	True
J-133	True	4,495	500	4,502	20	2	True
J-134	True	4,607	500	4,610	21	2	True
J-135	True	4,608	500	4,611	24	2	True
J-136	True	4,608	500	4,611	21	2	True
J-137	True	4,609	500	4,616	34	2	True
J-138	True	4,603	500	4,604	20	2	True
J-139	True	4,609	500	4,610	23	2	True
J-140	True	4,609	500	4,616	40	2	True
J-141	True	4,609	500	4,612	39	2	True
J-142	True	4,609	500	4,616	43	2	True
J-143	True	4,609	500	4,609	34	2	True
J-144	True	4,341	500	4,341	20	3	True
J-145	True	4,609	500	4,610	42	2	True
J-146	True	4,609	500	4,609	42	2	True
J-147	True	4,609	500	4,609	42	2	True
J-148	True	4,609	500	4,612	43	2	True
J-149	True	4,609	500	4,613	38	2	True
J-150	True	4,608	500	4,611	31	2	True
J-151	True	4,609	500	4,616	36	2	True
J-152	True	3,071	500	3,074	20	7	True
J-153	True	3,083	500	3,086	20	7	True
J-154	True	4,609	500	4,616	35	2	True
J-155	True	4,608	500	4,611	28	2	True
J-156	True	4,459	500	4,462	20	3	True
J-157	True	4,323	500	4,327	20	3	True
J-158	True	4,393	500	4,401	20	3	True
J-159	True	3,976	500	3,980	20	4	True
J-160	True	3,630	500	3,633	20	6	True
J-161	True	3,405	500	3,409	20	6	True
J-162	True	4,039	500	4,048	20	4	True
J-163	True	3,903	500	3,906	20	5	True
J-164	True	4,608	500	4,611	23	2	True
J-165	True	4,609	500	4,617	29	2	True
J-166	True	4,609	500	4,611	32	2	True
J-167	True	4,609	500	4,611	40	2	True
J-168	True	4,609	500	4,612	41	2	True
J-169	True	4,609	500	4,612	43	2	True
J-170	True	4,609	500	4,609	39	2	True
J-171	True	4,608	500	4,611	42	2	True
J-172	True	4,608	500	4,611	39	2	True
J-173	True	4,608	500	4,608	37	2	True
J-174	True	4,608	500	4,609	34	2	True
J-175	True	4,608	500	4,608	31	2	True
J-176	True	4,608	500	4,608	28	2	True
J-177	True	4,608	500	4,608	24	2	True
J-178	True	4,341	500	4,341	20	3	True
J-179	True	4,205	500	4,205	20	4	True
J-180	True	4,198	500	4,198	20	4	True
J-181	True	4,173	500	4,173	20	4	True
J-182	True	3,031	500	3,031	20	8	True
J-183	True	4,076	500	4,079	20	4	True
J-184	True	4,315	500	4,318	20	3	True
J-185	True	4,495	500	4,504	20	2	True
J-186	True	2,813	500	2,816	20	8	True
J-187	True	4,343	500	4,344	20	3	True
J-188	True	4,199	500	4,199	20	4	True
J-188	True	4,373	500	4,374	20	3	True

J:\2-13125 - Roundup On-Call 2013\TO-19 Phase 5 Water\CADD 2-13125 TO19\WaterCAD\2-13125-TO19 Hydraulic Model.wtg

Scenario: Phase 6 Alt D-4 Maximum Day
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
31	J-1	3,336.00	0	3,365.55	13
32	J-2	3,335.00	0	3,365.49	13
33	J-3	3,300.00	3	3,365.27	28
34	J-4	3,300.00	4	3,365.31	28
35	J-5	3,300.00	4	3,365.27	28
37	J-6	3,300.00	4	3,365.24	28
38	J-7	3,300.00	0	3,365.24	28
40	J-8	3,318.00	0	3,365.44	21
49	J-9	3,292.00	3	3,365.21	32
50	J-10	3,290.00	3	3,365.18	33
51	J-11	3,272.00	7	3,365.15	40
52	J-12	3,289.00	3	3,365.23	33
53	J-13	3,274.00	4	3,365.15	39
54	J-14	3,274.00	4	3,365.16	39
55	J-15	3,281.00	4	3,365.19	36
56	J-16	3,300.00	1	3,365.18	28
64	J-17	3,279.00	7	3,365.15	37
66	J-18	3,293.00	0	3,365.18	31
72	J-19	3,280.00	4	3,365.11	37
73	J-20	3,271.00	4	3,365.07	41
74	J-21	3,279.00	3	3,365.05	37
75	J-22	3,252.00	4	3,365.02	49
76	J-23	3,246.00	4	3,365.01	51
77	J-24	3,247.00	3	3,365.01	51
78	J-25	3,255.00	3	3,365.02	48
91	J-26	3,273.00	3	3,365.11	40
92	J-27	3,267.00	7	3,365.08	42
93	J-28	3,263.00	4	3,365.05	44
94	J-29	3,249.00	3	3,365.02	50
95	J-30	3,241.00	7	3,365.00	54
96	J-31	3,242.00	4	3,365.00	53
97	J-32	3,249.00	3	3,365.02	50
98	J-33	3,259.00	6	3,365.05	46
99	J-34	3,264.00	6	3,365.08	44
100	J-35	3,270.00	4	3,365.13	41
101	J-36	3,270.00	7	3,365.13	41
102	J-37	3,265.00	7	3,365.12	43
103	J-38	3,262.00	3	3,365.07	45
104	J-39	3,257.00	7	3,365.04	47
105	J-40	3,246.00	1	3,365.01	51
106	J-41	3,239.00	3	3,364.99	55
107	J-42	3,234.00	3	3,364.98	57
108	J-43	3,231.00	6	3,364.96	58
109	J-44	3,228.00	7	3,364.96	59
110	J-45	3,232.00	3	3,364.97	58
111	J-46	3,237.00	3	3,364.98	55
112	J-47	3,244.00	3	3,364.99	52
113	J-48	3,252.00	7	3,365.01	49
114	J-49	3,255.00	3	3,365.03	48
115	J-50	3,259.00	4	3,365.05	46
116	J-51	3,278.00	7	3,365.02	38
117	J-52	3,282.00	0	3,365.02	36
143	J-54	3,238.00	4	3,364.98	55
144	J-55	3,232.00	7	3,364.98	58
145	J-56	3,240.00	3	3,364.97	54
146	J-57	3,253.00	3	3,364.97	48
147	J-58	3,253.00	3	3,364.96	48

148	J-59	3,252.00	3	3,364.96	49
149	J-60	3,251.00	4	3,364.96	49
150	J-61	3,246.00	4	3,364.96	51
151	J-62	3,232.00	7	3,364.96	58
152	J-63	3,235.00	4	3,364.97	56
158	J-64	3,228.00	3	3,364.95	59
168	J-65	3,252.50	1	3,364.96	49
169	J-66	3,252.50	1	3,364.96	49
182	J-67	3,235.00	7	3,364.97	56
186	J-68	3,223.00	3	3,364.95	61
187	J-69	3,220.00	3	3,364.95	63
188	J-70	3,224.00	3	3,364.95	61
189	J-71	3,228.00	3	3,364.95	59
190	J-72	3,234.00	3	3,364.95	57
191	J-73	3,224.00	3	3,364.95	61
192	J-74	3,211.00	4	3,364.94	67
193	J-75	3,210.00	4	3,364.94	67
194	J-76	3,213.00	4	3,364.94	66
195	J-77	3,221.00	4	3,364.94	62
196	J-78	3,226.00	9	3,364.94	60
197	J-79	3,226.00	7	3,364.94	60
198	J-80	3,223.00	5	3,364.94	61
199	J-81	3,219.00	4	3,364.94	63
200	J-82	3,214.00	3	3,364.94	65
201	J-83	3,203.00	3	3,364.94	70
202	J-84	3,202.00	3	3,364.94	70
203	J-85	3,243.00	3	3,364.94	53
204	J-86	3,228.00	4	3,364.94	59
205	J-87	3,227.00	3	3,364.94	60
206	J-88	3,217.00	4	3,364.94	64
207	J-89	3,208.00	7	3,364.94	68
208	J-90	3,208.00	3	3,364.94	68
209	J-91	3,216.00	4	3,364.94	64
210	J-92	3,234.00	7	3,364.94	57
211	J-93	3,235.00	3	3,364.94	56
212	J-94	3,191.00	3	3,364.94	75
213	J-95	3,195.00	3	3,364.94	74
254	J-98	3,192.00	1	3,364.94	75
255	J-99	3,193.00	1	3,364.94	74
256	J-100	3,191.00	1	3,364.94	75
257	J-101	3,191.00	1	3,364.94	75
258	J-102	3,189.00	1	3,364.94	76
259	J-103	3,191.00	0	3,364.94	75
260	J-104	3,190.00	0	3,364.94	76
261	J-105	3,187.00	3	3,364.94	77
262	J-106	3,196.00	3	3,364.94	73
263	J-107	3,234.00	4	3,364.94	57
264	J-108	3,215.00	4	3,364.94	65
265	J-109	3,211.00	3	3,364.94	67
266	J-110	3,209.00	0	3,364.94	67
267	J-111	3,207.00	4	3,364.94	68
292	J-114	3,217.00	3	3,364.94	64
293	J-115	3,222.00	9	3,364.95	62
294	J-116	3,227.00	3	3,364.95	60
295	J-117	3,232.00	3	3,364.95	58
296	J-118	3,238.00	3	3,364.97	55
297	J-119	3,245.00	7	3,364.98	52
298	J-120	3,248.00	3	3,364.98	51
299	J-121	3,249.00	3	3,364.98	50
300	J-122	3,261.00	7	3,364.98	45
301	J-123	3,273.00	0	3,364.98	40
302	J-124	3,273.00	0	3,364.97	40
303	J-125	3,259.00	7	3,364.97	46
319	J-126	3,262.00	0	3,364.96	45
320	J-127	3,257.00	4	3,364.96	47
321	J-128	3,254.00	3	3,364.95	48
322	J-129	3,249.00	3	3,364.95	50

	J-130	3,251.00	4	3,364.97	49
324	J-131	3,243.00	3	3,364.96	53
325	J-132	3,239.00	7	3,364.96	54
326	J-133	3,233.00	3	3,364.96	57
327	J-134	3,226.00	4	3,364.95	60
328	J-135	3,224.00	3	3,364.95	61
329	J-136	3,220.00	7	3,364.94	63
330	J-137	3,213.00	1	3,364.94	66
331	J-138	3,204.00	1	3,364.94	70
332	J-139	3,197.00	7	3,364.94	73
333	J-140	3,195.00	3	3,364.94	74
334	J-141	3,190.00	7	3,364.94	76
335	J-142	3,200.00	0	3,364.94	71
336	J-143	3,199.00	1	3,364.94	72
337	J-144	3,187.00	1	3,364.94	77
338	J-145	3,187.00	0	3,364.94	77
339	J-146	3,186.00	0	3,364.94	77
340	J-147	3,189.00	4	3,364.94	76
341	J-148	3,190.00	4	3,364.94	76
342	J-149	3,192.00	3	3,364.94	75
343	J-150	3,199.00	7	3,364.94	72
344	J-151	3,206.00	3	3,364.94	69
345	J-152	3,207.00	3	3,364.94	68
346	J-153	3,215.00	7	3,364.94	65
347	J-154	3,217.00	4	3,364.94	64
348	J-155	3,221.00	3	3,364.94	62
349	J-156	3,229.00	4	3,364.94	59
350	J-157	3,235.00	7	3,364.95	56
351	J-158	3,242.00	4	3,364.95	53
352	J-159	3,250.00	3	3,364.95	50
353	J-160	3,239.00	4	3,364.94	54
354	J-161	3,232.00	9	3,364.94	58
355	J-162	3,223.00	4	3,364.94	61
356	J-163	3,225.00	3	3,364.94	61
357	J-164	3,226.00	9	3,364.94	60
358	J-165	3,217.00	2	3,364.94	64
359	J-166	3,197.00	2	3,364.94	73
360	J-167	3,196.00	3	3,364.94	73
361	J-168	3,191.00	3	3,364.94	75
362	J-169	3,184.00	1	3,364.94	78
363	J-170	3,181.00	3	3,364.94	80
364	J-171	3,184.00	3	3,364.94	78
365	J-172	3,181.00	0	3,364.94	80
366	J-173	3,182.00	1	3,364.94	79
367	J-174	3,183.00	0	3,364.94	79
368	J-175	3,183.00	0	3,364.94	79
369	J-176	3,189.00	0	3,364.94	76
370	J-177	3,208.00	0	3,364.94	68
371	J-178	3,215.00	0	3,364.94	65
372	J-179	3,218.00	0	3,364.94	64
373	J-180	3,220.00	0	3,364.94	63
374	J-181	3,223.00	0	3,364.94	61
446	J-182	3,241.00	3	3,364.95	54
447	J-183	3,235.00	4	3,364.95	56
448	J-184	3,228.00	9	3,364.94	59
449	J-185	3,222.00	3	3,364.94	62
450	J-186	3,216.00	1	3,364.94	64
451	J-187	3,214.00	1	3,364.94	65
452	J-188	3,212.00	1	3,364.94	66

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Scenario: Phase 6 Alt D-4 Maximum Day
Current Time Step: 0.000 h
FlexTable: Pipe Table

ID	Label	Length (Scaled) (ft)	Material	Start Node	Stop Node	Diameter (in)	Hazen- Williams C	Flow (gpm)	Velocity (ft/s)
41	P-1	467	Asbestos Cement	T-1	J-1	12.0	135.0	619	1.76
46	P-6	426	Asbestos Cement	J-1	J-8	12.0	135.0	294	0.84
47	P-7	542	Asbestos Cement	J-8	J-4	12.0	135.0	294	0.84
63	P-15	1,092	Asbestos Cement	J-4	J-14	12.0	135.0	214	0.61
127	P-38	368	Asbestos Cement	J-31	J-32	12.0	135.0	-125	0.35
129	P-39	544	Asbestos Cement	J-32	J-33	12.0	135.0	-128	0.36
133	P-43	376	Asbestos Cement	J-33	J-34	12.0	135.0	-169	0.48
134	P-44	366	Asbestos Cement	J-34	J-35	12.0	135.0	-202	0.57
136	P-46	356	Asbestos Cement	J-35	J-14	12.0	135.0	-172	0.49
159	P-58	366	Asbestos Cement	J-43	J-64	6.0	135.0	16	0.19
170	P-67	146	Asbestos Cement	J-59	J-66	6.0	135.0	-19	0.22
176	P-73	366	Asbestos Cement	J-31	J-54	12.0	135.0	135	0.38
177	P-74	365	Asbestos Cement	J-54	J-63	12.0	135.0	114	0.32
181	P-78	340	Asbestos Cement	J-62	J-63	12.0	135.0	-35	0.10
183	P-79	29	Asbestos Cement	J-63	J-67	12.0	135.0	75	0.21
184	P-80	363	Asbestos Cement	J-67	J-43	12.0	135.0	51	0.14
185	P-81	369	Asbestos Cement	J-43	J-44	12.0	135.0	69	0.19
214	P-82	364	Asbestos Cement	J-58	J-68	6.0	135.0	12	0.13
215	P-83	545	Asbestos Cement	J-68	J-74	6.0	135.0	9	0.10
216	P-84	366	Asbestos Cement	J-60	J-69	6.0	135.0	13	0.15
217	P-85	366	Asbestos Cement	J-69	J-75	6.0	135.0	10	0.11
218	P-86	172	Asbestos Cement	J-74	J-75	6.0	135.0	-4	0.05
221	P-89	357	Asbestos Cement	J-61	J-70	6.0	135.0	14	0.16
222	P-90	374	Asbestos Cement	J-70	J-77	6.0	135.0	11	0.12
229	P-96	365	Asbestos Cement	J-67	J-72	6.0	135.0	17	0.19
230	P-97	366	Asbestos Cement	J-72	J-79	6.0	135.0	14	0.16
231	P-98	368	Asbestos Cement	J-79	J-80	6.0	135.0	6	0.07
232	P-99	366	Asbestos Cement	J-64	J-80	6.0	135.0	13	0.15
233	P-100	363	Asbestos Cement	J-80	J-81	6.0	135.0	4	0.05
234	P-101	359	Asbestos Cement	J-44	J-73	6.0	135.0	14	0.16
235	P-102	373	Asbestos Cement	J-73	J-81	6.0	135.0	11	0.13
284	P-134	365	Asbestos Cement	J-91	J-108	6.0	135.0	5	0.06
291	P-141	390	Asbestos Cement	J-88	J-89	8.0	135.0	6	0.04
306	P-144	387	Asbestos Cement	J-44	J-115	12.0	135.0	79	0.23
383	P-165	364	Asbestos Cement	J-89	J-139	8.0	135.0	6	0.04
384	P-166	366	Asbestos Cement	J-139	J-138	8.0	135.0	-12	0.08
385	P-167	376	Asbestos Cement	J-138	J-137	8.0	135.0	-13	0.08
386	P-168	356	Asbestos Cement	J-137	J-136	8.0	135.0	-14	0.09
387	P-169	364	Asbestos Cement	J-115	J-136	12.0	135.0	55	0.15
403	P-185	369	Asbestos Cement	J-158	J-160	6.0	135.0	7	0.08
406	P-188	366	Asbestos Cement	J-157	J-161	6.0	135.0	8	0.09
408	P-190	366	Asbestos Cement	J-156	J-162	6.0	135.0	0	0.00
415	P-197	358	Asbestos Cement	J-153	J-152	6.0	135.0	7	0.08
416	P-198	371	Asbestos Cement	J-152	J-151	6.0	135.0	4	0.04
417	P-199	367	Asbestos Cement	J-151	J-150	6.0	135.0	1	0.01
459	P-233	348	Asbestos Cement	J-162	J-185	6.0	135.0	1	0.01
461	P-235	545	Asbestos Cement	J-185	J-184	6.0	135.0	-2	0.02
462	P-236	349	Asbestos Cement	J-161	J-184	6.0	135.0	-1	0.01
464	P-238	366	Asbestos Cement	J-161	J-160	6.0	135.0	-5	0.06
466	P-240	345	Asbestos Cement	J-160	J-183	6.0	135.0	-2	0.02
67	P-17	672	Cast iron	J-15	J-18	4.0	100.0	1	0.04
68	P-18	578	Cast iron	J-18	J-16	4.0	100.0	1	0.04
83	P-21	345	Ductile Iron	J-17	J-19	6.0	130.0	28	0.32
377	P-159	299	Ductile Iron	J-145	J-141	12.0	130.0	5	0.01
432	P-214	362	Ductile Iron	J-169	J-170	6.0	130.0	-3	0.03
42	P-2	217	PVC	J-1	J-2	12.0	150.0	325	0.92

43	P-3	909	PVC	J-2	J-5	12.0	150.0	325	0.92
44	P-4	366	PVC	J-5	J-6	12.0	150.0	188	0.53
45	P-5	51	PVC	J-6	J-7	6.0	150.0	0	0.00
48	P-8	336	PVC	J-4	J-3	8.0	150.0	77	0.49
57	P-9	368	PVC	J-6	J-9	12.0	150.0	185	0.52
58	P-10	371	PVC	J-9	J-10	12.0	150.0	182	0.52
59	P-11	353	PVC	J-10	J-11	12.0	150.0	179	0.51
60	P-12	366	PVC	J-11	J-13	8.0	150.0	-20	0.13
61	P-13	733	PVC	J-13	J-12	10.0	150.0	-130	0.53
62	P-14	358	PVC	J-12	J-5	10.0	150.0	-133	0.54
65	P-16	726	PVC	J-3	J-15	8.0	150.0	74	0.47
81	P-19	366	PVC	J-15	J-17	8.0	150.0	69	0.44
82	P-20	339	PVC	J-14	J-17	8.0	150.0	38	0.24
84	P-22	720	PVC	J-19	J-20	6.0	150.0	25	0.28
85	P-23	401	PVC	J-20	J-21	8.0	150.0	50	0.32
86	P-24	526	PVC	J-21	J-22	8.0	150.0	47	0.30
87	P-25	366	PVC	J-22	J-25	6.0	150.0	11	0.13
88	P-26	365	PVC	J-25	J-24	6.0	150.0	8	0.10
89	P-27	366	PVC	J-24	J-23	8.0	150.0	5	0.03
90	P-28	366	PVC	J-22	J-23	8.0	150.0	32	0.20
118	P-29	357	PVC	J-17	J-26	8.0	150.0	71	0.45
119	P-30	364	PVC	J-26	J-27	8.0	150.0	68	0.43
120	P-31	348	PVC	J-20	J-27	8.0	150.0	-29	0.18
121	P-32	341	PVC	J-27	J-34	8.0	150.0	-27	0.17
122	P-33	377	PVC	J-27	J-28	8.0	150.0	58	0.37
123	P-34	546	PVC	J-28	J-29	8.0	150.0	49	0.31
124	P-35	365	PVC	J-29	J-30	8.0	150.0	46	0.29
125	P-36	378	PVC	J-23	J-30	8.0	150.0	33	0.21
126	P-37	339	PVC	J-30	J-31	8.0	150.0	14	0.09
130	P-40	340	PVC	J-28	J-33	8.0	150.0	5	0.03
131	P-41	393	PVC	J-33	J-39	8.0	150.0	41	0.26
132	P-42	364	PVC	J-39	J-48	8.0	150.0	58	0.37
135	P-45	27	PVC	J-35	J-36	10.0	150.0	-33	0.14
137	P-47	356	PVC	J-13	J-36	10.0	150.0	106	0.43
138	P-48	366	PVC	J-36	J-37	10.0	150.0	65	0.27
139	P-49	366	PVC	J-11	J-37	12.0	150.0	192	0.54
140	P-50	366	PVC	J-37	J-50	10.0	150.0	174	0.71
141	P-51	366	PVC	J-50	J-51	10.0	150.0	119	0.49
142	P-52	209	PVC	J-51	J-52	8.0	150.0	0	0.00
153	P-53	367	PVC	J-37	J-38	8.0	150.0	75	0.48
154	P-54	365	PVC	J-38	J-39	8.0	150.0	72	0.46
155	P-55	538	PVC	J-39	J-40	8.0	150.0	48	0.30
156	P-56	368	PVC	J-41	J-42	8.0	150.0	43	0.28
157	P-57	368	PVC	J-42	J-43	8.0	150.0	40	0.26
160	P-59	368	PVC	J-44	J-45	8.0	150.0	-33	0.21
161	P-60	369	PVC	J-45	J-46	8.0	150.0	-35	0.23
162	P-61	362	PVC	J-46	J-47	8.0	150.0	-38	0.25
163	P-62	544	PVC	J-47	J-48	8.0	150.0	-41	0.26
164	P-63	377	PVC	J-48	J-49	8.0	150.0	-49	0.31
165	P-64	354	PVC	J-49	J-50	8.0	150.0	-52	0.33
166	P-65	174	PVC	J-58	J-59	8.0	150.0	-15	0.09
167	P-66	174	PVC	J-59	J-60	8.0	150.0	2	0.01
171	P-68	71	PVC	J-66	J-65	8.0	150.0	-20	0.13
172	P-69	179	PVC	J-65	J-57	8.0	150.0	-21	0.13
173	P-70	440	PVC	J-57	J-56	8.0	150.0	-24	0.15
174	P-71	340	PVC	J-55	J-54	8.0	150.0	-18	0.12
175	P-72	366	PVC	J-55	J-30	8.0	150.0	-58	0.37
178	P-75	396	PVC	J-60	J-61	8.0	150.0	-15	0.09
179	P-76	248	PVC	J-61	J-62	8.0	150.0	-32	0.21
180	P-77	366	PVC	J-62	J-55	8.0	150.0	-41	0.26
219	P-87	193	PVC	J-75	J-76	8.0	150.0	2	0.01
220	P-88	191	PVC	J-76	J-77	8.0	150.0	-11	0.07
223	P-91	260	PVC	J-77	J-78	8.0	150.0	-4	0.03
224	P-92	365	PVC	J-62	J-71	8.0	150.0	36	0.23
225	P-93	367	PVC	J-71	J-78	8.0	150.0	33	0.21
228	P-95	367	PVC	J-78	J-79	8.0	150.0	9	0.06
236	P-103	363	PVC	J-74	J-83	6.0	150.0	9	0.10

238	P-104	353	PVC	J-83	J-95	6.0	150.0	6	0.07
239	P-105	354	PVC	J-76	J-84	6.0	150.0	9	0.11
240	P-106	367	PVC	J-84	J-94	6.0	150.0	7	0.07
241	P-107	357	PVC	J-78	J-85	8.0	150.0	11	0.07
242	P-108	370	PVC	J-85	J-86	8.0	150.0	8	0.05
243	P-109	357	PVC	J-79	J-86	8.0	150.0	10	0.06
244	P-110	376	PVC	J-86	J-93	8.0	150.0	14	0.09
245	P-111	366	PVC	J-93	J-92	8.0	150.0	11	0.07
246	P-112	369	PVC	J-80	J-87	8.0	150.0	11	0.07
249	P-113	365	PVC	J-87	J-92	8.0	150.0	8	0.05
249	P-115	369	PVC	J-92	J-91	8.0	150.0	7	0.05
250	P-116	367	PVC	J-81	J-88	8.0	150.0	12	0.07
251	P-117	366	PVC	J-88	J-91	8.0	150.0	2	0.01
252	P-118	384	PVC	J-56	J-55	8.0	150.0	-27	0.17
253	P-119	368	PVC	J-40	J-41	8.0	150.0	46	0.29
268	P-120	382	PVC	J-95	J-99	6.0	150.0	3	0.04
269	P-121	194	PVC	J-98	J-99	8.0	150.0	-1	0.00
270	P-122	193	PVC	J-99	J-100	8.0	150.0	2	0.01
273	P-124	172	PVC	J-100	J-103	8.0	150.0	0	0.00
274	P-125	173	PVC	J-100	J-101	8.0	150.0	1	0.01
275	P-126	377	PVC	J-94	J-101	6.0	150.0	4	0.04
276	P-127	188	PVC	J-101	J-102	8.0	150.0	4	0.02
277	P-128	240	PVC	J-102	J-104	8.0	150.0	0	0.00
280	P-130	631	PVC	J-102	J-105	8.0	150.0	3	0.02
281	P-131	363	PVC	J-105	J-106	8.0	150.0	0	0.00
282	P-132	236	PVC	J-92	J-107	6.0	150.0	4	0.04
283	P-133	367	PVC	J-106	J-108	8.0	150.0	-3	0.02
285	P-135	175	PVC	J-108	J-109	8.0	150.0	-1	0.01
286	P-136	264	PVC	J-109	J-110	8.0	150.0	0	0.00
287	P-137	215	PVC	J-109	J-111	8.0	150.0	-4	0.03
288	P-138	365	PVC	J-111	J-90	8.0	150.0	-5	0.03
289	P-139	365	PVC	J-90	J-89	8.0	150.0	-8	0.05
290	P-140	365	PVC	J-89	J-82	8.0	150.0	-15	0.10
304	P-142	370	PVC	J-82	J-114	8.0	150.0	-18	0.12
305	P-143	363	PVC	J-114	J-115	8.0	150.0	-21	0.14
307	P-145	365	PVC	J-115	J-116	8.0	150.0	-6	0.04
308	P-146	367	PVC	J-116	J-117	8.0	150.0	-8	0.05
309	P-147	545	PVC	J-118	J-119	8.0	150.0	-33	0.21
310	P-148	389	PVC	J-48	J-119	8.0	150.0	58	0.37
311	P-149	372	PVC	J-119	J-120	8.0	150.0	-6	0.04
312	P-150	363	PVC	J-120	J-121	8.0	150.0	-9	0.06
313	P-151	363	PVC	J-121	J-122	8.0	150.0	-12	0.07
314	P-152	390	PVC	J-51	J-122	10.0	150.0	111	0.45
315	P-153	240	PVC	J-122	J-123	6.0	150.0	15	0.17
316	P-154	364	PVC	J-123	J-124	6.0	150.0	15	0.17
317	P-155	241	PVC	J-124	J-125	8.0	150.0	15	0.09
318	P-156	365	PVC	J-122	J-125	10.0	150.0	78	0.32
375	P-157	367	PVC	J-146	J-144	12.0	150.0	5	0.02
376	P-158	178	PVC	J-144	J-145	12.0	150.0	5	0.01
378	P-160	186	PVC	J-111	J-142	8.0	150.0	-3	0.02
379	P-161	177	PVC	J-142	J-141	8.0	150.0	-4	0.02
380	P-162	196	PVC	J-142	J-143	8.0	150.0	1	0.00
381	P-163	366	PVC	J-141	J-140	10.0	150.0	-5	0.02
382	P-164	366	PVC	J-140	J-139	10.0	150.0	-8	0.03
388	P-170	369	PVC	J-136	J-135	8.0	150.0	-17	0.11
389	P-171	362	PVC	J-135	J-134	8.0	150.0	-20	0.13
390	P-172	367	PVC	J-117	J-134	8.0	150.0	-11	0.07
391	P-173	366	PVC	J-134	J-133	8.0	150.0	-35	0.22
392	P-174	364	PVC	J-118	J-133	8.0	150.0	30	0.19
393	P-175	545	PVC	J-133	J-132	8.0	150.0	-9	0.05
394	P-176	365	PVC	J-119	J-132	6.0	150.0	23	0.27
395	P-177	377	PVC	J-132	J-131	8.0	150.0	-12	0.08
396	P-178	359	PVC	J-131	J-130	8.0	150.0	-15	0.10
397	P-179	363	PVC	J-130	J-125	8.0	150.0	-19	0.12
398	P-180	377	PVC	J-125	J-127	10.0	150.0	66	0.27
399	P-181	233	PVC	J-126	J-127	8.0	150.0	0	0.00
400	P-182	362	PVC	J-127	J-128	10.0	150.0	37	0.15

	P-183	368	PVC	J-127	J-159	8.0	150.0	25	0.16
402	P-184	364	PVC	J-159	J-158	8.0	150.0	22	0.14
404	P-186	366	PVC	J-158	J-157	8.0	150.0	11	0.07
405	P-187	378	PVC	J-132	J-157	6.0	150.0	20	0.23
407	P-189	545	PVC	J-157	J-156	8.0	150.0	16	0.10
409	P-191	358	PVC	J-156	J-155	8.0	150.0	12	0.08
410	P-192	374	PVC	J-155	J-154	8.0	150.0	9	0.06
411	P-193	366	PVC	J-154	J-163	8.0	150.0	10	0.06
412	P-194	366	PVC	J-154	J-153	8.0	150.0	-4	0.03
413	P-195	378	PVC	J-136	J-153	12.0	150.0	50	0.14
414	P-196	364	PVC	J-153	J-164	12.0	150.0	32	0.09
418	P-200	378	PVC	J-139	J-150	8.0	150.0	3	0.02
419	P-201	366	PVC	J-150	J-167	8.0	150.0	-7	0.05
420	P-202	365	PVC	J-150	J-149	8.0	150.0	4	0.02
421	P-203	368	PVC	J-149	J-148	8.0	150.0	1	0.01
422	P-204	378	PVC	J-148	J-141	8.0	150.0	1	0.01
423	P-205	366	PVC	J-148	J-147	8.0	150.0	-4	0.03
424	P-206	1,047	PVC	J-146	J-147	12.0	150.0	-5	0.02
425	P-207	381	PVC	J-147	J-168	12.0	150.0	-13	0.04
426	P-208	278	PVC	J-168	J-169	10.0	150.0	-2	0.01
427	P-209	353	PVC	J-168	J-167	12.0	150.0	-14	0.04
428	P-210	364	PVC	J-167	J-166	12.0	150.0	-19	0.05
429	P-211	378	PVC	J-166	J-165	12.0	150.0	-21	0.06
430	P-212	352	PVC	J-165	J-164	12.0	150.0	-23	0.07
431	P-213	366	PVC	J-164	J-163	8.0	150.0	-1	0.01
433	P-215	347	PVC	J-167	J-170	8.0	150.0	-5	0.03
434	P-216	362	PVC	J-170	J-171	10.0	150.0	-11	0.04
435	P-217	254	PVC	J-171	J-172	10.0	150.0	-10	0.04
436	P-218	245	PVC	J-172	J-173	10.0	150.0	-10	0.04
437	P-219	210	PVC	J-173	J-174	10.0	150.0	-11	0.05
438	P-220	567	PVC	J-174	J-175	10.0	150.0	-11	0.05
439	P-221	392	PVC	J-175	J-176	10.0	150.0	-11	0.05
440	P-222	413	PVC	J-176	J-177	10.0	150.0	-11	0.05
441	P-223	515	PVC	J-177	J-178	10.0	150.0	-11	0.05
442	P-224	397	PVC	J-178	J-179	10.0	150.0	-11	0.05
443	P-225	357	PVC	J-181	J-180	8.0	150.0	0	0.00
444	P-226	101	PVC	J-179	J-180	10.0	150.0	-11	0.05
445	P-227	356	PVC	J-128	J-129	10.0	150.0	34	0.14
453	P-228	377	PVC	J-171	J-188	8.0	150.0	-4	0.02
456	P-230	362	PVC	J-188	J-187	8.0	150.0	-4	0.03
457	P-231	362	PVC	J-187	J-186	8.0	150.0	-5	0.03
458	P-232	348	PVC	J-186	J-163	8.0	150.0	-6	0.04
460	P-234	544	PVC	J-162	J-161	8.0	150.0	-5	0.03
463	P-237	1,104	PVC	J-184	J-180	10.0	150.0	11	0.05
465	P-239	367	PVC	J-184	J-183	10.0	150.0	-23	0.09
467	P-241	364	PVC	J-183	J-182	10.0	150.0	-28	0.12
468	P-242	365	PVC	J-182	J-129	10.0	150.0	-31	0.13
516	P-244	348	PVC	J-188	J-165	8.0	150.0	(N/A)	(N/A)

J:\2-13125 - Roundup On-Call 2013\TO-19 Phase 5 Water\CADD 2-13125 TO19\WaterCAD\2-13125-TO19 Hydraulic Model.wtg

Appendix J:

User Rates and Financial Documentation

STATE OF MONTANA
GENERAL OBLIGATION BONDS
DRINKING WATER
(REVOLVING FUND PROGRAM) SER 12

BORROWER: Roundup

PROJECT NAME:

FINAL LOAN PAYMENT: 7/1/2034

LOAN COMMITMENT: \$1,392,000

OF LOAN PAYMENTS: 40

LOAN AMOUNT: 1,392,000

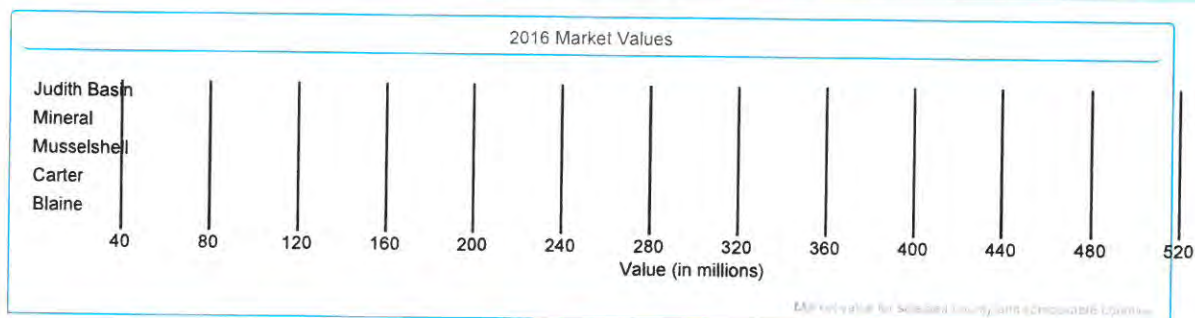
PROJECT NUMBER:

INTEREST RATE: 2.50%

DATE OF FUNDING: 10/16/2014

PAYMENT DUE	LOAN LOSS RESERVE	ADM EXPENSE SURCHARGE	INTEREST PAYMENT	PRINCIPAL PAYMENT	O/S LOAN BALANCE	TOTAL AMOUNT OF PAYMENT	
1 1/1/2015	725.00	725.00	5,800.00	27,000.00	1,365,000.00	\$34,250.00	\$ 34,250.00
2 7/1/2015	1,706.25	1,706.25	13,650.00	27,000.00	1,338,000.00	\$44,062.50	
3 1/1/2016	1,672.50	1,672.50	13,380.00	28,000.00	1,310,000.00	\$44,725.00	\$88,787.50
4 7/1/2016	1,637.50	1,637.50	13,100.00	28,000.00	1,282,000.00	\$44,375.00	
5 1/1/2017	1,602.50	1,602.50	12,820.00	28,000.00	1,254,000.00	\$44,025.00	\$88,400.00
6 7/1/2017	1,567.50	1,567.50	12,540.00	29,000.00	1,225,000.00	\$44,675.00	
7 1/1/2018	1,531.25	1,531.25	12,250.00	29,000.00	1,196,000.00	\$44,312.50	\$88,987.50
8 7/1/2018	1,495.00	1,495.00	11,960.00	29,000.00	1,167,000.00	\$43,950.00	
9 1/1/2019	1,458.75	1,458.75	11,670.00	30,000.00	1,137,000.00	\$44,587.50	\$88,537.50
10 7/1/2019	1,421.25	1,421.25	11,370.00	30,000.00	1,107,000.00	\$44,212.50	
11 1/1/2020	1,383.75	1,383.75	11,070.00	31,000.00	1,076,000.00	\$44,837.50	\$89,050.00
12 7/1/2020	1,345.00	1,345.00	10,760.00	31,000.00	1,045,000.00	\$44,450.00	
13 1/1/2021	1,306.25	1,306.25	10,450.00	31,000.00	1,014,000.00	\$44,062.50	\$88,512.50
14 7/1/2021	1,267.50	1,267.50	10,140.00	32,000.00	982,000.00	\$44,675.00	
15 1/1/2022	1,227.50	1,227.50	9,820.00	32,000.00	950,000.00	\$44,275.00	\$88,950.00
16 7/1/2022	1,187.50	1,187.50	9,500.00	33,000.00	917,000.00	\$44,875.00	
17 1/1/2023	1,146.25	1,146.25	9,170.00	33,000.00	884,000.00	\$44,462.50	\$89,337.50
18 7/1/2023	1,105.00	1,105.00	8,840.00	33,000.00	851,000.00	\$44,050.00	
19 1/1/2024	1,063.75	1,063.75	8,510.00	34,000.00	817,000.00	\$44,637.50	\$88,687.50
20 7/1/2024	1,021.25	1,021.25	8,170.00	34,000.00	783,000.00	\$44,212.50	
21 1/1/2025	978.75	978.75	7,830.00	35,000.00	748,000.00	\$44,787.50	\$89,000.00
22 7/1/2025	935.00	935.00	7,480.00	35,000.00	713,000.00	\$44,350.00	
23 1/1/2026	891.25	891.25	7,130.00	36,000.00	677,000.00	\$44,912.50	\$89,262.50
24 7/1/2026	846.25	846.25	6,770.00	36,000.00	641,000.00	\$44,462.50	
25 1/1/2027	801.25	801.25	6,410.00	36,000.00	605,000.00	\$44,012.50	\$88,475.00
26 7/1/2027	756.25	756.25	6,050.00	37,000.00	568,000.00	\$44,562.50	
27 1/1/2028	710.00	710.00	5,680.00	37,000.00	531,000.00	\$44,100.00	\$88,662.50
28 7/1/2028	663.75	663.75	5,310.00	38,000.00	493,000.00	\$44,637.50	
29 1/1/2029	616.25	616.25	4,930.00	38,000.00	455,000.00	\$44,162.50	\$88,800.00
30 7/1/2029	568.75	568.75	4,550.00	39,000.00	416,000.00	\$44,687.50	
31 1/1/2030	520.00	520.00	4,160.00	39,000.00	377,000.00	\$44,200.00	\$88,887.50
32 7/1/2030	471.25	471.25	3,770.00	40,000.00	337,000.00	\$44,712.50	
33 1/1/2031	421.25	421.25	3,370.00	40,000.00	297,000.00	\$44,212.50	\$88,925.00
34 7/1/2031	371.25	371.25	2,970.00	41,000.00	256,000.00	\$44,712.50	
35 1/1/2032	320.00	320.00	2,560.00	41,000.00	215,000.00	\$44,200.00	\$88,912.50
36 7/1/2032	268.75	268.75	2,150.00	42,000.00	173,000.00	\$44,687.50	
37 1/1/2033	216.25	216.25	1,730.00	42,000.00	131,000.00	\$44,162.50	\$88,850.00
38 7/1/2033	163.75	163.75	1,310.00	43,000.00	88,000.00	\$44,637.50	
39 1/1/2034	110.00	110.00	880.00	43,000.00	45,000.00	\$44,100.00	\$88,737.50
40 7/1/2034	56.25	56.25	450.00	45,000.00	0.00	\$45,562.50	\$45,562.50
	37,557.50	37,557.50	300,460.00	1,392,000.00		1,767,575.00	

Montana Certified Values



Musselshell



2016



City Of Roundup



Download CSV

Select a county, year and taxing jurisdiction to view total market and taxable property values within the selected taxing authority. On a touchscreen you can navigate between taxing jurisdictions by swiping left and right on the table.

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More information on the certification of values process can be found on the [Department of Revenue website](#).

Feedback

City Of Roundup		
Property Type	Market Value	Taxable Value
Special Mobile	\$168,335	\$2,525
Manufactured Homes	\$1,188,130	\$13,711
Personal Property	\$1,261,727	\$16,470
Real Property	\$87,180,444	\$1,247,722
Centrally Assessed	\$6,426,162	\$410,374
Net & Gross Proceeds	NA	\$0
Total*	\$96,056,463	\$1,690,802
Other Information		
Newly Taxable	NA	\$94,666
TIF Increment	NA	\$0

**STATE OF MONTANA
GENERAL OBLIGATION BONDS
DRINKING WATER
(REVOLVING FUND PROGRAM)**

BORROWER: Roundup

PROJECT NAME: DRAFT

FINAL LOAN PAYMENT: 1/1/2036

LOAN COMMITMENT: \$239,000

OF LOAN PAYMENTS: 40

LOAN AMOUNT: 239,000

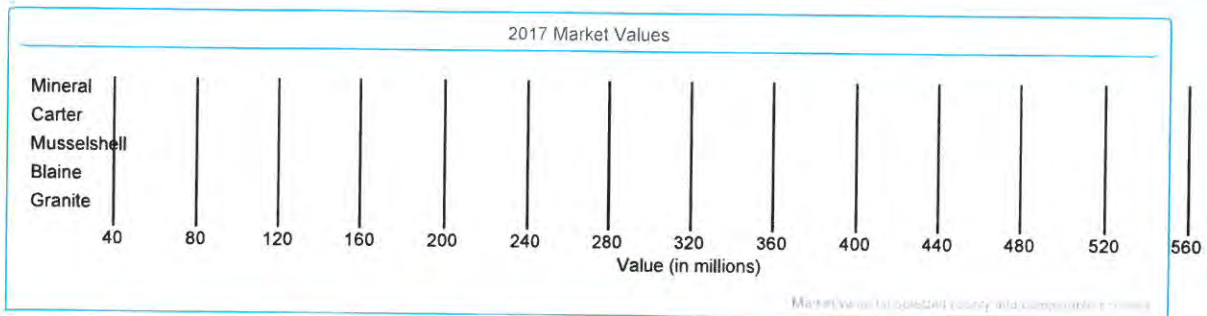
PROJECT NUMBER:

INTEREST RATE: 2.50%

DATE OF FUNDING: 5/15/2016

	PAYMENT DUE	LOAN LOSS RESERVE	ADM EXPENSE SURCHARGE	INTEREST PAYMENT	PRINCIPAL PAYMENT	O/S LOAN BALANCE	TOTAL AMOUNT OF PAYMENT	
1	7/1/2016	76.35	76.35	610.78	5,000.00	234,000.00	\$5,763.47	
2	1/1/2017	292.50	292.50	2,340.00	5,000.00	229,000.00	\$7,925.00	\$13,688.47
3	7/1/2017	286.25	286.25	2,290.00	5,000.00	224,000.00	\$7,862.50	
4	1/1/2018	280.00	280.00	2,240.00	5,000.00	219,000.00	\$7,800.00	\$15,662.50
5	7/1/2018	273.75	273.75	2,190.00	5,000.00	214,000.00	\$7,737.50	
6	1/1/2019	267.50	267.50	2,140.00	5,000.00	209,000.00	\$7,675.00	\$15,412.50
7	7/1/2019	261.25	261.25	2,090.00	5,000.00	204,000.00	\$7,612.50	
8	1/1/2020	255.00	255.00	2,040.00	5,000.00	199,000.00	\$7,550.00	\$15,162.50
9	7/1/2020	248.75	248.75	1,990.00	5,000.00	194,000.00	\$7,487.50	
10	1/1/2021	242.50	242.50	1,940.00	5,000.00	189,000.00	\$7,425.00	\$14,912.50
11	7/1/2021	236.25	236.25	1,890.00	5,000.00	184,000.00	\$7,362.50	
12	1/1/2022	230.00	230.00	1,840.00	5,000.00	179,000.00	\$7,300.00	\$14,662.50
13	7/1/2022	223.75	223.75	1,790.00	5,000.00	174,000.00	\$7,237.50	
14	1/1/2023	217.50	217.50	1,740.00	5,000.00	169,000.00	\$7,175.00	\$14,412.50
15	7/1/2023	211.25	211.25	1,690.00	6,000.00	163,000.00	\$8,112.50	
16	1/1/2024	203.75	203.75	1,630.00	6,000.00	157,000.00	\$8,037.50	\$16,150.00
17	7/1/2024	196.25	196.25	1,570.00	6,000.00	151,000.00	\$7,962.50	
18	1/1/2025	188.75	188.75	1,510.00	6,000.00	145,000.00	\$7,887.50	\$15,850.00
19	7/1/2025	181.25	181.25	1,450.00	6,000.00	139,000.00	\$7,812.50	
20	1/1/2026	173.75	173.75	1,390.00	6,000.00	133,000.00	\$7,737.50	\$15,550.00
21	7/1/2026	166.25	166.25	1,330.00	6,000.00	127,000.00	\$7,662.50	
22	1/1/2027	158.75	158.75	1,270.00	6,000.00	121,000.00	\$7,587.50	\$15,250.00
23	7/1/2027	151.25	151.25	1,210.00	6,000.00	115,000.00	\$7,512.50	
24	1/1/2028	143.75	143.75	1,150.00	6,000.00	109,000.00	\$7,437.50	\$14,950.00
25	7/1/2028	136.25	136.25	1,090.00	6,000.00	103,000.00	\$7,362.50	
26	1/1/2029	128.75	128.75	1,030.00	6,000.00	97,000.00	\$7,287.50	\$14,650.00
27	7/1/2029	121.25	121.25	970.00	6,000.00	91,000.00	\$7,212.50	
28	1/1/2030	113.75	113.75	910.00	6,000.00	85,000.00	\$7,137.50	\$14,350.00
29	7/1/2030	106.25	106.25	850.00	7,000.00	78,000.00	\$8,062.50	
30	1/1/2031	97.50	97.50	780.00	7,000.00	71,000.00	\$7,975.00	\$16,037.50
31	7/1/2031	88.75	88.75	710.00	7,000.00	64,000.00	\$7,887.50	
32	1/1/2032	80.00	80.00	640.00	7,000.00	57,000.00	\$7,800.00	\$15,687.50
33	7/1/2032	71.25	71.25	570.00	7,000.00	50,000.00	\$7,712.50	
34	1/1/2033	62.50	62.50	500.00	7,000.00	43,000.00	\$7,625.00	\$15,337.50
35	7/1/2033	53.75	53.75	430.00	7,000.00	36,000.00	\$7,537.50	
36	1/1/2034	45.00	45.00	360.00	7,000.00	29,000.00	\$7,450.00	\$14,987.50
37	7/1/2034	36.25	36.25	290.00	7,000.00	22,000.00	\$7,362.50	
38	1/1/2035	27.50	27.50	220.00	7,000.00	15,000.00	\$7,275.00	\$14,637.50
39	7/1/2035	18.75	18.75	150.00	7,000.00	8,000.00	\$7,187.50	
40	1/1/2036	10.00	10.00	80.00	8,000.00	0.00	\$8,100.00	\$15,287.50
		6,363.85	6,363.85	50,910.78	239,000.00		302,638.47	

Montana Certified Values



Musselshell



2017



City Of Roundup



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Select a county, year and taxing jurisdiction to view total market and taxable property values within the selected taxing authority. On a touchscreen you can navigate between taxing jurisdictions by swiping left and right on the table.

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More information on the certification of values process can be found on the [Department of Revenue website](#).

Feedback

City Of Roundup		
Property Type	Market Value	Taxable Value
Special Mobile	\$0	\$0
Manufactured Homes	\$1,121,710	\$12,865
Personal Property	\$1,428,930	\$21,901
Real Property	\$97,350,419	\$1,362,725
Centrally Assessed	\$6,946,925	\$411,932
Net & Gross Proceeds	NA	\$0
Total*	\$106,847,984	\$1,809,423
Other Information		
Newly Taxable	NA	\$27,999
TIF Increment	NA	\$0

12/07/17
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CITY OF ROUNDUP
Statement of Expenditure - Budget vs. Actual Report
For the Accounting Period: 6 / 17

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5210 WATER

Account	Object	Committed Current Month	Committed YTD	Original Appropriation	Current Appropriation	Available Appropriation	% Committed
430000	Public Works						
430500	Water Utilities						
	100 Personal Services	9,668.56	116,433.26	125,000.00	125,000.00	8,566.74	93 %
	190 PERS	-1,369.24	-1,369.24	0.00	0.00	1,369.24	0 %
	200 Supplies	4,088.76	68,491.09	80,000.00	80,000.00	11,508.91	86 %
	210 Office Supplies & Materials	0.00	1,488.25	2,000.00	2,000.00	511.75	74 %
	300 Purchased Services	2,491.32	29,487.39	40,000.00	40,000.00	10,512.61	74 %
	310 Contracted Services	0.00	860.25	20,000.00	20,000.00	19,139.75	4 %
	330 Reservoir Cleaning	0.00	0.00	7,000.00	7,000.00	7,000.00	0 %
	350 Professional Services	313.33	1,566.66	4,000.00	4,000.00	2,433.34	39 %
	390 Other Purchased Services	15,000.00	15,000.00	15,000.00	15,000.00	0.00	100 %
	500 Fixed Charges	0.00	3,476.80	10,000.00	10,000.00	6,523.20	35 %
	830 Deprec-Closed to Retained Earnings	143,519.00	143,519.00	0.00	0.00	-143,519.00	0 %
	940 Machinery & Equipment	-35,137.71	0.00	15,000.00	15,000.00	15,000.00	0 %
	960 Water Rehab Project	-1,482,177.50	-6,421.30	1,851,627.14	1,851,627.14	1,858,048.44	0 %
	990 Depreciation Fund	0.00	0.00	345,228.19	345,228.19	345,228.19	0 %
	Account Total:	-1,343,603.48	372,532.16	2,514,855.33	2,514,855.33	2,142,323.17	15 %
430610	bonds interest expenditure						
	600 Debt Service	0.00	31,268.53	0.00	0.00	-31,268.53	0 %
	Account Total:	0.00	31,268.53	0.00	0.00	-31,268.53	0 %
430620	bonds interest exp						
	600 Debt Service	0.00	816.36	0.00	0.00	-816.36	0 %
	Account Total:	0.00	816.36	0.00	0.00	-816.36	0 %
	Account Group Total:	-1,343,603.48	404,617.05	2,514,855.33	2,514,855.33	2,110,238.28	16 %
	Fund Total:	-1,343,603.48	404,617.05	2,514,855.33	2,514,855.33	2,110,238.28	16 %
	Grand Total:	-1,343,603.48	404,617.05	2,514,855.33	2,514,855.33	2,110,238.28	16 %

12/07/17
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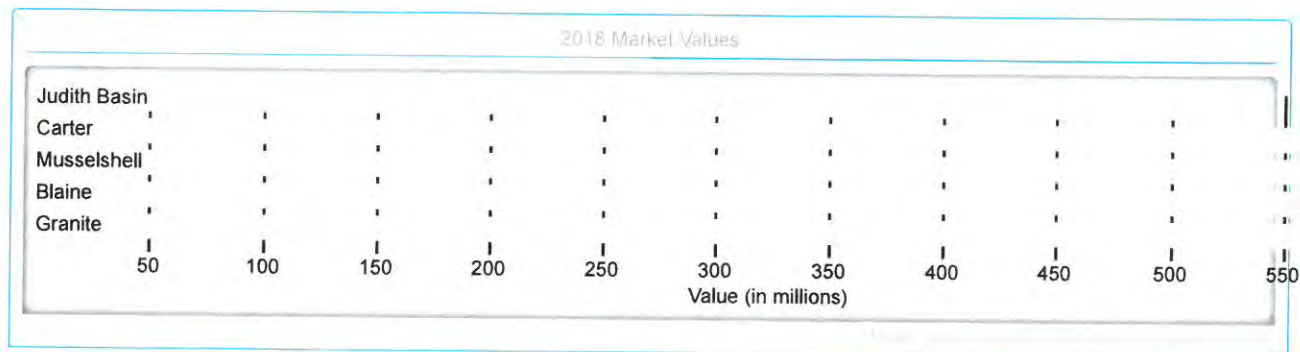
5210 WATER

CITY OF ROUNDUP
Statement of Revenue Budget vs Actuals
For the Accounting Period: 6 / 17

Page: 1 of 1
Report ID: B110

Account	Received Current Month	Received YTD	Estimated Revenue	Revenue To Be Received	% Received
330000 INTERGOVERNMENTAL REVENUES					
331000 Federal Grants	0.00	350,933.21	450,000.00	99,066.79	78 %
334060 COAL IMPACT GRANT	0.00	458,127.54	500,000.00	1,872.46	100 %
334120 TSEP GRANT	0.00	388,434.50	500,000.00	111,565.50	78 %
336020 revenue on behalf payment	1,909.12	1,909.12	0.00	-1,909.12	** %
Account Group Total:	1,909.12	1,239,404.37	1,450,000.00	210,595.63	85 %
340000 Charges for Services					
343021 Metered Water Sales	42,887.37	427,321.24	420,000.00	-7,321.24	102 %
343026 Water Installation Charges	0.00	106.00	1,000.00	894.00	11 %
343027 Miscellaneous Water Revenue	275.00	1,475.00	0.00	-1,475.00	** %
Account Group Total:	43,162.37	428,902.24	421,000.00	-7,902.24	102 %
370000 Investment and Royalty Earnings					
371010 Interest Earnings	117.33	988.12	650.00	-338.12	152 %
Account Group Total:	117.33	988.12	650.00	-338.12	152 %
380000 Other Financing Sources					
381070 Proceeds Intercap	-61,842.00	0.00	16,500.00	16,500.00	0 %
381071 Proceeds Bonds	-120,000.00	0.00	120,000.00	120,000.00	0 %
381072 Proceeds Bonds	-120,000.00	0.00	120,000.00	120,000.00	0 %
Account Group Total:	-301,842.00	0.00	256,500.00	256,500.00	0 %
Fund Total:	-256,653.18	1,669,294.73	2,128,150.00	458,855.27	78 %
Grand Total:	-256,653.18	1,669,294.73	2,128,150.00	458,855.27	78 %

Montana Certified Values



Musselshell

2018

City Of Roundup

[Download CSV](#)

Select a county, year and taxing jurisdiction to view total market and taxable property values within the selected taxing authority. On a touchscreen you can navigate between taxing jurisdictions by swiping left and right on the table.

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City Of Roundup		
Property Type	Market Value	Taxable Value
Special Mobile	\$0	\$0
Manufactured Homes	\$1,086,190	\$12,385
Personal Property	\$1,107,514	\$16,846
Real Property	\$97,377,159	\$1,357,850
Centrally Assessed	\$7,322,768	\$424,748
Net & Gross Proceeds	NA	\$0
Total*	\$106,893,631	\$1,811,829
Other Information		
Newly Taxable	NA	\$34,479
TIF Increment	NA	\$0

01/14/20
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5210 WATER

CITY OF ROUNDUP
Statement of Revenue Budget vs Actuals
For the Accounting Period: 6 / 18

Page: 1 of 1
Report ID: B110

Account	Received		Revenue		% Received
	Current Month	Received YTD	Estimated Revenue	To Be Received	
330000 INTERGOVERNMENTAL REVENUES					
331000 Federal Grants	0.00	0.00	450,000.00	450,000.00	0 %
334060 COAL IMPACT GRANT	3,708.50	-82,121.72	182,000.00	264,121.72	-45 %
334118 T-SEP Planning Grant	15,000.00	15,000.00	15,000.00	0.00	100 %
Account Group Total:	18,708.50	-67,121.72	647,000.00	714,121.72	-10 %
340000 Charges for Services					
343021 Metered Water Sales	37,329.52	445,124.12	420,000.00	-25,124.12	106 %
343026 Water Installation Charges	75.00	1,050.00	1,000.00	-50.00	105 %
343027 Miscellaneous Water Revenue	250.00	1,950.00	0.00	-1,950.00	** %
Account Group Total:	37,654.52	448,124.12	421,000.00	-27,124.12	106 %
370000 Investment and Royalty Earnings					
371010 Interest Earnings	145.97	2,408.42	950.00	-1,458.42	254 %
Account Group Total:	145.97	2,408.42	950.00	-1,458.42	254 %
Fund Total:	56,508.99	383,410.82	1,068,950.00	685,539.18	36 %
Grand Total:	56,508.99	383,410.82	1,068,950.00	685,539.18	36 %

01/14/20
15:13:57

CITY OF ROUNDUP
Statement of Expenditure - Budget vs. Actual Report
For the Accounting Period: 5 / 18

Page: 1 of 1
Report ID: B100

5210 WATER

Account	Object	Committed Current Month	Committed YTD	Original Appropriation	Current Appropriation	Available Appropriation	% Committed
430000	Public Works						
430500	Water Utilities						
100	Personal Services	9,752.62	113,878.97	130,000.00	130,000.00	16,121.03	88 %
200	Supplies	10,631.39	62,791.51	98,000.00	98,000.00	35,208.49	64 %
210	Office Supplies & Materials	0.00	0.00	2,000.00	2,000.00	2,000.00	%
300	Purchased Services	1,735.31	29,476.72	40,000.00	40,000.00	10,523.28	74 %
310	Contracted Services	0.00	0.00	35,000.00	35,000.00	35,000.00	%
330	Reservoir Cleaning	0.00	0.00	8,000.00	8,000.00	8,000.00	%
350	Professional Services	0.00	1,360.00	4,000.00	4,000.00	2,640.00	34 %
390	Other Purchased Services	0.00	0.00	15,000.00	15,000.00	15,000.00	%
500	Fixed Charges	0.00	4,909.40	10,000.00	10,000.00	5,090.60	49 %
940	Machinery & Equipment	0.00	0.00	20,000.00	20,000.00	20,000.00	%
960	Water Rehab Project	20,754.70	111,662.50	900,000.00	900,000.00	788,337.50	12 %
990	Depreciation Fund	0.00	0.00	456,349.98	456,349.98	456,349.98	%
Account Total:		42,874.02	324,079.10	1,718,349.98	1,718,349.98	1,394,270.88	19 %
430610	bonds interest expenditure						
600	Debt Service	0.00	30,987.50	0.00	0.00	-30,987.50	%
Account Total:		0.00	30,987.50	0.00	0.00	-30,987.50	%
430620	bonds interest exp						
600	Debt Service	0.00	2,950.00	0.00	0.00	-2,950.00	%
Account Total:		0.00	2,950.00	0.00	0.00	-2,950.00	%
Account Group Total:		42,874.02	358,016.60	1,718,349.98	1,718,349.98	1,360,333.38	21 %
Fund Total:		42,874.02	358,016.60	1,718,349.98	1,718,349.98	1,360,333.38	21 %
Grand Total:		42,874.02	358,016.60	1,718,349.98	1,718,349.98	1,360,333.38	21 %

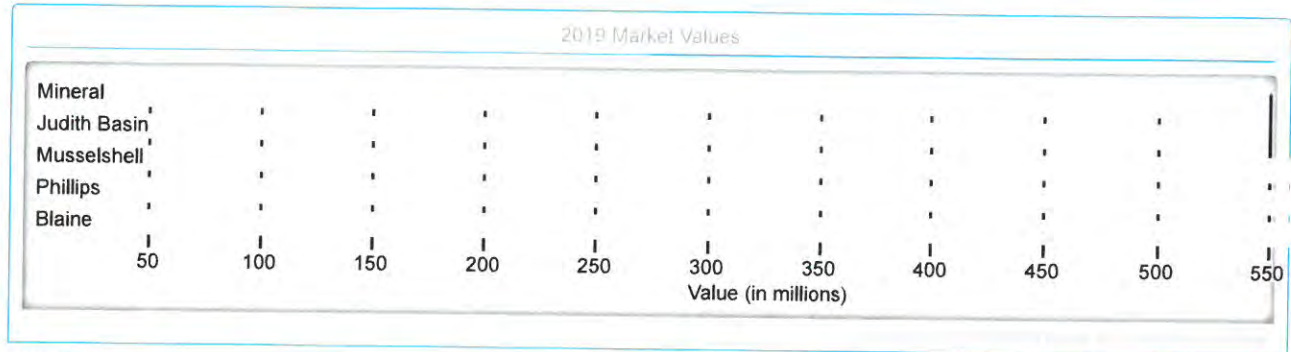
**STATE OF MONTANA
GENERAL OBLIGATION BONDS
DRINKING WATER
(REVOLVING FUND PROGRAM)**

BORROWER: Roundup
PROJECT NAME: Water Lines
LOAN COMMITMENT: \$494,000
LOAN AMOUNT: 494,000
INTEREST RATE: 2.50%

FINAL LOAN PAYMENT: 7/1/2040
OF LOAN PAYMENTS: 40
PROJECT NUMBER:
DATE OF FUNDING: 6/24/2020

PAYMENT DUE	LOAN LOSS RESERVE	ADM EXPENSE SURCHARGE	INTEREST PAYMENT	PRINCIPAL PAYMENT	O/S LOAN BALANCE	TOTAL AMOUNT OF PAYMENT
1 1/1/2021	641.51	641.51	5,132.11	10,000.00	484,000.00	\$16,415.14
2 7/1/2021	605.00	605.00	4,840.00	10,000.00	474,000.00	\$16,050.00
3 1/1/2022	592.50	592.50	4,740.00	10,000.00	464,000.00	\$15,925.00
4 7/1/2022	580.00	580.00	4,640.00	10,000.00	454,000.00	\$15,800.00
5 1/1/2023	567.50	567.50	4,540.00	10,000.00	444,000.00	\$15,675.00
6 7/1/2023	555.00	555.00	4,440.00	10,000.00	434,000.00	\$15,550.00
7 1/1/2024	542.50	542.50	4,340.00	10,000.00	424,000.00	\$15,425.00
8 7/1/2024	530.00	530.00	4,240.00	10,000.00	414,000.00	\$15,300.00
9 1/1/2025	517.50	517.50	4,140.00	11,000.00	403,000.00	\$16,175.00
10 7/1/2025	503.75	503.75	4,030.00	11,000.00	392,000.00	\$16,037.50
11 1/1/2026	490.00	490.00	3,920.00	11,000.00	381,000.00	\$15,900.00
12 7/1/2026	476.25	476.25	3,810.00	11,000.00	370,000.00	\$15,762.50
13 1/1/2027	462.50	462.50	3,700.00	11,000.00	359,000.00	\$15,625.00
14 7/1/2027	448.75	448.75	3,590.00	11,000.00	348,000.00	\$15,487.50
15 1/1/2028	435.00	435.00	3,480.00	11,000.00	337,000.00	\$15,350.00
16 7/1/2028	421.25	421.25	3,370.00	12,000.00	325,000.00	\$16,212.50
17 1/1/2029	406.25	406.25	3,250.00	12,000.00	313,000.00	\$16,062.50
18 7/1/2029	391.25	391.25	3,130.00	12,000.00	301,000.00	\$15,912.50
19 1/1/2030	376.25	376.25	3,010.00	12,000.00	289,000.00	\$15,762.50
20 7/1/2030	361.25	361.25	2,890.00	12,000.00	277,000.00	\$15,612.50
21 1/1/2031	346.25	346.25	2,770.00	12,000.00	265,000.00	\$15,462.50
22 7/1/2031	331.25	331.25	2,650.00	12,000.00	253,000.00	\$15,312.50
23 1/1/2032	316.25	316.25	2,530.00	13,000.00	240,000.00	\$16,162.50
24 7/1/2032	300.00	300.00	2,400.00	13,000.00	227,000.00	\$16,000.00
25 1/1/2033	283.75	283.75	2,270.00	13,000.00	214,000.00	\$15,837.50
26 7/1/2033	267.50	267.50	2,140.00	13,000.00	201,000.00	\$15,675.00
27 1/1/2034	251.25	251.25	2,010.00	13,000.00	188,000.00	\$15,512.50
28 7/1/2034	235.00	235.00	1,880.00	13,000.00	175,000.00	\$15,350.00
29 1/1/2035	218.75	218.75	1,750.00	14,000.00	161,000.00	\$16,187.50
30 7/1/2035	201.25	201.25	1,610.00	14,000.00	147,000.00	\$16,012.50
31 1/1/2036	183.75	183.75	1,470.00	14,000.00	133,000.00	\$15,837.50
32 7/1/2036	166.25	166.25	1,330.00	14,000.00	119,000.00	\$15,662.50
33 1/1/2037	148.75	148.75	1,190.00	14,000.00	105,000.00	\$15,487.50
34 7/1/2037	131.25	131.25	1,050.00	14,000.00	91,000.00	\$15,312.50
35 1/1/2038	113.75	113.75	910.00	15,000.00	76,000.00	\$16,137.50
36 7/1/2038	95.00	95.00	760.00	15,000.00	61,000.00	\$15,950.00
37 1/1/2039	76.25	76.25	610.00	15,000.00	46,000.00	\$15,762.50
38 7/1/2039	57.50	57.50	460.00	15,000.00	31,000.00	\$15,575.00
39 1/1/2040	38.75	38.75	310.00	15,000.00	16,000.00	\$15,387.50
40 7/1/2040	20.00	20.00	160.00	16,000.00	0.00	\$16,200.00
	13,686.51	13,686.51	109,492.11	494,000.00		630,865.14

Montana Certified Values



Musselshell

2019

City Of Roundup

[Download CSV](#)

Select a county, year and taxing jurisdiction to view total market and taxable property values within the selected taxing authority. On a touchscreen you can navigate between taxing jurisdictions by swiping left and right on the table.

*The sum of all property types may not add up to the Total due to corrections, revisions and rounding. For some jurisdictions, the total value may not be divided into all property types. In these cases, only the total value will be shown.

More information on the certification of values process can be found on the [Department of Revenue website](#).

City Of Roundup		
Property Type	Market Value	Taxable Value
Special Mobile	\$0	\$0
Manufactured Homes	\$831,610	\$9,407
Personal Property	\$962,881	\$14,488
Real Property	\$96,396,183	\$1,348,909
Centrally Assessed	\$7,084,478	\$397,667
Net & Gross Proceeds	NA	\$0
Total*	\$105,275,152	\$1,770,471
Other Information		
Newly Taxable	NA	\$11,247
TIF Increment	NA	\$0

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5210 WATER

CITY OF ROUNDUP
Statement of Expenditure - Budget vs. Actual Report
For the Accounting Period: 5 / 19

Page: 1 of 1
Report ID: B100

Account	Object	Committed Current Month	Committed YTD	Original Appropriation	Current Appropriation	Available Appropriation	% Committed
430000	Public Works						
430500	Water Utilities						
	100 Personal Services	11,177.15	130,328.75	140,000.00	140,000.00	9,671.25	93 %
	190 PERS	0.00	20,999.50	0.00	0.00	-20,999.50	0 %
	200 Supplies	0.00	58,505.93	105,000.00	105,000.00	46,494.07	56 %
	210 Office Supplies & Materials	1,237.69	0.00	2,000.00	2,000.00	2,000.00	66 %
	300 Purchased Services	0.00	26,351.57	40,000.00	40,000.00	13,648.43	66 %
	310 Contracted Services	1,837.52	0.00	35,000.00	35,000.00	35,000.00	66 %
	330 Reservoir Cleaning	0.00	16,225.00	0.00	0.00	-16,225.00	0 %
	350 Professional Services	0.00	1,360.00	4,000.00	4,000.00	2,640.00	34 %
	390 Other Purchased Services	0.00	15,000.00	15,000.00	15,000.00	0.00	100 %
	500 Fixed Charges	0.00	4,311.81	10,000.00	10,000.00	5,688.19	43 %
	940 Machinery & Equipment	0.00	0.00	20,000.00	20,000.00	20,000.00	77 %
	960 Water Rehab Project	41,804.00	904,551.58	1,168,100.78	1,168,100.78	263,549.20	77 %
	Account Total:	71,056.36	1,177,634.14	1,539,100.78	1,539,100.78	361,466.64	77 %
430610	bonds interest expenditure						
	600 Debt Service	0.00	29,537.50	0.00	0.00	-29,537.50	0 %
	Account Total:	0.00	29,537.50	0.00	0.00	-29,537.50	0 %
430620	bonds interest exp						
	600 Debt Service	0.00	2,850.00	0.00	0.00	-2,850.00	0 %
	Account Total:	0.00	2,850.00	0.00	0.00	-2,850.00	0 %
	Account Group Total:	71,056.36	1,210,021.64	1,539,100.78	1,539,100.78	329,079.14	79 %
	Fund Total:	71,056.36	1,210,021.64	1,539,100.78	1,539,100.78	329,079.14	79 %
	Grand Total:	71,056.36	1,210,021.64	1,539,100.78	1,539,100.78	329,079.14	79 %

01/14/20
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CITY OF ROUNDUP
Statement of Revenue Budget vs Actuals
For the Accounting Period: 6 / 19

Page: 1 of 1
Report ID: B110

5210 WATER

Account	Received		Received YTD	Estimated Revenue	Revenue		% Received
	Current Month				To Be Received		
330000 INTERGOVERNMENTAL REVENUES							
331000 Federal Grants	0.00	450,000.00	450,000.00	450,000.00	0.00	100 %	
334060 COAL IMPACT GRANT	0.00	178,291.50	178,291.50	182,000.00	3,708.50	98 %	
334118 T-SEP Planning Grant	0.00	0.00	0.00	15,000.00	15,000.00	0 %	
336020 revenue on behalf payment	2,570.62	4,571.04	4,571.04	0.00	-4,571.04	** %	
Account Group Total:	2,570.62	632,862.54	632,862.54	647,000.00	14,137.46	98 %	
340000 Charges for Services							
343021 Metered Water Sales	43,480.00	455,453.56	455,453.56	430,000.00	-25,453.56	106 %	
343022 Unmetered Water Sales	12,585.00	136,935.00	136,935.00	144,000.00	7,065.00	95 %	
343026 Water Installation Charges	0.00	618.33	618.33	1,000.00	381.67	62 %	
343027 Miscellaneous Water Revenue	425.00	3,100.00	3,100.00	0.00	-3,100.00	** %	
Account Group Total:	56,490.00	596,106.89	596,106.89	575,000.00	-21,106.89	104 %	
370000 Investment and Royalty Earnings							
371010 Interest Earnings	178.81	2,691.52	2,691.52	500.00	-2,191.52	538 %	
Account Group Total:	178.81	2,691.52	2,691.52	500.00	-2,191.52	538 %	
Fund Total:	59,239.43	1,231,660.95	1,231,660.95	1,222,500.00	-9,160.95	101 %	
Grand Total:	59,239.43	1,231,660.95	1,231,660.95	1,222,500.00	-9,160.95	101 %	

CURRENT CITY DEBT

WATER BOND 2014 (WATER METERS AND LINES)

- Loan WRF-15326 Total Loan \$1,392,000.00 20 years at 2.5% interest rate
- Loan Date 10/16/2014 Final Loan Payment 7/1/2034
- Payments Due January 1st and July 1st each year
- Remaining balance as of 1/1/2020 \$1,076,000
- Principal payment \$31,000 goes up 1,000 each year interest payments average \$10,000

WATER BOND 2016 (WATER LINES)

- Loan WRF-17370 Total Loan \$120,000.00 20 years at 2.5% interest rate
- Loan Date 08/10/2016 Final Loan Payment 7/1/2036
- Payments Due January 1st and July 1st each year
- Remaining balance as of 1/1/2020 \$106,000.00
- Principal payment \$3,000 interest payments average \$1,300.00

SEWER BOND 99

- Loan RD1 Total Loan \$835,272.99 29 years at 4.5% interest rate
- Loan Date (05/25/99Original) New 06/25/2005 Final Loan Payment 03/25/2028
- Payments Due every month on the 25th of the month
- Remaining balance as of 1/1/2020 \$399,356.19
- Principal payment \$4,901 interest payments average \$1,500.00

SEWER BOND 2012 (LAGOON UV DISINFECTION)

- Loan UV Disinfection Total Loan \$286,000 15 years at variable rate 1.0- 2.5% interest rate
- Loan Date 7/20/2012 Final Loan Payment 08/15/2027
- Payments Due February 15th and August 15th
- Remaining balance as of 02/15/2020 \$121,635.89
- Principal payment \$8,105 interest payments average \$2,000.00

WATER DEBT \$1,182,000 SEWER DEBTS \$ 520,992.08

TOTAL DEBT \$1,702,992.08 AS OF 2/15/2020

RESOLUTION OF INTENT # 1094

A Resolution of Intent giving notice of restructuring of the water rates effective July 1, 2018.

WHEREAS, Section 69-7-111 of the MCA requires that a Public Hearing be held. The City of Roundup will hold a public meetings on Tuesday May 8th, and Tuesday May 22nd at the City Office 34 3rd Avenue West, at 7:00 p.m. for the purpose of soliciting public comment on the change to the water rates structure for city residents. This resolution was advertised under the sections for legal advertisement and notices of public hearings in the Roundup Record Tribune, and the Roundup Herald. The water users were also notified of said public hearings personally by postmarked mail dated April 23rd, 2018.

WHEREAS, all users and the City citizens were given an opportunity to comment on the rate change at the May 8th and May 22nd, 2018 public hearings.

Now, therefore, be it resolved by the Council of the City of Roundup, Montana:

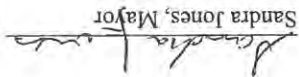
The Council has determined that there is a need to update the rate structure. Now therefore, resolve that effective July 1, 2018:

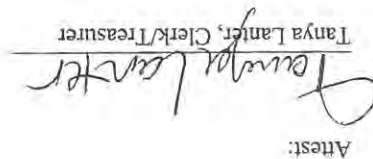
- (1) Water charges will include a base rate and a usage rate. The usage rate will be based on a per thousand and gallon usage amount from the water meters.
- (2) The base rate shall be \$28.50 per residence and business (all connections). The base rate fee does not include any water usage. The base rate is for operation and maintenance costs.
- (3) The usage rate will be \$2.70 per thousand gallons.

NOW, THEREFORE, BE IT RESOLVED by the City Council as follows:

That the City of Roundup does hereby adopt the Resolution of Intent to restructure the water rates system.

Passed and approved this 22nd day of May, 2018


Sandra Jones, Mayor


Tanya Lanier, Clerk/Treasurer

Attest:

RESOLUTION OF INTENT #1095

A Resolution of Intent giving notice to charge a monthly capital surcharge fee for the purpose of maintaining and upgrading the City's Water Infrastructure System.

WHEREAS, Section 69-7-11 of the MCA requires that a Public Hearing be held. The City of Roundup will hold public meetings on Tuesday May 8th and Tuesday May 22nd at the City Office 34 3rd Avenue West, at 7:00 p.m. for the purpose of soliciting public comment on the capital surcharge fee. This resolution was advertised under the sections for legal advertisement and notices of public hearings in the Roundup Record Tribune, and the Roundup Herald. The water users were also notified of said public hearing personally by postmarked mail dated April 23rd, 2018.

WHEREAS, all users and the City residents will be given an opportunity to comment on the monthly capital surcharge fee at the May 8th and May 22, 2018 public hearings.

Now, therefore, be it resolved by the City Council for the City of Roundup, Montana:

The Council has determined that there is a need to charge a monthly capital surcharge fee for the purpose of maintaining and upgrading the city's water system infrastructure needs.

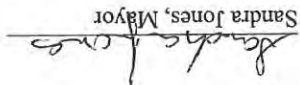
(1) **ALL service connections will be charged a \$15.00 capital surcharge fee.**

For the proposed changes, users will see a separate line item charge of \$15.00 on the utility bill starting July 1, 2018.

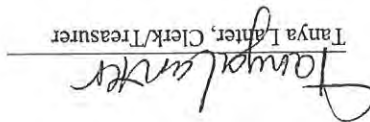
NOW, THEREFORE, BE IT RESOLVED by the City Council as follows:

That the City of Roundup does hereby adopt the Resolution of Intent to charge a capital surcharge fee in the amount of \$15.00 for the purpose of maintaining and upgrading the water infrastructure system.

Passed and approved this 22nd day of May, 2018


Sandra Jones, Mayor

Attest:


Tanya Lanter, Clerk/Treasurer

RESOLUTION # 1096

A Resolution giving notice of restructuring of the water rates effective July 1, 2018.

WHEREAS, Section 69-7-111 of the MCA requires that a public hearing be held. The City of Roundup held two public meetings on Tuesday May 8th and Tuesday May 22nd at the City Office 34 3rd Avenue West, at 7:00 p.m. for the purpose of soliciting public comment on the change to the water rates structure for city residents. The resolution of intent was advertised under the sections for legal advertisement and notices of public hearings in the Roundup Record Tribune, and the Roundup Herald. The water users were also notified of said public hearings personally by postmarked mail dated April 23rd, 2018.

WHEREAS, all users and the City citizens were given an opportunity to comment on the rate change at the May 8th and May 22nd, 2018 public hearings.

Now, therefore, be it resolved by the Council of the City of Roundup, Montana:

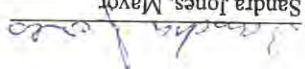
The Council has determined that there is a need to update the rate structure. Now therefore, resolve that effective July 1, 2018:

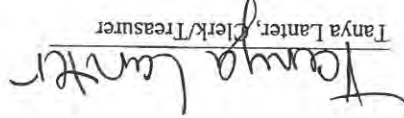
- (1) Water charges will include a base rate and a usage rate. The usage rate will be based on a per thousand gallon usage amount from the water meters.
- (2) The base rate shall be \$28.50 per residence and business (all connections). The base rate fee does not include any water usage. The base rate is for operation and maintenance costs.
- (3) The usage rate will be \$2.70 per thousand gallons.

NOW, THEREFORE, BE IT RESOLVED by the City Council as follows:

That the City of Roundup does hereby adopt the Resolution to restructure the water rates system.

Passed and approved this 5th day of June, 2018


Sandra Jones, Mayor

Attest:

Tanya Lanter, Clerk/Treasurer

RESOLUTION #1097

A Resolution giving notice to charge a monthly capital surcharge fee for the purpose of maintaining and upgrading the City's Water Infrastructure System.

WHEREAS, Section 69-7-111 of the MCA requires that a public hearing be held. The City of Roundup held two public meetings on Tuesday May 8th and Tuesday May 22nd at the City Office 34 3rd Avenue West, at 7:00 p.m. for the purpose of soliciting public comment on the Capital Surcharge Fee. This resolution of intent was advertised under the sections for legal advertisement and notices of public hearings in the Roundup Record Tribune, and the Roundup Herald. The water users were also notified of said public hearings personally by postmarked mail dated April 23rd, 2018.

WHEREAS, all users and the City residents where given an opportunity to comment on the monthly Capital Surcharge Fee at the May 8th and May 22, 2018 public hearings.

Now, therefore, be it resolved by the City Council for the City of Roundup, Montana:

The Council has determined that there is a need to charge a monthly capital surcharge fee for the purpose of maintaining and upgrading the City's Water System Infrastructure needs.

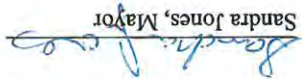
(1) ALL service connections will be charged a \$15.00 Capital Surcharge Fee.

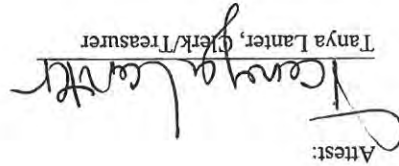
Users will see a separate line item charge of \$15.00 on the utility bill starting July 1, 2018.

NOW, THEREFORE, BE IT RESOLVED by the City Council as follows:

That the City of Roundup does hereby adopt the Resolution to charge a Capital Surcharge Fee in the amount of \$15.00 for the purpose of maintaining and upgrading the Water Infrastructure System.

Passed and approved this 5th day of June, 2018


Sandra Jones, Mayor

Attest:

Tanya Lanter, Clerk/Treasurer

MINUTES OF THE REGULAR MEETING OF THE CITY COUNCIL OF THE CITY OF
ROUNDUP HELD ON May 8, 2018 AT 7:00 p.m. CITY COUNCIL CHAMBERS.

The meeting was called to order by Mayor Jones. Clerk/Treasurer Lanter conducted roll call with council members Liggett, Schladweiler, Perrella, Griffith III, Toombs and Fisher present. Also present were Director Sibley, Assistant Clerk Mann and Attorney Lundvall via phone. Picchioni and Weitzel were absent.

Moved by Griffith II, seconded by Toombs to approve the minutes of the April 17, 2018 meeting. All in favor. Motion carried.

Moved by Toombs, seconded by Fisher to approve agenda. All in favor. Motion carried.

Water Authority will meet Wednesday May 9, 2018.

Visitors: Undersheriff Shawn Lesnik reported for Law Enforcement. Undersheriff Lesnik ran some numbers comparing calls for service which include ambulance and fire. 2015 there were 3,125 calls, 124 felonies and 336 misdemeanors. 2016 there were 3,358 calls, 139 felonies and 384 misdemeanors. 2017 there were 4,003 calls, 148 felonies and 368 misdemeanors, and as of May 8, 2018 there's been 1,554 calls. In the past two years, there have been an average of 595 citations. Using savings from last year and cutting spending, the sheriff's office was able to purchase a new vehicle and a used vehicle. Lesnik reports that the County is having some budget issues and he plans on approaching the City Council for help in the cost of hiring a new officer. Councilmember Toombs asked "what kind of dollars are you needing?" Lesnik thinks it's around \$80,000.00. A federal grant should pay for 75%. Lesnik would like to assign an officer to rove between Roundups schools for extra security.

Mayor Jones- The council will discuss the inter-local agreement for court services at next meeting after council receives a copy of the draft from Attorney Lance Lundvall.

Mayor Jones would like corrections to resolutions of Intent 1094 & 1095. # 3 on Resolution of Intent 1094 for water rate structure, change to base rate is only for usage charges. Resolution of Intent 1095 for Capital Surcharge fee, the word capital is misspelled.

Councilmember Schladweiler said the Public Hearing Notice was not in the Roundup Record and wanted to make sure that every water user was notified.

Attorney Lance Lundvall will finalize the inter-local agreement for court services.

Attorney Lundvall has been in communication with Floyd Fisher and Justin Russell of DES (Disaster Emergency Service) working on language for a Memorandum of Understanding between the city and county regarding city properties that are in the FEMA (Federal Emergency Management Agency) mitigation.

Attorney Lundvall is working with Mayor Jones and Compliance Officer Hoiland with curb and gutter issue at 224 7th St West.

911/Communications Committee Meeting- A copy of the meeting's agenda was received. Councilmember Weitzel reported that the new 911 system is up and running. Working on new tower, should be up by the end of the month. Slowly moving forward with plans to relocate dispatch.

Parks Committee-Councilmember Toombs reported that the football equipment on the sidewalk at rest area needs to be moved. Pipe by the dugout on the west baseball field needs to be removed. The committee recommends a 10 cent an hour raise across the board for lifeguards. Councilmember Picchioni would like a printout of hours for lifeguards. Will approve wages at next meeting. Erica (Sibley) Alhgren is interested in taking Deanna Wolff's place as pool manager when she retires.

Mike Morgan would like an underground pipe moved away from the stage, he would do the work at no cost to the City. A Permanent electrical box needs to be installed to be in compliance with OSHA (Occupational Safety and Health Administration).

Health Fair will be August 11th, the hospital would like the nets removed and use the tennis courts for dodgeball. The council is concerned the poles would be a danger to those playing and would like proof of Insurance provided.

Edith Sloan, organizer for Pickleball would like blue lines painted on the north tennis courts. Council suggests using blue tape for now. The cost for tape would be the clubs responsibility. The council will require appropriate shoes to be worn while on the Tennis Courts.

Codes & Ordinance Committee- Variance requested by Kurt Lang, committee recommends approval. Garage requested by Madeline Cooper, committee recommends approval. Both will be brought before the Council to be approved. Curb and gutter ordinance as requested by Compliance Officer Hoiland requires further study and will visit at next meeting per Councilmember Schladweiler.

Clerk/Treasurer Lanter reports the City received a new copier.

Director of Public Works Lon Sibley-The bank of the Musselshell River washed out last Thursday on number 4 road. Mayor Jones declared an emergency. Brewer and Soennichsen were hired to haul rock to place along the bank. The maintenance crew have been busy cleaning up. A broom for the skid steer was rented.

There will be a meeting with COP Construction on June 21. Phase 4 of the water project will begin July 9th.

Coal Board money for a dump truck is coming soon.

Moved by Picchioni, seconded by Toombs to approve Resolution 1096 restructuring of the water rates. All in favor. Motion carried. Clerk/Treasurer Lanter called for a vote to move forward. Councilpersons voting Aye: Picchioni, Liggett, Schladweiler, Weitzel, Griffith III, Toombs and Fisher. Voting nay: none. Absent was Perrella. Motion passes, Motion carried.

Moved by Toombs, seconded by Weitzel to approve Capital surcharge fee for maintaining water infrastructure system. All in favor. Motion carried. Clerk/Treasurer Lanter called for a vote to move forward. Councilpersons voting Aye: Picchioni, Liggett, Schladweiler, Weitzel,

Griffith III, Toombs and Fisher. Voting nay: none. Absent was Perrella. Motion passes, Motion carried.

CLAIMS were read as follows:

City Payroll	\$45,247.86	Max Pflughoff	\$100.00
City Council per Diem	\$300.00	McCleary Dist. Inc	\$3,495.71
City for Petty Cash	\$254.39	Mid-Rivers.	\$390.74
AT & T	\$36.72	Midland Implement	\$184.62
AEI Applicators, LLC	\$1490.00	Montana Dept of Enviro	\$240.00
American Welding & Gas	\$29.96	Montana League of Cities	\$644.00
Andrea Goffena	\$60.00	Montana Oasis Pools	\$3,456.36
Big Sky Fire/Affirmed Med	\$84.00	Montana Peterbilt	\$636.28
Big Sky Linen	\$165.28	Morrison Maierle	\$2,010.00
Border States Electric	\$403.16	MSHL/Golden Valley Weed	\$35.00
Butler, Lee	\$79.18	Normont Equipment	\$7,610.40
Carters Plumbing	\$316.90	Northwest Pipe Fittings	\$6,163.16
County Of Musselshell	\$25,000.00	Northwestern Energy	\$11,403.18
DPC Industries Inc.	\$544.49	O'Reilly Auto Parts	\$242.66
Electric Service Shop	\$134.65	Patrick Riedl	\$5430.00
Energy Laboratories	\$1,230.00	Picchioni IGA	\$53.87
First Security Bank	\$42.80	Pitney Bowes	\$300.00
Florin's Services	\$2,986.75	Post Office	\$1,500.00
Great West Engineering	\$6,863.00	Recreonics	\$186.80
Heiman Fire Equipment	\$1,816.95	Roundup Hardware	\$226.66
Integrated AG	\$1,147.00	Roundup Public Schools	\$4,125.00
Kirk Electric	\$425.00	Roundup Record	\$753.50
Laboult, Sharon	\$250.00	Rutts/Aqua System	\$16.50
Lang, Delinda	\$200.00	Silver Tip	\$1,612.81
Lundvall, Lance	\$550.00	State Industrial Products	\$284.62
MasterCard	\$510.50	PostMaster	\$116.00
Terrell's Office Machines	\$6,099.00	Utilities Underground Cntr	\$18.20
		Van Dykes	\$162.19

Moved by Toombs, seconded by Griffith III to approve the Claims as read and draw warrants on the treasury for the same. All in favor. Motion carried.

Moved by Picchioni, seconded by Griffith III to adjourn the meeting. Motion carried.
The meeting adjourned at 8:05 p.m.

APPROVED BY Sandra Jones
 Sandra Jones- Mayor

Tanya Lanter
 Tanya Lanter- Clerk Treasurer

Cassandra Mann
 Cassandra Mann-Assistant Clerk

City of Roundup
Taxable Valuation/Mill Levy
Ten-Year History and Analysis

NOTE: The analysis below includes only entity-wide levies subject to the limitations of Section 15-10-420, MCA.

If applicable, a separate analysis is provided for levies subject to the limitations of Section 15-10-420, MCA that are authorized and actually imposed using a different taxable valuation.

Analyses contained in this report do not include voted or permissive levies. Voted and/or permissive mills levied in the current year are listed below.

FISCAL YEAR	ENTITY-WIDE TAXABLE VALUATION	%INCREASE (DECREASE) FROM PREVIOUS YEAR	TOTAL CURRENT YEAR AUTHORIZED MILL LEVY (Includes Prior Year Carry Forward Mills)	CURRENT YEAR ACTUAL MILL LEVY	CARRY FORWARD MILLS AVAILABLE (May be levied in a subsequent year)
			FY's 2009-2010 through 2016-2017 enter number of mills from prior year budget - page 9. FY's 2017-2018 and forward enter number of mills from line (14) of the applicable Mill Levy Determination Form.	FY's 2009-2010 through 2016-2017 enter number of mills from prior year budget - page 9. FY's 2017-2018 & forward enter number of mills from line (16) of the applicable Mill Levy Determination Form.	The Carry Forward in this column is <u>not cumulative</u> - the current fiscal year carry forward mills available are the full amount that may be levied in a subsequent year. These mills will be included in the next year's total authorized mill levy.
2010 - 2011	1,409,082		149.31	149.31	
2011 - 2012	1,380,298	-2.04%	154.56	154.56	
2012 - 2013	1,378,142	-0.16%	160.57	160.57	
2013 - 2014	1,377,689	-0.03%	165.10	165.10	
2014 - 2015	1,380,194	0.18%	168.93	168.93	
2015 - 2016	1,637,675	18.66%	148.82	148.82	
2016 - 2017	1,690,802	3.24%	153.49	153.49	
2017 - 2018	1,809,423	7.02%	146.54	146.54	0.00
2018 - 2019	1,811,829	0.13%	150.41	150.41	0.00
2019 - 2020	1,770,471	-2.28%	156.49	156.49	0.00

Enter Fund Name (example: County Road Fund)

FISCAL YEAR	TAXABLE VALUATION	%INCREASE (DECREASE) FROM PREVIOUS YEAR	TOTAL CURRENT YEAR AUTHORIZED MILL LEVY (Includes Prior Year Carry Forward Mills)	CURRENT YEAR ACTUAL MILL LEVY	CARRY FORWARD MILLS AVAILABLE (May be levied in a subsequent year)
2010 - 2011					
2011 - 2012		#DIV/0!			
2012 - 2013		#DIV/0!			
2013 - 2014		#DIV/0!			
2014 - 2015		#DIV/0!			
2015 - 2016		#DIV/0!			
2016 - 2017		#DIV/0!			
2017 - 2018		#DIV/0!			0.00
2018 - 2019		#DIV/0!			0.00
2019 - 2020		#DIV/0!			0.00

Voted/Permissive mills levied in the current fiscal year:

Description	Number of Mills levied
-------------	------------------------

04/23/20
10:13:43

CITY OF ROUNDUP
Cash Report by Fund/Account
For the Accounting Period: 4/20

Page: 1 of 1
Report ID: L160

Funds 5210-5210

Fund/Account	Beginning Balance	Received	Transfers In	Disbursed	Transfers Out	Ending Balance
5210 WATER						
101000 Cash - Operating	295,856.26	0.00	0.00	0.00	0.00	295,856.26
102000 Cash/Cash Equivalents -	389,310.89	0.00	0.00	0.00	0.00	389,310.89
102100 Cash/Cash Equivalents -	136,935.00	0.00	0.00	0.00	0.00	136,935.00
102220 Cash - Reserve (Future Payment)	49,115.92	0.00	0.00	0.00	0.00	49,115.92
103000 Petty Cash	300.00	0.00	0.00	0.00	0.00	300.00
Total Fund	871,518.07					871,518.07
Totals	871,518.07	0.00	0.00	0.00	0.00	871,518.07

*** Transfers In and Transfers Out columns should match. There are a couple exceptions to this: 1) Canceled Electronic Checks and 2) Payroll Journal Vouchers that include local deductions set up with receipt accounting. Please see cash reconciliation procedure in manual or call for more details.

BLACK MOUNTAIN SOFTWARE UTILITY BILLING SYSTEM
RATE CODE LISTING

CITY OF ROUNDUP
09:43:00 - 02/20/20

Page 1

Service Type

Rate Code Description

Comment

Line # Usage Over

Base

Rate Over Usage

Line #

-- Rate Code Adjustment Factors --

Usage Over

Base

Rate Over Usage

WATER

BASE RATE

1		28.50	2.7000000	1
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WATER

COM-MTR

1		36.47		1
2	3.000	36.47	2.5500000	2
3	10.000	54.32	1.7200000	3

WATER

NONE

WATER

RES-MTR

1		33.02		1
2	3.000	33.02	2.8700000	2
3	5.000	38.76	1.1100000	3

CAPTL SURCHARGE

CAPTL SURCHARGE

1		15.00		1
---	--	-------	--	---

SEWER

COM-ACT- 0.75"

1		22.14		1
2	3.000	22.14	1.8800000	2

SEWER

COM-ACT- 1.00"

1		22.78		1
2	3.000	22.78	1.8800000	2

SEWER

COM-ACT- 1.50"

1		23.61		1
2	3.000	23.61	1.8800000	2

SEWER

COM-ACT- 2.00"

1		25.93		1
2	3.000	25.93	1.8800000	2

SEWER

COM-ACT- 3.00"

1		42.90		1
2	3.000	42.90	1.8800000	2

Service Type

Comment

Rate Code Description

-- Rate Code Adjustment Factors --

Line #	Usage Over	Base	Rate Over Usage	Line #	Usage Over	Base	Rate Over Usage
--------	------------	------	-----------------	--------	------------	------	-----------------

SEWER

NONE

SEWER

RES-AVG- 0.75"

1		22.14		1			
2	3.000	22.14	1.8800000	2			

SEWER

RES-AVG- 1.00"

1		22.78		1			
2	3.000	22.78	1.8800000	2			

SEWER

RES-AVG- 1.25"

1		23.20		1			
2	3.000	23.20	1.8800000	2			

SEWER

RES-AVG- 1.50"

1		23.61		1			
2	3.000	23.61	1.8800000	2			

SEWER

RES-AVG- 2.00"

1		25.93		1			
2	3.000	25.93	1.8800000	2			

SEWER

RES-AVG- 2.50"

1		34.51		1			
2	3.000	34.51	1.8800000	2			

SEWER

RES-AVG- 3.00"

1		42.90		1			
2	3.000	42.90	1.8800000	2			

SEWER

RES-AVG- 4.00"

1		49.18		1			
2	3.000	49.18	1.8800000	2			

SEWER

RES-AVG- 6.00"

1		63.86		1			
2	3.000	63.86	1.8800000	2			

SEWER

RES-AVG- 8.00"

1		80.62		1			
---	--	-------	--	---	--	--	--

Service Type				Comment			
Rate Code Description				-- Rate Code Adjustment Factors --			
Line #	Usage Over	Base	Rate Over Usage	Line #	Usage Over	Base	Rate Over Usage
2	3.000	80.62	1.8800000	2			
<u>SEWER</u>							
RES-AVG-10.00"							
1		99.48		1			
2	3.000	99.48	1.8800000	2			
<u>SEWER</u>							
RES-AVG-12.00"							
1		120.45		1			
2	3.000	120.45	1.8800000	2			
<u>GARBAGE</u>							
COM 1 CON 1 X WEEK							
1		14.58		1			
<u>GARBAGE</u>							
COM 1 CON 2 X WEEK							
1		21.87		1			
<u>GARBAGE</u>							
COM 1 CON 3 X WEEK							
1		32.80		1			
<u>GARBAGE</u>							
COM 1-2Y:1							
1		24.75		1			
<u>GARBAGE</u>							
COM 1-2Y:1 HALF							
1		13.23		1			
<u>GARBAGE</u>							
COM 1-2Y:2							
1		40.66		1			
<u>GARBAGE</u>							
COM 1-2Y:3							
1		56.58		1			
<u>GARBAGE</u>							
COM 1-2Y:3HALF							
1		29.14		1			
<u>GARBAGE</u>							
COM 1-2Y:5							
1		88.41		1			
<u>GARBAGE</u>							
COM 1-3Y + 1-2Y:1							
1		35.40		1			
<u>GARBAGE</u>							
COM 1-3Y + 1-2Y:5							
1		113.25		1			

Service Type				Comment			
Rate Code Description				-- Rate Code Adjustment Factors --			
Line #	Usage Over	Base	Rate Over Usage	Line #	Usage Over	Base	Rate Over Usage
<u>GARBAGE</u>							
COM 1-3Y:1							
1		28.30		1			
<u>GARBAGE</u>							
COM 1-3Y:2							
1		47.75		1			
<u>GARBAGE</u>							
COM 1-3Y:3							
1		67.24		1			
<u>GARBAGE</u>							
COM 1-3Y:5							
1		106.18		1			
<u>GARBAGE</u>							
COM 1-3Y:5 / 1-2Y1							
1		113.30		1			
<u>GARBAGE</u>							
COM 1-4Y:1							
1		31.85		1			
<u>GARBAGE</u>							
COM 1-4Y:3							
1		70.79		1			
<u>GARBAGE</u>							
COM 1-6Y:3							
1		77.88		1			
<u>GARBAGE</u>							
COM 2 CON 1 X WEEK							
1		29.15		1			
<u>GARBAGE</u>							
COM 2 CON 2 X WEEK							
1		43.73		1			
<u>GARBAGE</u>							
COM 2 CON 3 X WEEK							
1		65.58		1			
<u>GARBAGE</u>							
COM 2-2Y:1							
1		31.85		1			
<u>GARBAGE</u>							
COM 2-2Y:3							
1		63.69		1			
<u>GARBAGE</u>							
COM 2-3Y:1							
1		35.40		1			

Service Type				Comment			
Rate Code Description				-- Rate Code Adjustment Factors --			
Line #	Usage Over	Base	Rate Over Usage	Line #	Usage Over	Base	Rate Over Usage
<u>GARBAGE</u>							
COM 2-3Y:2							
1		54.87		1			
<u>GARBAGE</u>							
COM 2-3Y:5							
1		113.30		1			
<u>GARBAGE</u>							
COM 3-3Y:5							
1		120.41		1			
<u>GARBAGE</u>							
COM 4-2Y:3							
1		77.91		1			
<u>GARBAGE</u>							
COM 5-3Y:5							
1		146.94		1			
<u>GARBAGE</u>							
NONE							
<u>GARBAGE</u>							
RES 1 CON 1 X WEEK							
1		13.80		1			
<u>GARBAGE</u>							
RES 2 CON 1 X WEEK							
1		27.59		1			
<u>GARBAGE</u>							
RES 3 CON 1 X WEEK							
1		41.39		1			
<u>MISCELLANEOUS</u>							
1991 LEGISLATURE FEE							
1		2.00		1			



NorthWestern
Energy
Delivering a Bright Future

Customer Service: 1-888-467-2669

11 E Park St | Butte, MT 59701-1711 | NorthWesternEnergy.com

Page 1

CUSTOMER:

CITY OF ROUNDUP

ACCOUNT NUMBER:

0713780-5

ACCOUNT DESCRIPTION:

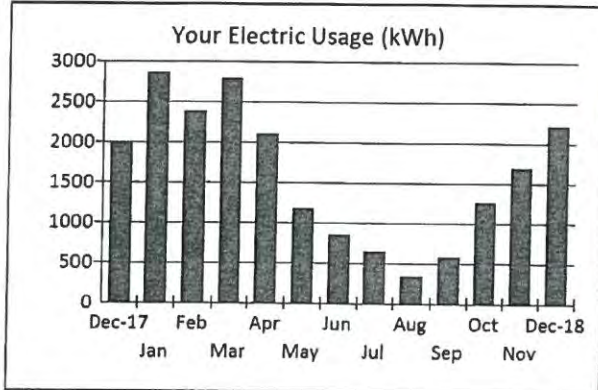
Water Pumps

GB

BILLING DATE:

December 14, 2018

Service Address: 120 RAILROAD AVE E PMP, ROUNDUP MT 59072



	Dec 2017	Nov 2018	Dec 2018
Days of Service	32	31	30
kWh Used	1989.00	1691.00	2219.00
Avg. kWh per day	62.2	54.5	74.0
Avg. daily temp (°F)	39	43	34

DUE DATE	TOTAL AMOUNT DUE
January 11, 2019	\$ 304.37

ACCOUNT SUMMARY

Previous Balance		\$ 239.85
Payments Received	December 10, 2018 Thank you	\$ (239.85)
Current Charges		\$ 304.37

Total Amount Due	\$ 304.37
------------------	-----------

SUMMARY OF CURRENT CHARGES

	Delivery Service	Supply Service	TOTAL
Electric Service	\$ 94.82	\$ 135.87	\$ 230.69
Unmetered Service	\$ 14.36	\$ 9.92	\$ 24.28
State and Local Taxes	\$ 39.15	\$ 10.25	\$ 49.40

Total Current Charges	\$ 148.33	\$ 156.04	\$ 304.37
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BUDGET BILLING INFORMATION

IMPORTANT ACCOUNT INFORMATION

MESSAGE BOARD

Effective 12/01/2018, electric supply rates have increased from the previous month as a result of the supply tracker. For questions about your bill or service, call NorthWestern Energy at 888-467-2669 (Monday through Friday, 7 a.m.-6 p.m.). For information or to make a payment, visit us at: www.northwesternenergy.com.

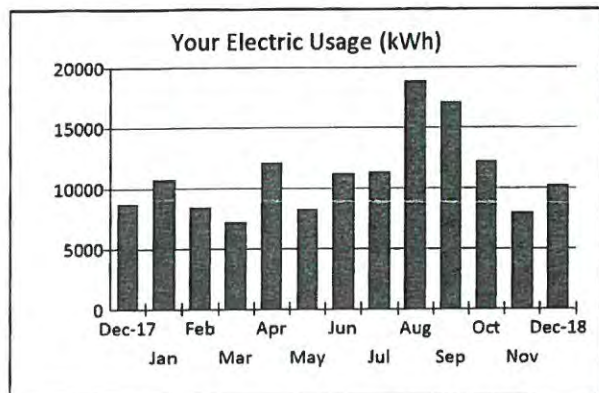


Customer Service: 1-888-467-2669

CUSTOMER: CITY OF ROUNDUP
ACCOUNT NUMBER: 3067800-7
ACCOUNT DESCRIPTION:
BILLING DATE: December 14, 2018

Pumphouse

Service Address: 244 S 2ND ST E, ROUNDUP MT 59072



	Dec 2017	Nov 2018	Dec 2018
Days of Service	30	30	32
kWh Used	8680.00	7960.00	10200.00
Avg. kWh per day	289.3	265.3	318.8
Avg. daily temp (°F)	39	44	34

DUE DATE	TOTAL AMOUNT DUE
December 31, 2018	\$ 1,602.09

ACCOUNT SUMMARY

Previous Balance		\$ 1,426.17
Payments Received	December 10, 2018 Thank you	\$ (1,426.17)
Current Charges		\$ 1,602.09

Total Amount Due \$ 1,602.09

SUMMARY OF CURRENT CHARGES

	Delivery Service	Supply Service	TOTAL
Electric Service	\$ 690.34	\$ 644.72	\$ 1,335.06
State and Local Taxes	\$ 223.12	\$ 43.91	\$ 267.03

Total Current Charges \$ 913.46 \$ 688.63 \$ 1,602.09

BUDGET BILLING INFORMATION

BUDGET BILLING -- PAY THE SAME AMOUNT EACH MONTH

If you were to go on budget billing next month, your approximate monthly budget billing amount would be \$1,676.00. Your account must be current and in good standing to qualify for budget billing.

IMPORTANT ACCOUNT INFORMATION

MESSAGE BOARD

Effective 12/01/2018, electric supply rates have increased from the previous month as a result of the supply tracker. For questions about your bill or service, call NorthWestern Energy at 888-467-2669 (Monday through Friday, 7 a.m.-6 p.m). For information or to make a payment, visit us at: www.northwesternenergy.com.



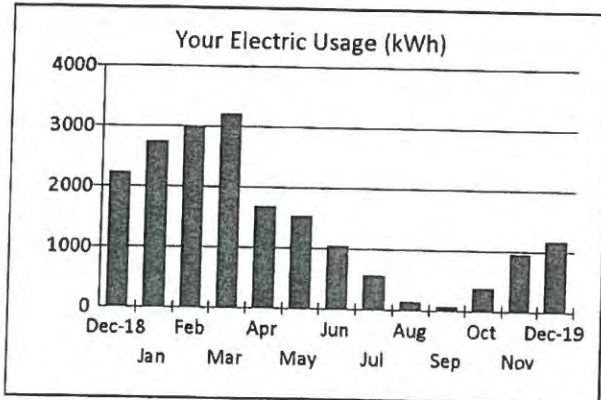
Customer Service: 1-888-467-2669

CUSTOMER:
ACCOUNT NUMBER:
ACCOUNT DESCRIPTION:
BILLING DATE:

CITY OF ROUNDUP *Water Pumps GB*
0713780-5

December 16, 2019

Service Address: 120 RAILROAD AVE E PMP, ROUNDUP MT 59072



	Dec 2018	Nov 2019	Dec 2019
Days of Service	30	31	30
kWh Used	2219.00	945.00	1161.00
Avg. kWh per day	74.0	30.5	38.7
Avg. cost per day	\$9.16	\$4.19	\$5.27
Avg. daily temp (°F)	34	37	33

DUE DATE	TOTAL AMOUNT DUE
January 8, 2020	\$ 351.86

ACCOUNT SUMMARY

Previous Balance	\$	161.79
Payments Received	\$	0.00
Current Charges	\$	190.07

Total Amount Due	\$	351.86
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SUMMARY OF CURRENT CHARGES

	Delivery Service	Supply Service	TOTAL
Electric Service	\$ 54.43	\$ 77.38	\$ 131.81
Unmetered Service	\$ 14.89	\$ 10.79	\$ 25.68
State and Local Taxes	\$ 26.81	\$ 5.77	\$ 32.58

Total Current Charges	\$ 96.13	\$ 93.94	\$ 190.07
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BUDGET BILLING INFORMATION

IMPORTANT ACCOUNT INFORMATION

Currently, a balance remains on your account. If payment has been sent, please disregard this reminder.

MESSAGE BOARD

For questions about your bill or service, call NorthWestern Energy at 1-888-467-2669 (Monday through Friday, 7 a.m.-6 p.m). For information or to make a payment, visit us at: www.northwesternenergy.com

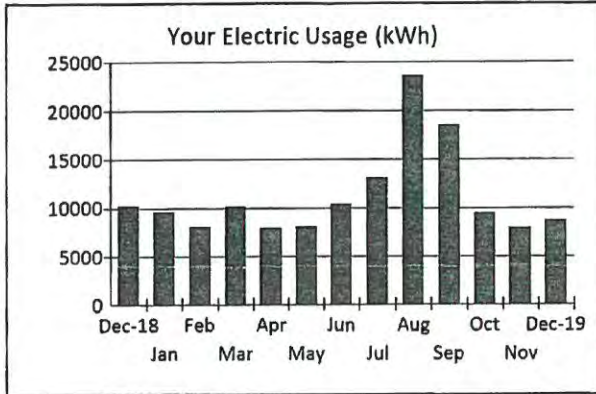


Customer Service: 1-888-467-2669

CUSTOMER: CITY OF ROUNDUP
ACCOUNT NUMBER: 3067800-7
ACCOUNT DESCRIPTION:
BILLING DATE: December 16, 2019

Rumphouse

Service Address: 244 S 2ND ST E, ROUNDUP MT 59072



	Dec 2018	Nov 2019	Dec 2019
Days of Service	32	29	32
kWh Used	10200.00	8000.00	8680.00
Avg. kWh per day	318.8	275.9	271.3
Avg. cost per day	\$50.07	\$54.10	\$50.75
Avg. daily temp (°F)	34	38	33

DUE DATE	TOTAL AMOUNT DUE
January 2, 2020	\$ 1,624.14

ACCOUNT SUMMARY

Previous Balance			\$ 904.18
Payments Received	December 9, 2019	Thank you	\$ (904.18)
Current Charges			\$ 1,624.14

Total Amount Due \$ 1,624.14

SUMMARY OF CURRENT CHARGES

	Delivery Service	Supply Service	TOTAL
Electric Service	\$ 731.63	\$ 578.50	\$ 1,310.13
State and Local Taxes	\$ 276.15	\$ 37.86	\$ 314.01

Total Current Charges \$ 1,007.78 \$ 616.36 \$ 1,624.14

BUDGET BILLING INFORMATION

BUDGET BILLING -- PAY THE SAME AMOUNT EACH MONTH

If you were to go on budget billing next month, your approximate monthly budget billing amount would be \$1,813.00. Your account must be current and in good standing to qualify for budget billing.

IMPORTANT ACCOUNT INFORMATION

MESSAGE BOARD

For questions about your bill or service, call NorthWestern Energy at 1-888-467-2669 (Monday through Friday, 7 a.m.-6 p.m). For information or to make a payment, visit us at: www.northwesternenergy.com

FUND NAME: CAPITAL OUTLAY		Actual Expenditures	BUDGETED EXPENDITURES	ACTUAL EXP.	Final Budget
FUND NUMBER: 4010		2013-2014	2014-2015	2014-2015	2015-2016
900 - Miscellaneous		\$ 16,912.96	\$ 620,548.87		\$ 681,593.55
920 - Fire Station					
930 - Storm Drain					
940-Machinery&Equip. Shop/Fire Dept.			\$ 227,921.00	\$ 227,921.00	
950-Construction -			\$ -		
TOTAL CAPITAL IMPROVEMENTS:		\$ 16,912.96	\$ 848,469.87	\$ 227,921.00	\$ 681,593.55
FUND NAME: WATER OPERATING		Actual Expenditures	BUDGETED EXPENDITURES	ACTUAL EXP.	Final Budget
FUND NUMBER: 5210		2013-2014	2014-2015	2014-2015	2015-2016
4305 - 100 - Personal Services		\$ 101,587.33	\$ 120,000.00	\$ 106,229.42	\$ 120,000.00
4305 - 200 - Supplies		\$ 65,539.22	\$ 75,000.00	\$ 52,231.54	\$ 80,000.00
4305 - 210 - Off Supp. Comp. Supplies		\$ 2,656.13	\$ 2,000.00	\$ 932.33	\$ 2,000.00
4305 - 300 - Purchased Services		\$ 30,266.98	\$ 35,000.00	\$ 31,384.52	\$ 40,000.00
4305 - 310 - Contracted Services		\$ 27,683.15	\$ 40,000.00	\$ -	\$ 40,000.00
4305 - 320 - Water Quality Study				\$ -	
4305 - 330 - Reservoir Cleaning			\$ 7,000.00	\$ -	\$ 7,000.00
4305 - 350 - Prof. Serv. - Audit		\$ 1,483.67	\$ 4,000.00	\$ 1,566.67	\$ 4,000.00
4305 - 390 - Other Prof. Serv. Admin. Chg.		\$ 15,000.00	\$ 15,000.00	\$ 15,000.00	\$ 15,000.00
4305 - 500 - Fixed Charges		\$ 5,257.00	\$ 10,000.00	\$ 3,459.00	\$ 10,000.00
4305 - 790 - Other Act. Milton Grant		\$ 23,966.35	\$ 36,100.00	\$ 19,005.15	\$ 17,026.00
4305 - 940 - Mach. & Equip. Shop Truck					\$ 15,000.00
4305 - 960 - Water Comm. Rehab		\$ 251,374.85	\$ 2,100,000.00	\$ 1,605,760.09	\$ 1,950,000.00
SRF loan principal & interest (reserve)				\$ 43,137.00	\$ 43,137.00
payments for srf loan					\$ 88,788.00
Transfer to Water Depreciation		\$ 10,272.77	\$ 66,971.00	\$ 33,485.50	\$ 73,290.50
TOTAL WATER OPERATING:		\$ 535,087.45	\$ 2,511,071.00	\$ 1,912,191.22	\$ 2,505,241.50
Water Depreciation cash		\$ 438,792.32	\$ 506,263.32	\$ 344,373.64	\$ 418,114.14
TOTAL WATER DEPRECIATION:		\$ 438,792.32	\$ 506,263.32	\$ 344,373.64	\$ 418,114.14

ANNUAL BUDGET ESTIMATE NON-TAX REVENUES
FISCAL YEAR: 2015-2016

REVENUE

FUND NAME: WATER	Actual Revenues 2013-2014	Budgeted Revenues 2014-2015	Actual Revenues 2014-2015	Final Budget 2015-2016
FUND NUMBER: 5210 - OPERATING				
343021-Metered Water Sales	\$ 320,840.78	\$ 417,000.00	\$ 414,421.69 ✓	\$ 417,000.00 ✓
343026-Water Installation Chgs.	\$ 3,902.03	\$ 1,000.00	\$ 2,967.14 ✓	\$ 1,000.00 ✓
343027-Misc. Revenue	\$ 5,365.91		\$ 1,075.00 ✓	
371010-Interest Earnings	\$ 317.43	\$ 200.00	\$ 282.39 ✓	\$ 200.00 ✓
331000-CDBG Grant				\$ 450,000.00 ✓
334020-State DES Grant			\$ 2,440.53 ✓	
334121-DNRC Grant-milton grant	\$ 17,350.00	\$ 42,650.00	\$ 25,624.50 ✓	\$ 17,025.50 ✓
334122-DNRC water system	\$ 90,000.00	\$ 10,000.00	\$ 10,000.00 ✓	\$ - ✓
334120-TSEP - Grant fy 2013-14	\$ 30,301.75	\$ 469,081.00	\$ 381,601.66 ✓	\$ - ✓
334120-TSEP-Grant fy 2015-2016				\$ 500,000.00 ✓
334118-TSEP Planning Grant(PER)		\$ 15,000.00	\$ 15,000.00 ✓	\$ 15,000.00 ✓
334060- Coal Board- water system				\$ 500,000.00 ✓
36000- mic water revenue			\$ 4,459.99 ✓	
Board of Investments loan proceeds SRF		\$ 1,392,270.00	\$ 1,226,673.00 ✓	\$ 213,981.00 ✓
Transfer from Depreciation to operating				
Transfer to Depreciation from operating				
331110-Other Fin. FEMA			\$ 10,448.69 ✓	
Total:	\$ 468,077.90	\$ 2,347,201.00	\$ 2,094,994.59	\$ 2,114,206.50
WATER DEPRECIATION				
Water depreciation cash balance	\$ 438,792.32	\$ 438,792.32		\$ 344,373.64
371010 - Interest Earnings	\$ 564.59	\$ 500.00	\$ 482.65	\$ 450.00 ✓
Tran to Operating from Depr				
Tran from Operating to Depr.	\$ 10,272.77	\$ 66,971.00	\$ 33,485.50	\$ 73,290.50
Total Depr. Revenue	\$ 427,954.90	\$ 449,000.50	\$ 33,968.15	\$ 73,740.50
Depreciation cash balance				\$ 418,114.14
Total Depr. Appropriation	\$ 438,792.26	\$ 449,000.50	\$ 67,936.30	\$ 418,114.14

BLACK MOUNTAIN SOFTWARE UTILITY BILLING SYSTEM

CITY OF ROUNDUP

Rate Code Usage and Billing by Month Breakdown

From Post date 01/01/2018 to 12/31/2018 Account From 01758-01

to MN039-00

16:17:05 - 02/13/2020

SERVICES: WATER

METER SIZES: ALL

SUBDIVISIONS: ALL

AP-Year

Page 1

Service Rate Code	Usage in Actual Units Monthly Usage	Charges	Number
01-2018			
WATER			
COM-MTR	1105630	6512.76	130
RES-MTR	2786730	25061.34	694
Subtotal for Service WATER	: 3892360	31574.10	824
02-2018			
WATER			
COM-MTR	1420930	7138.24	132
RES-MTR	2405900	24479.87	690
Subtotal for Service WATER	: 3826830	31618.11	822
03-2018			
WATER			
COM-MTR	1218650	6797.83	133
RES-MTR	2540204	24744.19	693
Subtotal for Service WATER	: 3758854	31542.02	826
04-2018			
WATER			
COM-MTR	1387903	7047.18	132
RES-MTR	2718098	25281.32	699
Subtotal for Service WATER	: 4106001	32328.50	831
05-2018			
WATER			
COM-MTR	1291180	6943.80	134
RES-MTR	3478135	26515.59	711
Subtotal for Service WATER	: 4769315	33459.39	845
06-2018			

AP-Year

Service Rate Code	Usage in Actual Units Monthly Usage	Charges	Number
07-2018			
WATER COM-MTR RES-MTR	2402131 3973086 Subtotal for Service WATER : 6375217	8959.23 27400.53 36359.76	136 716 852
08-2018			
WATER COM-MTR RES-MTR	3774661 4606325 Subtotal for Service WATER : 8380986	11321.04 28010.27 39331.31	136 712 848
09-2018			
WATER BASE RATE	10583990 Subtotal for Service WATER : 10583990	52773.60 52773.60	849 849
10-2018			
WATER BASE RATE	8971783 Subtotal for Service WATER : 8971783	48335.29 48335.29	846 846
11-2018			
WATER BASE RATE	4416943 Subtotal for Service WATER : 4416943	36065.77 36065.77	847 847
12-2018			
WATER BASE RATE	3778209 Subtotal for Service WATER : 3778209	33799.60 33799.60	828 828
Grand Total : 66997015 441697.85 10037			

BLACK MOUNTAIN SOFTWARE UTILITY BILLING SYSTEM

CITY OF ROUNDUP

Rate Code Usage and Billing by Month

From Post date 01/01/2019 to 12/31/2019 Account From 01758-01

to MN039-00

16:18:28 - 02/13/2020

Breakdown

SERVICES: WATER CAPTL SURCHARGE

METER SIZES: ALL

SUBDIVISIONS: ALL

AP-Year

Page 1

Service	Usage in Actual Units	Charges	Number
Rate Code	Monthly Usage		
01-2019			
CAPTL SURCHARGE			
CAPTL SURCHARGE	0	12345.00	823
Subtotal for Service CAPTL SURCHARGE:		12345.00	823
WATER			
BASE RATE	3504564	32804.25	819
Subtotal for Service WATER :	3504564	32804.25	1642
02-2019			
CAPTL SURCHARGE			
CAPTL SURCHARGE	0	12240.00	816
Subtotal for Service CAPTL SURCHARGE:		12240.00	816
WATER			
BASE RATE	4447735	35179.75	813
Subtotal for Service WATER :	4447735	35179.75	1629
03-2019			
CAPTL SURCHARGE			
CAPTL SURCHARGE	0	12180.00	812
Subtotal for Service CAPTL SURCHARGE:		12180.00	812
WATER			
BASE RATE	6309141	40091.47	809
Subtotal for Service WATER :	6309141	40091.47	1621
04-2019			
CAPTL SURCHARGE			
CAPTL SURCHARGE	0	12195.00	813
Subtotal for Service CAPTL SURCHARGE:		12195.00	813
WATER			
BASE RATE	4081814	34106.25	810

AP-Year

Service Rate Code	Usage in Actual Units Monthly Usage	Charges	Number
05-2019			
Subtotal for Service WATER :	4081814	34106.25	1623
CAPTL SURCHARGE			
CAPTL SURCHARGE	0	12300.00	820
Subtotal for Service CAPTL SURCHARGE:		12300.00	820
WATER			
BASE RATE	13702368	60309.65	818
Subtotal for Service WATER :	13702368	60309.65	1638
06-2019			
CAPTL SURCHARGE			
CAPTL SURCHARGE	0	12600.00	840
Subtotal for Service CAPTL SURCHARGE:		12600.00	840
WATER			
BASE RATE	7391512	43840.50	838
Subtotal for Service WATER :	7391512	43840.50	1678
07-2019			
CAPTL SURCHARGE			
CAPTL SURCHARGE	0	12645.00	843
Subtotal for Service CAPTL SURCHARGE:		12645.00	843
WATER			
BASE RATE	10876206	53334.48	841
Subtotal for Service WATER :	10876206	53334.48	1684
08-2019			
CAPTL SURCHARGE			
CAPTL SURCHARGE	0	12600.00	840
Subtotal for Service CAPTL SURCHARGE:		12600.00	840
WATER			
BASE RATE	12169523	56741.01	838
Subtotal for Service WATER :	12169523	56741.01	1678
09-2019			
CAPTL SURCHARGE			
CAPTL SURCHARGE	0	12630.00	842
Subtotal for Service CAPTL SURCHARGE:		12630.00	842
WATER			
BASE RATE	22248372	84010.98	840

Service Rate Code	Usage in Actual Units		Charges	Number
	Monthly Usage			
10-2019				
Subtotal for Service WATER :	22248372	84010.98	1682	
CAPTL SURCHARGE				
CAPTL SURCHARGE	0	12510.00	834	
Subtotal for Service CAPTL SURCHARGE:		12510.00	834	
WATER				
BASE RATE	4545968	36014.98	833	
Subtotal for Service WATER :	4545968	36014.98	1667	
11-2019				
CAPTL SURCHARGE				
CAPTL SURCHARGE	0	12390.00	826	
Subtotal for Service CAPTL SURCHARGE:		12390.00	826	
WATER				
BASE RATE	32491089	111238.77	825	
Subtotal for Service WATER :	32491089	111238.77	1651	
12-2019				
CAPTL SURCHARGE				
CAPTL SURCHARGE	0	12255.00	817	
Subtotal for Service CAPTL SURCHARGE:		12255.00	817	
WATER				
BASE RATE	3221554	31954.38	816	
Subtotal for Service WATER :	3221554	31954.38	1633	
Grand Total :	124989846	768516.47	19826	

BLACK MOUNTAIN SOFTWARE UTILITY BILLING SYSTEM

METER SIZE OPTIONS

ALL ROUTES SUB-ORDER METER SIZE

CITY OF ROUNDUP

15:38:38 - 03/03/2020

Status: A - ACTIVE

Billing Codes: 1 FULL CHARGES

Primary and Secondary Accounts

Inactive (Billing Codes 4 or 5)

Active (Billing Codes 1, 2 or 3)

METER SIZE

RESIDENTIAL CUSTOMERS			NON-RESIDENTIAL CUSTOMERS			ALL CUSTOMERS		
Active	Inactive	Total	Active	Inactive	Total	Active	Inactive	Total

Route ALL

0.75"	592	0	592	75	0	75	667	0	667
1.00"	95	0	95	29	0	29	124	0	124
1.50"	1	0	1	14	0	14	15	0	15
2.00"	0	0	0	6	0	6	6	0	6
3.00"	0	0	0	1	0	1	1	0	1
4.00"	0	0	0	2	0	2	2	0	2
Total for Route(s) ALL	688	0	688	127	0	127	815	0	815
Grand Total	688	0	688	127	0	127	815	0	815

Appendix K:

Concrete Water Reservoir Interior Condition Survey

Liquid Engineering Corporation
Concrete Water Reservoir Interior Condition Survey

Job Number: 48346
 Inspector: A. Burson

Utility: Roundup, MT
 Dive Controller: J. Tillman

Tank: #1
 Date: 10/9/2015

AMERICAN CONCRETE INSTITUTE ACI 201.1R-08 / 311.1R									
CONCRETE CONDITION CODE									
A - Abrasion	D - Cracking	G - contraction	J - Curling	M - Void	P - Pitting	S - Bugholes	V - Exudation	Y - Corrosion	
B - Erosion	E - Deflection	H - Deformation	K - Checking	N - Cold Pour	Q - Spalling	T - Chalking	W - Efflorescence	Z - Exposed	
C - Blistering	F - Expansion	I - Settling	L - Delamination	O - Honeycomb	R - Popouts	U - Leaching	X - Stains	Reinforcement	

QUADRANT 1	QUADRANT 2	QUADRANT 3	QUADRANT 4
------------	------------	------------	------------

INTERIOR RESERVOIR ROOF

Roof Slab(s)	Good, D	Good, D	Good, D	Good, D
Expansion Joint(s)	Good, D	Good, D	Good, D	Good, D
Support Beam(s)	Good, S	Good, S	Good, S	Good, S
Beam Joint(s)	Good, S	Good, S	Good, S	Good, S
Roof-Column Joint	Good, S	Good, S	Good, S	Good, S

General Appearance: Good Coating: N/A Vents: Good Level Sensors: -----
 All expansion Joints Uniform width: Yes Uniform Level: Yes Gaskets Intact: Yes

INTERIOR RESERVOIR WALLS

Wall-Roof Joint	Good	Good	Good	Good
Wall Structure	Good, S	Good, S	Good, S	Good, S

General Appearance: Good Coating: N/A Ladder: ----- Leaking: None observed Dye Tested: No
 All expansion Joints Uniform width: Yes Uniform Level: Yes Gaskets Intact: Yes

INTERIOR RESERVOIR SUPPORT COLUMNS

Columns	Good, S	Good, S	Good, S	Good, S
Column Floor Plates	Good, S	Good, S	Good, S	Good, S

General Appearance: Good Coating: N/A ColumnBase Leaking: None observed Dye Tested: No
 All expansion Joints Uniform width: Yes Uniform Level: Yes Gaskets Intact: Yes

INTERIOR RESERVOIR FLOOR

Perimeter Joint	Good	Good	Good	Good
Floor Slabs	Good, D, S	Good, D, S	Good, D, S	Good, D, S

General Appearance: Good Coating: N/A Inlet Structure: Good Outlet Structure: Good
 Overflow Structure: Good Sump System: Good Leaking: None observed Dye Tested: No
 All expansion Joints Uniform width: Yes Uniform Level: Yes Gaskets Intact: Yes

Additional Interior Notes / Comments

DISCLAIMER

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Liquid Engineering Corporation
Concrete Water Reservoir Exterior Condition Survey

Job Number: 48346
 Inspector: A. Burson

Utility: Roundup, MT
 Dive Controller: J. Tillman

Tank: #1
 Date: 10/9/2015

AMERICAN CONCRETE INSTITUTE
ACI 201.1R-08 / 311.1R

CONCRETE CONDITION CODE

A -- Abrasion	D - Cracking	G - contraction	J - Curling	M - Void	P - Pitting	S - Bugholes	V - Exudation	Y - Corrosion
B -- Erosion	E - Deflection	H - Deformation	K - Checking	N - Cold Pour	Q - Spalling	T - Chalking	W - Efflorescence	Z - Exposed
C - Blistering	F - Expansion	I - Settling	L - Delamination	O - Honeycomb	R - Popouts	U - Leaching	X - Stains	Reinforcement

QUADRANT 1

QUADRANT 2

QUADRANT 3

QUADRANT 4

EXTERIOR RESERVOIR ROOF

Roof Slab(s)	Good I,X	Good I,X	Good I,X	Good I,X
Expansion Joint(s)	Good	Good	Good	Good
Roof-Wall Joint	Good	Good	Good	Good

General Appearance: Good Coating: N/A Vents: Good Level Indicator: -----
 Hatch & Gaskets: Good Hatch hinges: Good Lock & Hasp: Good Hatch Cage & Railing: -----
 All expansion Joints Uniform width: Yes Uniform Level: Yes Gaskets Intact: -----

EXTERIOR RESERVOIR WALLS

Wall-Roof Joint	Good	Good	Good	Good
Wall Structure	Good	Good	Good	Good

General Appearance: Good Coating: N/A Ladder: ----- Safety Climb: -----
 Overflow Structure: Good Clean out hatch: ----- Leaking: None observed
 All expansion Joints Uniform width: Yes Uniform Level: Yes Gaskets Intact: -----

EXTERIOR RESERVOIR FOOTINGS / FOUNDATION

Perimeter Joint				
Floor Slab				
Footing Ring				
Sump-Valve Vault				

General Appearance: ----- Coating: N/A Leaking: ----- Ground Subsidence: -----
 All expansion Joints Uniform width: ----- Uniform Level: ----- Gaskets Intact: ----- Overflow: -----

Additional Exterior Notes / Comments

Unable to fully evaluate the exterior items as this tank is a semi-buried tank. The observable areas are in good overall condition.

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Potable Water Reservoir Contamination, Health and Safety Report

Job Number: 48346

Utility: Roundup, MT

Tank: #1

Inspector: A. Burson

Dive Controller: J. Tillman

Date: 10/9/2015

Complies With: AWWA • OSHA • ANSI • NIOSH • NAVFAC • NFPAC

CONTAMINATION & HEALTH

Air Vents	Type: Mushroom	#: 1	Screen Condition(s): Good	
Hatches	Type: Square	#: 1	Secured Properly: Yes	Properly Sealed: Yes
Exterior Overflow	Flapper: Yes	Screen: Yes	Gasket: Yes	Condition: ---- Runs underground
Cathodic Covers	In Place:	#:	Gasket:	Properly Sealed:
Roof to Wall Joint	Welded: No	Properly Sealed: Yes		
Roof Integrity	Holes: No	Cracking: No	Standing Water: No	
Wall Integrity	Holes: No	Cracking: No		
Manway Integrity	Leaks: ----	Condition: ----		
Water Clarity	General Appearance: Clear		Odor: None	
Floating Surface Debris	Type: None		Source: NA	
Hydrolon Floating Cover	Condition: ----	Holes: ----	Tears: ----	
Telemetry Penetrations	Properly Sealed: Yes			

FACILITY SAFETY COMPLIANCE

~~Exterior Ladder~~

Overall Ladder	Condition: ----	#: ----	Offset Landing: ----	Height:
Vandal Guard	Present: ----	Vandal Guard Locked: ----		
Ladder Rails & Rungs	Condition: ----	Missing/Damaged Rungs: ----		
Rung Spacing & Depth	Spacing: in. (max 12")	Toe Depth: in. (min 7")		
Rail Spacing & Size	Width: in. (min 2")	Thickness: in. (min 1/4")	Rail to Rail: in. (min 16")	
Safety Climb System	Type: ----	Condition: ----		
Number & Locations	Wall: Leg: Roof: Riser Pipe: Other:			
Ladder Attachments				

~~Manways~~

Type and size	Type: ----	#: ----	Size: inches (24" - 18"x22" min)
Support Structure	Type: ----	Condition: ----	
Number & Locations	Wall: Roof: Riser Pipe: Other:		

~~Hatches~~

Hatch Type & Size	Type: Square	#: 1	Size: 31 x 55 in. (24" - 24"x15" min)
Hatch & Lid Lip Height	Hatch: 5 in. (min 4")	Lid: 3 in. (min 2")	

~~Balconies & Railing~~

Deck / Walkways	Condition: Good	Width: 72"	
Hand Rails	Condition: Good	Height: 42 in. (min 42")	No. Rails: 2 (min 2)
Toe Rail	Condition: Good	Height: 4 in. (min 4")	
Welds / Attachments	Condition: Good		

~~Roof~~

Safety Tie-Off Points	Condition: Good	#: 6
Antennas	Type: ----	#:

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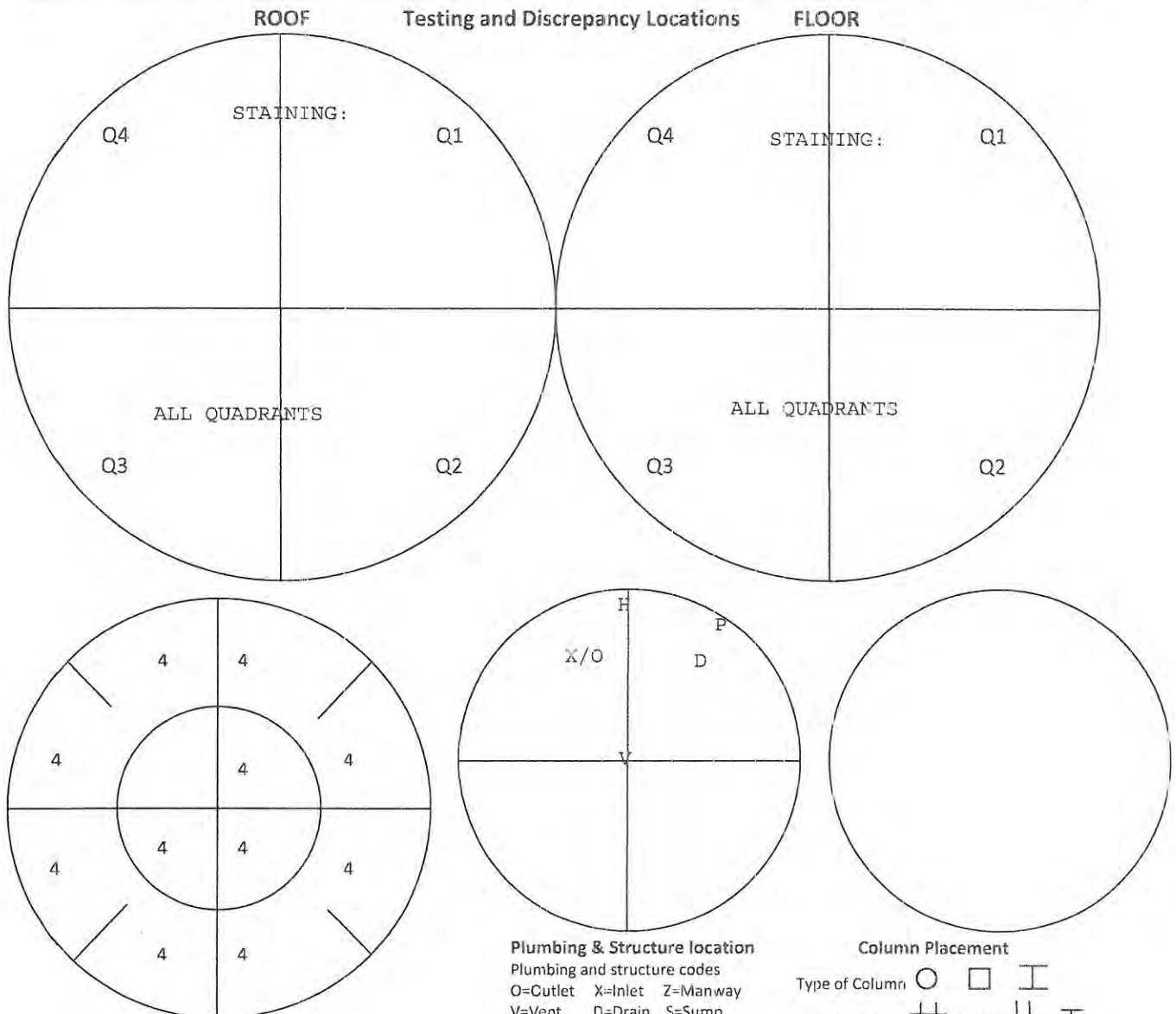
Liquid Engineering Corporation
Circular Tank Diagram / Information Worksheet

Job Number 48346

Utility Name Roundup, MT

Tank Name #1

Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
STAINING: ALL QUADRANTS			



Sediment Depth Measurements

Average Sediment Depth = The sum of all measurements taken,
divided by the number of measurements taken

Avg. Depth 4"

Cubic Yardage

Sediment Type Iron maganese

Plumbing & Structure location

Plumbing and structure codes

O=Outlet X=Inlet Z=Manway

V=Vent D=Drain S=Sump

L=Ladder H=Hatch P=Over-flow

F=Float Level Indicator

T=Telemetry

Column Placement

Type of Column

Base Structure

Top Structure

Column Construction -----

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Steel Potable Water Reservoir Security / Measurement Worksheet

Job Number 48346

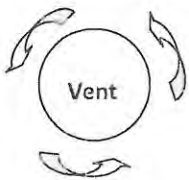
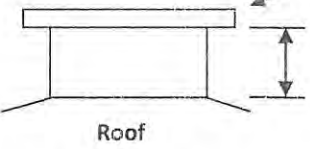
Utility Name Roundup, MT

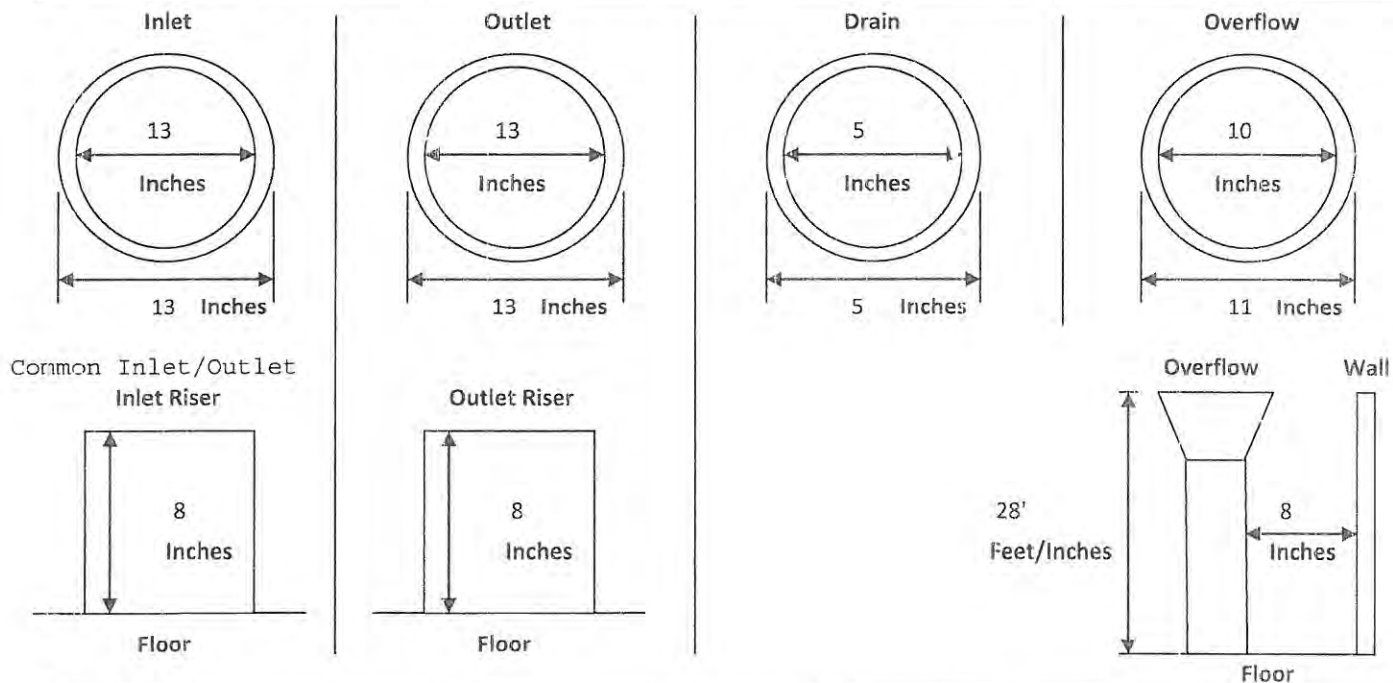
Tank Name #1

Security

Is the area surrounding the tank well lit?	No
Is the tank surrounded by a Security Fence?	Yes
Are the access gates locked?	Yes
Is the tank equipped with a Vandal Guard on the primary access ladder?	N/A
If so, is the Vandal Guard locked?	N/A
Are the vents equipped with security vent shrouds?	No
Are all of the hatches equipped with electronic monitoring devices?	No
Are the external plumbing components housed in a secure vault or out-building?	Yes
Does the surrounding geography of the tank obscure it from public view?	No
Does the exterior of the tank show signs of trespass?	Yes

Measurements

 Vent Outside Circumference 49 Inches	 Roof	Flange Metal Thickness	1/4	Inches
		Roof to Screen or Flange	29	Inches
		Flange	No	
		Number of Bolt Holes		Inches
		Size of Bolts		Inches



DISCLAIMER

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Liquid Engineering Corporation
Steel Potable Water Reservoir Immediate Needs Assessment

Job Number: 48346

Utility: Roundup, MT

Tank: #1

Inspector: A. Burson

Dive Controller: J. Tillman

Date: 10/9/2015

1. Health and Safety Items☐ Safety Climb System Installation:☐ Vent Screen Repairs:**2. Testing Items**☐ Dye Testing for Leak Evaluation:☐ Presence of Lead Test (Interior/Exterior):**3. Destructive Testing Items**☐ % of Lead Test (Interior/Exterior) *(Coating samples are removed for laboratory analysis)*☐ Coating Adhesion Test (Interior/Exterior):*Specific written authorization required to perform destructive testing. Destructive tests include touch-up of coating system.***4. Repair Items**☐ Epoxy Coating Repairs:☐ Temporary Leak Repairs:☐ Float Operated Level Indicator Repairs / Maintenance:☐ Hypalon Repairs:**5. Security Related Items** *(Critical security upgrade information is immediately available)*☒ Tank vents are not equipped with a security vent shroud:☒ Tank hatches are not equipped with a security hatch locking device:☐ Tank perimeter not adequately secured:

The above mentioned additional work is considered immediately necessary and is recommended to be completed. Some items may be completed in conjunction with work currently being performed while the crew is on site.

Reservoir Inspection Condition Supplemental

Exterior tank is in good condition. it is semi buried so some of it we were unable to evaluate. There is no external ladder. Exterior roof is in good condition along with the vent in the center. The hatch was locked and secured and everything was working fine. There was no internal ladder. Interior floor there was about an average of 4 inches of sediment and a little more in some areas in the tank. The floor was in good condition some minor cracking nothing major. There were two square cut outs in the floor one was for the drain the other was for the Common inlet/outlet. both were in good condition. the interior overflow was heavily corroded. overall tank was in good condition, we recommend a clean and inspect every three years

Security items checked above

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Appendix L:

Health Effects and Information Sheets

Role of the water main in lead service line replacement: a utility case study

ELIMAN CAMARA, KRYSTA R. MONTREUIL, ALISHA K. KNOWLES, AND GRAHAM A. GAGNON

<http://dx.doi.org/10.5942/jawwa.2013.105.0102>

The objective of this study was to understand the role of water mains in a lead service line (LSL) replacement program conducted in Halifax, N.S. Water samples from an LSL replacement program were collected from tap water of 28 homes. In full replacement sites, average lead concentrations in service lines connected to cast-iron water mains with three different maintenance conditions—"pigged," "pigged and lined," and "not pigged or lined"—were 31.5 ± 11.0 , 3.3 ± 2.3 , and $3.7 \pm$

$2.7 \mu\text{g/L}$, respectively, compared with $0.58 \pm 0.2 \mu\text{g/L}$ for service lines connected to ductile-iron water mains. In partial replacement sites, average lead concentrations were 63.09 ± 30.9 , 14.60 ± 2.9 , and $6.82 \pm 3.3 \mu\text{g/L}$, respectively, for the three cast-iron main conditions, compared with $8.5 \pm 3.1 \mu\text{g/L}$ for ductile-iron mains. Adsorption of lead on iron corrosion scales from tuberculated water mains was suspected for the higher lead release observed.

To reduce the amount of lead in the distribution system, many utilities have adopted LSL replacement programs in which a portion or the whole of an LSL is replaced. The public side of the service line is the responsibility of the utility, and the private side is the responsibility of the homeowner. Partial replacement means replacing the LSL on either the private side or the public side of the service. Full replacement means replacing the LSL from the water main to the home. Halifax has numerous corroded, unlined cast-iron pipes in the water distribution system, and there was concern that iron scales may adsorb lead and increase lead burden at the tap.

The objective of the current study was to understand the role of water mains in an LSL replacement program. Specifically, the study evaluated unlined cast-iron, lined cast-iron, and ductile-iron water mains connected to both full and partial LSLs.

STUDY SITE

Replacement type and plumbing materials in participating homes. Within the Halifax Regional Municipality, 4,000 homes are estimated to have either full or partial LSLs. In this study, 28 homes volunteered for the LSL replacement program. Of these, 15 homes (53.5%) had full replacements, and 13 (46.5%) had partial replacements. The program duration was from April 2011 to June 2012. Plumbing in the homes was a mixture of polyvinyl chloride and copper. Lead release from brass devices and leaded solder joints was expected to account for some of

the lead release observed in this study, especially in homes with full LSL replacements that still exhibited high lead release. Homeowners participating in the program were asked to collect plumbing information; in those cases in which the homeowner could not comply, a Halifax Water inspector collected the information.

Water main condition. The condition of the cast-iron water mains in the study area was categorized from available historical information and varied from tuberculated water mains to recently pigged and lined water mains. Tuberculation is the formation of small mounds of iron corrosion products on the inside of the iron pipe. This occurs on unlined cast-iron pipes but not on ductile-iron pipes (which in this study area were cement–mortar lined with an asphaltic coating). Tuberculated pipes are maintained by mechanically cleaning the inside of the water main with pigs and lining the inside of the pipe with either epoxy or cured-in-place liners. Lining of the water main prevents the direct contact of the water with the wall of the pipe.

In this study, the "pigged" condition refers to water mains that were mechanically cleaned with pigs in 1960s but were not lined following the pigging process. Previous experience by Halifax Water determined that unlined cast-iron mains that were pigged without being lined became tuberculated within five to ten years. The "pigged and lined" condition refers to mains that were mechanically cleaned and lined with either epoxy or cured-in-place liners. The "not pigged or lined" condi-

tion refers to mains that had no recorded issues with tuberculation.

RESULTS

Comparison of lead release from partial and full LSL replacement sites. Partial LSL replacements resulted in an increase in lead concentration after the removal of the lead service on the public side. Dislodging of particulate lead from the remaining service line and galvanic corrosion have been shown to be causes of elevated lead observed after partial replacements. In this study, partial replacements resulted in more lead released in the water than full replacements. However, a decrease in lead release was observed over time in both full and partial replacement samples. In full replacements, average lead concentrations of service lines connected to cast-iron mains with the three different maintenance conditions—pigged, pigged and lined, and not pigged or lined—were 31.5 ± 11.0 , 3.3 ± 2.3 , and 3.7 ± 2.7 $\mu\text{g/L}$, respectively, compared with 0.58 ± 0.2 $\mu\text{g/L}$ for service lines connected to ductile-iron mains. In the partial replacements, average lead concentrations were 63.09 ± 30.9 , 14.60 ± 2.9 , and 6.82 ± 3.3 $\mu\text{g/L}$ for pigged, pigged and lined, and not pigged or lined cast-iron mains, respectively, compared with 8.5 ± 3.1 $\mu\text{g/L}$ for ductile-iron mains.

Interaction between lead release and water main condition. The lowest lead release was measured in service lines connected to ductile-iron mains where full LSL replacements were performed; the average ($\pm$ standard deviation) lead concentration was 0.6 ± 0.2 $\mu\text{g/L}$. As shown in Figure 1, the average lead concentration measured in full replacement sites was 31.5 ± 11.0 $\mu\text{g/L}$ for homes connected to

cast-iron mains that had been pigged. In contrast, the average lead release in full replacement sites was 3.3 ± 2.3 $\mu\text{g/L}$ for those cast-iron mains categorized as pigged and lined and 3.7 ± 2.7 $\mu\text{g/L}$ for those categorized as not pigged and lined (Figure 1).

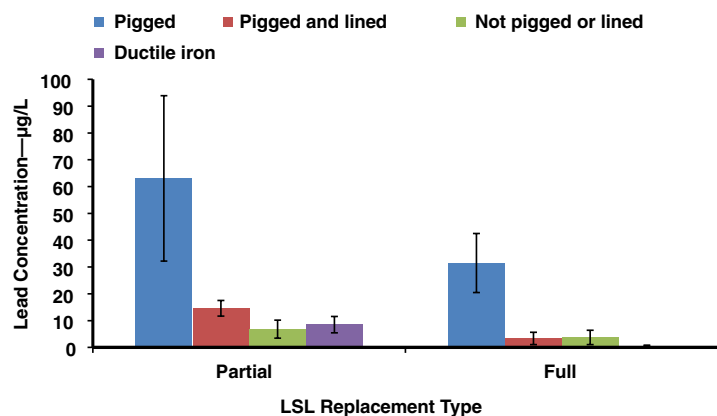
CONCLUSION

This study set out to determine the role of the water main material and condition on lead release in an LSL replacement program conducted in Halifax. Results showed that full replacements consistently produced lower lead release than partial replacements in this study area. Furthermore, a relationship between cast-iron pipe and lead release was found. Tuberculated cast-iron water mains exacerbated lead release, especially in homes still containing lead soldered joints or brass with high lead content even though LSLs were fully replaced.

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FIGURE 1 Comparison of lead concentrations by water main material and replacement type



LSL—lead service line, n—number of samples taken

Concentrations shown are averaged results for the fourth litre multiplied by 10 samplings for a total of 40 observations. Error bars indicate one standard deviation.

	Partial	Full
Ductile iron	n = 10	n = 10
Cast iron		
Pigged	n = 10	n = 10
Pigged and lined	n = 10	n = 10
Not pigged or lined	n = 25	n = 35

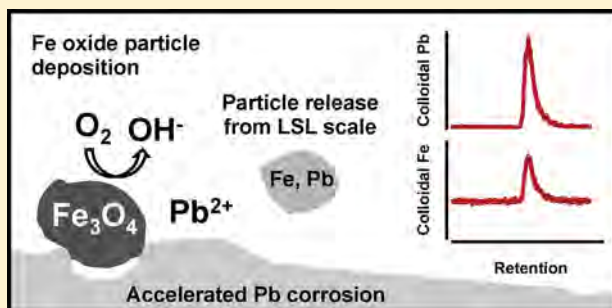
Understanding the Role of Particulate Iron in Lead Release to Drinking Water

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S Supporting Information

ABSTRACT: Lead service lines (LSLs) are a major source of drinking water lead, and high iron levels are frequently observed along with elevated lead release. A model distribution system, dosed with orthophosphate, was used to evaluate the effect of corroded iron distribution mains on lead release from recovered LSLs. Lead release was higher by $96 \mu\text{g L}^{-1}$, on average, from LSLs supplied by corroded iron compared to the inert reference material (PVC). This effect may be explained by deposition of semiconducting iron oxide particles within LSLs. When galvanic cells with lead and magnetite (Fe_3O_4) electrodes were short-circuited, lead release increased 8-fold and a current averaging $26 \mu\text{A}$ was observed. In effluent from LSLs with an upstream iron main, colloidal lead and iron occurred in the same size fraction—possibly due to release of colloidal particles from LSL corrosion scale enriched with iron. Under these circumstances, high molecular weight ($>669 \text{ kDa}$) ^{208}Pb and ^{56}Fe elution profiles, observed via size-exclusion chromatography, were highly correlated (average $R^2 = 0.97$). Increasing orthophosphate from 0.5 to 1.0 mg L^{-1} (as PO_4^{3-}) accompanied an average reduction in lead release of $6 \mu\text{g L}^{-1} \text{ month}^{-1}$ but did not significantly reduce the effect of an upstream iron main.



INTRODUCTION

Elevated blood lead levels are associated with learning deficits and neurobehavioral disorders in children,¹ and drinking water lead levels have been shown to correlate with blood lead.^{2,3} At lower levels of exposure, increases in blood lead accompany steeper declines in children's cognitive performance.^{4,5}

High levels of iron in distributed drinking water have been observed in previous work along with elevated lead measured at the point of use.^{6–8} Unlined cast iron distribution mains—especially disturbed iron mains—have been linked with greater lead release from lead service lines (LSLs).⁸ Accumulation of iron within LSL corrosion scale is a widespread phenomenon,^{9–11} and iron deposits within LSLs could function both as sites for adsorption of lead and as sources from which lead and iron are subsequently released.^{6,11–13} Elevated arsenic in drinking water systems has been attributed to adsorption and transport by particulate iron,¹⁴ and iron-rich particles may also play a role in mobilizing lead from sources to the point of use via adsorption.^{15–17}

Magnetite (Fe_3O_4), hematite ($\alpha\text{-Fe}_2\text{O}_3$), maghemite ($\gamma\text{-Fe}_2\text{O}_3$), goethite ($\alpha\text{-FeOOH}$), lepidocrocite ($\gamma\text{-FeOOH}$), siderite (FeCO_3), ferrous hydroxide ($\text{Fe}(\text{OH})_2$), ferric hydroxide ($\text{Fe}(\text{OH})_3$), ferrihydrite ($5\text{Fe}_2\text{O}_3 \cdot 9\text{H}_2\text{O}$), and green rusts have been identified in previous work as constituents of iron main corrosion scale.^{18–22} Magnetite in particular has sufficiently high electrical conductivity (approximately $2 \times 10^4 \Omega^{-1} \text{ m}^{-1}$) to support cathodic reduction of oxygen,^{23,24} although oxygen reduction on hematite and

lepidocrocite has also been demonstrated.^{25,26} As an electrode, magnetite is known to promote galvanic attack on iron,^{23,27,28} and deposition of magnetite particles can induce galvanic corrosion of aluminum surfaces as well.²⁹ Magnetite is predicted to be cathodic to lead in neutral waters,^{30,31} and previous work has identified magnetite in drinking water sampled at the point of use downstream from a corroded iron distribution main.^{32,33}

Efforts to control drinking water lead often include addition to distributed water of an orthophosphate-based corrosion inhibitor.^{34,35} Lead phosphate minerals are relatively insoluble in the neutral pH range and can act as a passivating film, separating lead from the aqueous environment.³⁶ The ability of orthophosphate to reduce lead release has been well documented, especially at doses greater than 3 mg L^{-1} (as PO_4^{3-}).^{37–41}

Given the prevalence of unlined and corroding iron distribution mains, the use of iron-based coagulants in water treatment, and the high levels of iron sometimes present in source waters, there is value in an improved understanding of lead–iron interactions in drinking water systems. This work investigated the link between iron distribution mains and elevated lead release observed via residential sampling in

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previous work.^{7,8} A model distribution system was used—along with a new analytical tool, size-exclusion chromatography with ICP-MS detection—to evaluate the effect of an upstream source of iron on lead release from LSLs at two commonly applied orthophosphate doses.³⁴ A follow-up study explored galvanic corrosion of lead by semiconducting iron oxide particles as a possible mechanism for the effect of an upstream iron main on lead release. This work highlights the importance of distribution main condition for controlling drinking water lead, and has relevance for the implementation of lead corrosion control schemes, especially for low-alkalinity distributed waters.

EXPERIMENTAL SECTION

Model Distribution System. The model distribution system comprised four pipe loops (2 unlined cast iron, 2 PVC) and four pairs of LSL sections configured such that each pipe loop supplied a full and partial LSL section in parallel (Figure 1). Each of the four combinations of distribution main

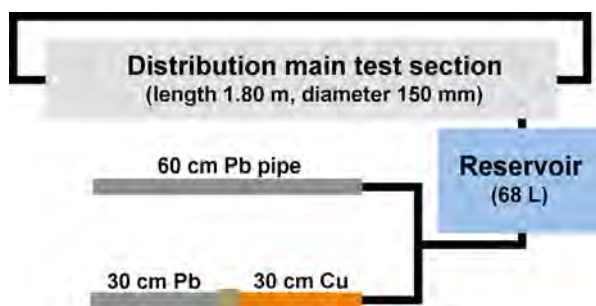


Figure 1. Simplified diagram of a cast iron pipe loop (1 of 2) and set of LSL test sections (30 and 60 cm sections, both configurations had lead-brass junctions). Reference (PVC) distribution mains had a diameter of 100 mm.

material and LSL configuration was represented by two LSL sections. The pipe loop apparatus, excluding the simulated LSLs, is described in detail elsewhere.^{42,43} Iron distribution main sections, recovered from the same water system as the LSL sections, were 150 mm in diameter and moderately to heavily tuberculated. PVC sections were 100 mm in diameter.

The simulated partial and full LSLs comprised 30 and 60 cm sections, respectively, of lead pipe (1 in. ID, 1.5 in. o.d.), recovered from a single-unit residence supplied by distributed water with an orthophosphate residual of approximately 0.5 mg L⁻¹ (as PO₄³⁻). Recovered lead pipe had been in use for at least 40 years. Following recovery, lead pipe sections were stored in the same distributed water (with 0.5 mg L⁻¹ of orthophosphate) for a period of 4 weeks prior to installation in the model system. Partial LSL sections included 30 cm of new copper pipe (3/4 in. type 'K') coupled to the reclaimed lead with a brass fitting. Electrical continuity between lead and copper was confirmed using a digital multimeter (Extech Instruments). Based on distribution system water quality and the relatively low orthophosphate residual, lead(II) carbonates and phosphates were expected as the primary and secondary crystalline phases, respectively. Owing to the prevalence of unlined iron distribution mains in the water system,⁸ iron deposits within LSL corrosion scale were probable. Despite the use of free chlorine as a secondary disinfectant, lead(IV) oxides were not expected due to the demonstrated inhibition of lead(IV) oxide formation by orthophosphate.⁴⁴ Furthermore, the long

stagnation regime applied over the duration of the experiment was expected to have inhibited formation of lead(IV) compounds by depleting the free chlorine residual.⁴⁵

Water from the clearwell of a full-scale water treatment facility⁴⁶ was collected prior to chlorination and corrosion inhibitor addition for use as the feedwater to the model system. Typical feedwater pH, alkalinity, and total organic carbon were 5.5, 5.0 mg L⁻¹ (as CaCO₃), and 1.5 mg L⁻¹, respectively. Lead and iron were below their respective reporting limits. The feedwater was modified with sodium hypochlorite (1.0 mg L⁻¹ free chlorine), sodium hydroxide (pH 7.4), and the blended zinc ortho/polyphosphate corrosion inhibitor added to distributed water at the treatment facility (0.5 and 1.0 mg L⁻¹ as PO₄³⁻). Effluent from each pipe loop was discharged into a separate 68 L reservoir and pumped into the LSL sections for alternating 23 h 55 min standing and 5 min flow periods. Flow through the LSLs was approximately 2.0 L min⁻¹, and each held an approximate volume of 250 mL. Water entered and exited LSL sections via plastic tubing connected to lead or copper with a brass fitting. Thus, both full and partial LSL configurations had the potential for galvanic corrosion via lead-brass couples. LSL effluent water temperature varied seasonally within the range 9.9–23 °C, with summer maxima in the last week of August.

Following installation of the LSL sections, orthophosphate was applied at a nominal dose of 0.5 mg L⁻¹ (as PO₄³⁻) for a 23-week conditioning phase and an 18-week baseline phase. The applied orthophosphate dose was chosen to match the distributed water residual in the system from which the lead pipes were recovered. Following 41 weeks—the combined conditioning and baseline phases—the nominal dose was increased to 1.0 mg L⁻¹ (as PO₄³⁻) and the system was operated for an additional 74 weeks (the test phase). [Supporting Information \(SI\) Table S1](#) summarizes LSL influent water quality over the baseline and test phases. The duration of the conditioning period (23 weeks) fell between the duration of conditioning for reclaimed lead pipes adopted by Wang et al.^{47,48} and Cartier et al.³⁷ (13 weeks and 8 months, respectively). Conditioning in the present study was aided by the fact that water circulated in the model system closely approximated the distributed water that lead pipes had been exposed to prior to recovery.

Standards and Reagents. Stock solutions of NaOH, NaOCl (Fisher Scientific), and blended zinc ortho/polyphosphate (ZOP-123, Shannon Chemical) were made each week and diluted with feedwater for addition to the pipe loops. Sample preservation and hot acid digestion were performed with trace metal grade HNO₃ (Fisher Scientific). For size exclusion chromatography, tris buffer (tris (hydroxymethyl) aminomethane) and trace metal grade HCl (Fisher Scientific) were used. Thyroglobulin was purchased from GE Healthcare. Mobile phases, blanks, sample dilutions, and electrolyte were prepared using ultrapure water (18.2 MΩ cm⁻¹, 5 ppb or less total organic carbon).

Analytical Methods. LSL effluent was collected in 250 mL polyethylene (HDPE) bottles following a 23 h 55 min stagnation within LSL sections. Total lead in LSL effluent was quantified following HNO₃ digestion according to Standard Method 3030.⁴⁹ Lead contamination as a result of the digestion procedure was estimated, using method blanks (*n* = 70), at 0.4 μg L⁻¹ (95% CI: 0.3–0.5). Metals were quantified by inductively coupled plasma-mass spectrometry (ICP-MS, X Series II, Thermo Scientific) according to Standard Method

3125,⁴⁹ with reporting limits of 0.4 and 6.0 $\mu\text{g L}^{-1}$ for lead and iron, respectively. Sample bottles, tubes, flasks, and caps were immersed in 2 M HNO_3 for 24 h and rinsed three times with ultrapure water prior to use. Orthophosphate and free chlorine were measured using a colorimeter (Standard Methods 4500-P E and 4500-Cl G, respectively).⁴⁹ A combination pH/conductivity/dissolved oxygen meter was used to measure pH (Accumet XL-50).

Lead was also quantified after filtration—within 20 min of LSL effluent collection—through 0.45 μm cellulose nitrate membrane filters with a syringe filter cartridge. Mean recovery was estimated, using a solution of 35 mg L^{-1} NaHCO_3 (pH 7.0) spiked with $\text{Pb}(\text{NO}_3)_2$ (35–500 $\mu\text{g L}^{-1}$ as Pb), at 84.9% (95% CI: 82.7–87.1). Lead contamination due to filtration and acid preservation was estimated using method blanks ($n = 119$) at 0.6 $\mu\text{g L}^{-1}$ (95% CI: 0.6–0.7). During the test phase, lead in 0.45 μm filtrate was quantified for 23 weeks longer than total lead.

Size-Exclusion Chromatography with ICP-MS Detection. The size-exclusion chromatography (SEC) method applied for the separation of LSL effluent is described in detail elsewhere.¹⁵ The stationary phase used for all separations was a composite of cross-linked agarose and dextran (Superdex 200, 10 $\times$ 300 mm, 13 μm particle size, GE Healthcare). Separations were performed using a 50 mM tris-HCl (pH 7.3) mobile phase at a flow rate of 0.5 mL min^{-1} . The retention volume of thyroglobulin (669 kDa, Stoke's radius 8.5 nm), indicated in chromatograms as a qualitative point of reference, was monitored as ¹²⁷I.

Galvanic Cells. Commercial magnetite powder (Fisher Scientific) was densified into solid electrodes using a spark plasma sintering (SPS) machine (model 10–3, Thermal Technology LLC). SPS allows consolidation of powders under applied mechanical pressure at relatively low temperatures; heating is provided by an electric current.⁵⁰ Densification of the magnetite powder was performed in a graphite die, using graphite foil to isolate the powder from the die, at 50 MPa with a pulsed DC current (25 ms on, 5 ms off). Prepressurized samples were heated under a vacuum at 100 $^\circ\text{C min}^{-1}$ to 800 $^\circ\text{C}$, held isothermally for 10 min, and rapidly cooled. Postdensification, samples were polished with 320-grit aluminum oxide paper and rinsed thoroughly with ultrapure water. Electrodes were 0.4 cm thick and had flat faces with apparent surface areas of approximately 1 cm^2 . The X-ray diffraction pattern of the magnetite powder is provided as SI Figure S1 (Bruker D8 Advance XRD system, Co $K\alpha$ radiation, $\lambda = 1.79 \text{ \AA}$). Consistent with previous work at comparable or higher sintering temperatures,^{51,52} densification of magnetite by SPS did not result in any significant changes in diffraction peaks, other than the appearance of some small reflections attributable to hematite.

Lead coupons (3.8 $\text{cm} \times 1.3 \text{ cm} \times 0.2 \text{ cm}$) were immersed in 2 M HNO_3 for 2 h in order to remove surface deposits. Coupons were subsequently conditioned for 2 weeks by immersion in daily changes of 35 mg L^{-1} NaHCO_3 . Electrodes were suspended, via insulated copper wires fastened to copper alligator clips, in 250 mL Erlenmeyer flasks sealed with rubber stoppers (SI Figure S2). Magnetite and lead electrodes were suspended such that approximately $1/3$ and $1/2$, respectively, of the total surface areas were submerged in the electrolyte; the submerged portions were approximately 1.5 cm apart. Copper wires passed through the rubber stoppers and were connected above the flasks via a second set of clips; circuits were

interrupted at this point in order to measure galvanic current. Current was measured immediately after changing the electrolyte by connecting the multimeter (Extech Instruments) inline for 10 s. The 35 mg L^{-1} NaHCO_3 electrolyte (pH 7.5, 20–23 $^\circ\text{C}$) was changed daily over the duration of the experiment, allowing for a stagnation time of 24 h. Daily electrolyte changes were accomplished by transferring the electrode assembly to a new flask and preserving the contents of the previous flask by adding HNO_3 to a final concentration of 0.5%. Preserved 200 mL samples were held for 24 h prior to direct quantification.

Data Analysis. Where applicable, medians and interquartile ranges were used, instead of means and standard deviations, to describe distributions that were skewed due to outliers or were approximately log-normal. Linear regression models with autoregressive errors⁵³ were used to estimate the effects of distribution main material (categorical variable), LSL configuration (categorical variable), and orthophosphate (as a time-trend) on total and 0.45 μm -filtered lead release. To reduce serial correlation, lead release data from the model system were aggregated into 4-week averages prior to model fitting.⁵⁴ Trends in lead release with time were estimated separately for each orthophosphate dose (baseline and test phases). Model residuals were examined graphically for approximate normality and constant variance. Final fitted models were additive: no significant interaction between LSL configuration and distribution main material was observed. For the time series illustrations of lead in LSL effluent, a local linear smooth with a kernel window spanning 40% of the data was used.^{54,55} This smoothing algorithm performs function estimation by computing a separate weighted least-squares linear regression estimate at each point in time, with weights given by a tricube kernel of user-specified width.

RESULTS AND DISCUSSION

Effect of an Iron Distribution Main. Relative to the reference condition (inert PVC pipe), corroded iron distribution mains accompanied increases in total and 0.45 μm -filtered lead release of 96 and 34 $\mu\text{g L}^{-1}$, respectively (Table 1). These

Table 1. Linear Model Coefficient Estimates and Confidence Intervals

variable	total lead		0.45 μm filtrate	
	estimate	95% CI	estimate	95% CI
LSL length (30/60 cm)	108.4 ^c	67.2, 149.6	49.9	34.3, 65.5
iron distribution main	96.3 ^c	66.8, 125.7	34.3	20.8, 47.7
time, baseline phase ^a	9.0	−6.1, 24.1	8.2	0.6, 15.7
time, test phase ^b	−6.1	−9.5, −2.7	−3.1	−4.2, −1.9

^aOrthophosphate dosed at 0.5 mg L^{-1} (as PO_4^{3-}), coefficients represent change in lead (in $\mu\text{g L}^{-1}$) over 4 weeks. ^bOrthophosphate dosed at 1.0 mg L^{-1} , coefficients have same significance. ^cUnits of $\mu\text{g L}^{-1}$.

increases were nearly as great as the effect of doubling the length of lead pipe from 30 to 60 cm. Total lead release from 60 cm LSLs—relative to 30 cm partial LSLs—was higher by 108 $\mu\text{g L}^{-1}$ on average. Since brass fittings were used throughout to connect plastic tubing to LSL sections at the influent and effluent ends, galvanic corrosion of lead was likely in both full and partial LSL configurations. Brass and copper are both expected to be cathodic to lead under these circumstances.⁵⁶ For this reason, the area of the lead–water interface

(i.e., length of lead pipe) was likely the most important difference between the two configurations.

Lead release over both experimental phases was higher than is typically observed in residential point-of-use monitoring.^{6–8,12} Elevated lead was attributed to galvanic corrosion at lead-brass or lead–copper couples, low-alkalinity test water, and the long stagnation period (~24 h. vs 30 min or a minimum of 6 h. in typical residential sampling). Previous work has shown that stagnation time is an important predictor of lead release, and that solubility equilibrium with lead corrosion scale may take longer than 24 h.^{57–59} For this reason, a net release of lead to standing water was expected over the full stagnation period, with the majority occurring in the first 6 h.^{57,59}

Effect of Orthophosphate. After 41 weeks at 0.5 mg L⁻¹ (as PO₄³⁻, conditioning and baseline phases), the nominal orthophosphate dose in the model system was increased to 1.0 mg L⁻¹. Figure 2 compares the distribution of total lead

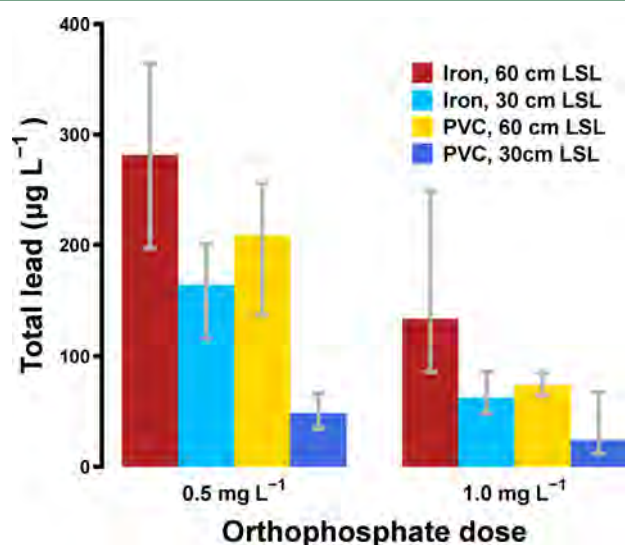


Figure 2. Median lead in LSL effluent grouped by LSL configuration, distribution main material, and orthophosphate dose (equivalent periods at each dose). Error bars span the interquartile range.

grouped according to LSL configuration, distribution main material, and orthophosphate dose. The baseline phase (0.5 mg L⁻¹ orthophosphate) is compared with an equivalent period (February to June) during the test phase (1.0 mg L⁻¹ orthophosphate). In this illustration, medians and interquartile ranges were used to better represent the skewed distributions of lead release (confidence intervals for the linear model are provided in Table 1).

The effect of an iron distribution main was approximately consistent at the two orthophosphate doses evaluated (Figures 3 and S3); allowing for a change in the effect of iron according to experimental phase did not improve the linear model fit significantly. While increasing orthophosphate did accompany reductions in total and 0.45 µm-filtered lead release (Table 1, approximately 6 and 3 µg L⁻¹ month⁻¹ respectively), lead in LSL effluent was stratified by distribution main material over both experimental phases. LSLs with an upstream source of iron released significantly more lead over the full experiment duration.

The increase in orthophosphate at the beginning of the test phase was immediately followed by a reversal of the trend in

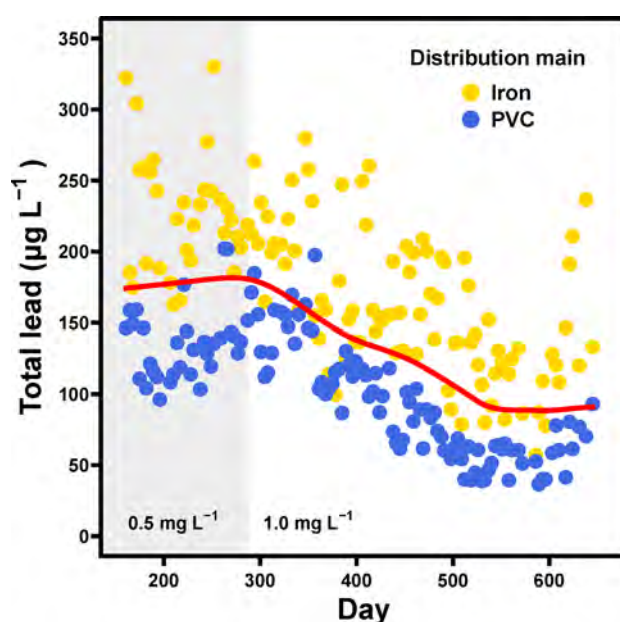


Figure 3. Mean lead in LSL effluent ($N = 122$ per LSL section), aggregated at each point in time by distribution main material. Orthophosphate doses (0.5 and 1.0 mg L⁻¹) are separated by background shading and a local linear smooth is superimposed to represent the overall trend.

lead (0.45 µm filtrate) observed over the duration of the baseline phase (approximately 8 µg L⁻¹ month⁻¹, Table 1 and SI Figure S3). The initial positive trend could have various explanations, including the increase in water temperature over the baseline phase (from 9.9–17.5 °C) or other seasonal factors. A strong dependence of lead release on temperature at low orthophosphate doses has been reported previously.⁶⁰ However, the trend reversal immediately following the orthophosphate dose increase is poorly explained by seasonality: the series maxima preceded the summer water temperature peak by approximately 10 weeks.

Colloidal Particles in LSL Effluent. Lead and iron concentrations were uncorrelated in both filtered and unfiltered LSL effluent. However, high apparent molecular weight (>669 kDa) ⁵⁶Fe and ²⁰⁸Pb SEC elution profiles were highly correlated in separations representing filtrate from LSLs with upstream iron (average $R^2 = 0.97$, Figure 4). (Pronounced tailing of high molecular weight ⁵⁶Fe and ²⁰⁸Pb peaks is consistent with a common secondary interaction with the stationary phase.) Traces of ²⁰⁸Pb, along with a significant ⁵⁶Fe signal (Figure 4), were also detected in a low molecular weight fraction at a comparable retention volume to the principal UV₂₅₄ peak for the same source water.¹⁵ This may have been due to complexation with natural organic matter.^{61,62} In filtrate from LSLs with upstream PVC, a high molecular weight ²⁰⁸Pb peak was detected without a corresponding ⁵⁶Fe peak.

Previous work has shown that high molecular weight peaks represented colloidal lead and iron: SEC separation effectively isolated colloidal particles by retaining the soluble fraction on the agarose/dextran stationary phase.¹⁵ At environmentally relevant concentrations soluble lead and iron standards were completely adsorbed, and at higher concentrations they eluted at peak retention volumes greater than 20 mL.¹⁵ Consistent with the presence of colloidal particles, filtration at 0.1 or 0.05 µm altered high molecular weight ⁵⁶Fe and ²⁰⁸Pb peaks significantly and in identical fashion.¹⁵ In SEC separations of

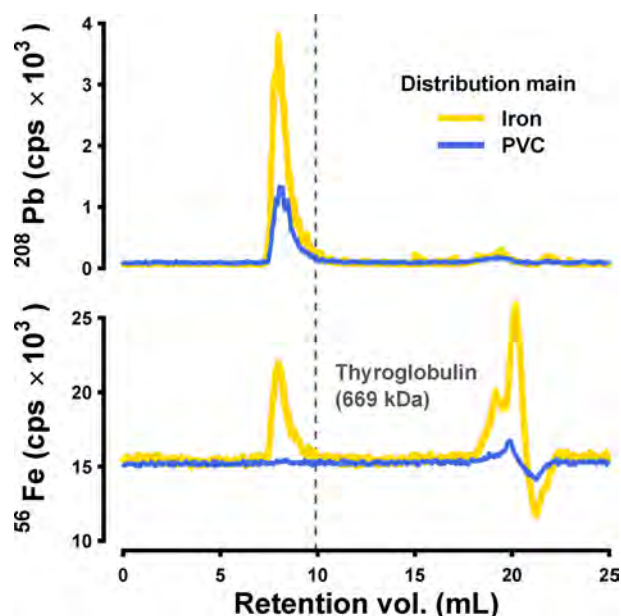


Figure 4. Typical ^{208}Pb and ^{56}Fe chromatograms representing separation of $0.45\ \mu\text{m}$ -filtered effluent from LSL sections supplied by iron and PVC distribution mains (cps denotes counts s^{-1}). As a qualitative point of reference, the retention volume of thyroglobulin (669 kDa, Stoke's radius 8.5 nm) is indicated.

residential samples collected within the water system from which LSL sections were recovered, high molecular weight elution profiles for ^{56}Fe and ^{208}Pb were also correlated (average $R^2 = 0.96$).¹⁵ Under these circumstances, coeluting lead and iron were taken to represent a single colloidal species. This interpretation was corroborated by a correlation ($R^2 = 0.82$) in the masses of colloidal lead and iron (estimated qualitatively via peak area) and by comparable elution profiles for the two metals on stationary phases with opposite surface charges (agarose/dextran and polymethacrylate) and different separation ranges (up to 8×10^6 Da on polymethacrylate).¹⁵

In the context of the present study, coelution of ^{56}Fe and ^{208}Pb is consistent with several possible phenomena. First, high molecular weight peaks may represent colloidal particles released from LSL corrosion scale; this was the expected source of colloidal lead in effluent from PVC systems. In cast iron systems, iron enrichment of LSL scale was probable,^{9–11} and release from LSLs of particles rich in iron and lead would explain ^{56}Fe and ^{208}Pb coelution. The high degree of similarity in ^{208}Pb elution profiles representing cast iron and PVC systems is noteworthy, and could be explained by the controlled water quality and flow regime. Previous work has identified water quality parameters (e.g., dissolved organic matter, phosphate, free chlorine, pH) as important determinants of (iron) particle size,^{63–65} and flow characteristics may also be influential in this regard. The apparent size distribution of colloidal lead—as determined on two stationary phases with different separation characteristics—was also remarkably consistent in residential sampling within the same water system, as described elsewhere.¹⁵ In separations representing 23 residential sites, coefficients of variation for peak retention volumes on polymethacrylate and agarose/dextran were 1.7% and 3.3%, respectively.¹⁵

Alternatively, ^{56}Fe and ^{208}Pb coelution could be explained by adsorption of soluble lead to suspended colloidal iron particles released from iron corrosion scale upstream: extensive research

has shown that soluble lead adsorbs readily to particulate iron oxides.^{66–70} Despite the expectation that soluble lead would adsorb to any colloidal iron oxides present, the occurrence of independent, noninteracting colloidal lead and iron cannot be completely ruled out either—especially in light of diminished size resolution at low retention volumes.

Galvanic Corrosion of Lead by Magnetite. Deposition of semiconducting iron mineral particles within LSLs may explain elevated lead release in the presence of an upstream source of iron. Depending on particle size, a relatively small particle mass deposited within LSLs could provide a large surface area for cathodic reactions such as oxygen reduction. The potential for deposition corrosion of lead by iron oxides was explored using triplicate galvanic cells with lead anodes and magnetite (Fe_3O_4) cathodes. Magnetite was selected as a model electrically conductive iron oxide.

Prior to the introduction of magnetite, lead release to the electrolyte was $20\text{--}41\ \mu\text{g L}^{-1}$ (Figure 5, gray shaded region).

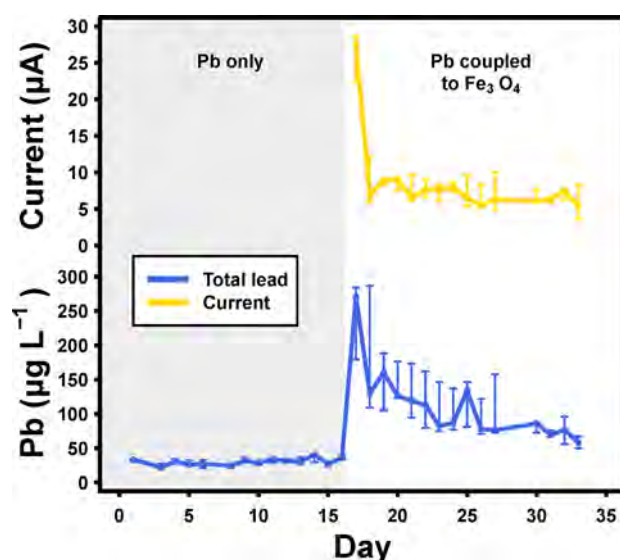


Figure 5. Lead release and galvanic current from triplicate galvanic cells with magnetite (Fe_3O_4) cathodes and lead anodes. Points represent medians, error bars span the range, and background shading indicates the introduction of magnetite.

When lead was made anode by coupling to a densified magnetite cathode (day 17), lead release increased by $140\text{--}251\ \mu\text{g L}^{-1}$ and a galvanic current of $22\text{--}29\ \mu\text{A}$ was observed. Following this initial spike, both lead release and galvanic current declined, rapidly at first and then gradually. On day 33, current was $3.6\text{--}8.4\ \mu\text{A}$ and lead release was $50\text{--}67\ \mu\text{g L}^{-1}$. When the surface layer of magnetite cathodes was removed by polishing on day 34, galvanic current increased to $17\text{--}19\ \mu\text{A}$ (data not shown). Galvanic current and lead release were moderately correlated ($R^2 = 0.53$): a strong correlation between current and lead release was neither observed nor expected due to the formation of corrosion scale on lead coupons.^{45,71} Adsorption of lead to magnetite was expected,⁷⁰ and may have influenced both cathodic reactions at the magnetite surface and lead release to the electrolyte. Iron concentrations in the electrolyte were consistently below the reporting limit, however this does not rule out release of particles: magnetite was poorly soluble in $0.5\% \text{HNO}_3$.

Iron Retention within LSL Sections. While iron corrosion scale was not analyzed to identify crystalline phases, previous

work has shown that magnetite is often a primary scale constituent in the presence of free chlorine and otherwise.^{18–22} Furthermore, magnetite has been identified in point-of-use drinking water samples collected downstream from a corroded iron main and in deposits mobilized by hydrant flushing.^{20,32,33} Iron in LSL influent was apparently dominated by particles: as a linear predictor, variation in iron explained 82% of the variation in turbidity at an orthophosphate dose of 0.5 mg L⁻¹ (consistent with previous work).²² At the 1.0 mg L⁻¹ dose, iron levels explained 51% of the variation in turbidity.

Iron released from iron corrosion scale was largely retained within LSL sections. While median iron in LSL effluent differed according to distribution main material by less than 3 µg L⁻¹, influent iron concentrations from cast iron and PVC pipes differed more substantially. Figure 6 illustrates iron retention

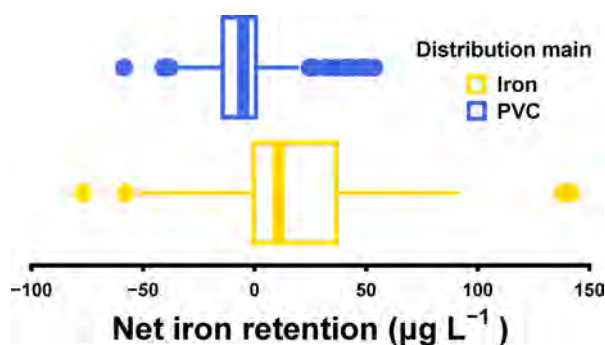


Figure 6. Iron retention within LSL sections, shown via box-and-whisker plots of pairwise differences between influent and effluent iron concentrations ($N = 100$ paired measurements for each distribution main material). Boxes enclose the interquartile range (IQR), medians divide the boxes, and whiskers extend from the upper and lower quartiles to the most extreme value within 1.5 times the IQR.

via pairwise differences in LSL influent and effluent iron concentrations. Median iron in LSL influent from iron distribution mains was 24.0 µg L⁻¹ (interquartile range 9.0–47.3 µg L⁻¹), and 75% of pairwise differences were positive, indicating a net retention of iron within LSL sections (18.2 µg L⁻¹ day⁻¹ on average). The distribution of iron released from iron mains was positively skewed with frequent high outliers. Conversely, median iron in LSL influent from PVC mains was below the reporting limit (4.6 µg L⁻¹, interquartile range 3.6–12.1 µg L⁻¹), and 73% of pairwise differences were negative, indicating a small net release of iron (1.1 µg L⁻¹ day⁻¹ on average). This release was attributed primarily to iron deposits that had accumulated within LSL sections prior to recovery.

Iron retention within LSL sections is consistent with widespread observations of iron deposits in LSL corrosion scale.^{9–11} Schock et al.⁹ recovered lead pipes from multiple water systems that were coated in scales rich in iron oxyhydroxides at the water-scale interface. In the present study, iron deposits within LSL sections likely served as sites for adsorption and release of lead and may have induced galvanic corrosion of lead. The role of drinking water parameters such as orthophosphate, free chlorine, and natural organic matter in the hypothesized galvanic reaction remains a subject for future work.

A potential consequence of iron accumulation is that lowering LSL influent iron levels may not immediately reduce lead release. Following a reduction in influent iron levels, accumulated iron could release lead—by facilitating cathodic

reactions or via desorption and hydraulic mechanisms—until deposits were depleted. In a recent study,⁷ a decrease in distributed water pH (from 10.3 to 9.7) accompanied elevated levels of iron and lead in residential drinking water samples. Following an increase back to pH 10.3, iron levels decreased substantially, but at some sites, lead levels remained high. These observations were explained with reference to the higher adsorption density of lead on iron oxides at higher pH and to the likely accumulation over time of iron deposits within LSLs—a significant potential reservoir of lead and iron. The present study contributes to an understanding of the role of iron particles in lead release to drinking water, highlighting the importance of distribution main condition for lead corrosion control. The composition of iron corrosion scale may be particularly important if the particulate release of semi-conducting oxide phases, such as magnetite, induces elevated lead release via deposition corrosion. Given the prevalence of unlined iron distribution mains in many drinking water systems and the significant public health risks posed by low-level lead exposure, an improved understanding of the mechanisms governing lead–iron interactions in this context is important.

■ ASSOCIATED CONTENT

§ Supporting Information

The Supporting Information is available free of charge on the ACS Publications website at DOI: 10.1021/acs.est.6b01153.

A table summarizing pipe loop effluent water quality, an X-ray diffraction pattern for the magnetite powder, a diagram of a galvanic cell, and a time series of lead in 0.45 µm filtrate from LSL sections (PDF)

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Notes

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Lead in Drinking Water and Human Blood Lead Levels in the United States

Supplements

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Introduction

Lead is a pervasive environmental contaminant. The adverse health effects of lead exposure in children and adults are well documented, and no safe blood lead threshold in children has been identified. Lead can be ingested from various sources, including lead paint and house dust contaminated by lead paint, as well as soil, drinking water, and food. The concentration of lead, total amount of lead consumed, and duration of lead exposure influence the severity of health effects. Because lead accumulates in the body, all sources of lead should be controlled or eliminated to prevent childhood lead poisoning. Beginning in the 1970s, lead concentrations in air, tap water, food, dust, and soil began to be substantially reduced, resulting in significantly reduced blood lead levels (BLLs) in children throughout the United States. However, children are still being exposed to lead, and many of these children live in housing built before the 1978 ban on lead-based residential paint. These homes might contain lead paint hazards, as well as drinking water service lines made from lead, lead solder, or plumbing materials that contain lead. Adequate corrosion control reduces the leaching of lead plumbing components or solder into drinking water. The majority of public water utilities are in compliance with the Safe Drinking Water Act Lead and Copper Rule (LCR) of 1991. However, some children are still exposed to lead in drinking water. EPA is reviewing LCR, and additional changes to the rule are expected that will further protect public health. Childhood lead poisoning prevention programs should be made aware of the results of local public water system lead monitoring measurement under LCR and consider drinking water as a potential cause of increased BLLs, especially when other sources of lead exposure are not identified.

This review describes a selection of peer-reviewed publications on childhood lead poisoning, sources of lead exposure for adults and children, particularly children aged <6 years, and LCR. What is known and unknown about tap water as a source of lead exposure is summarized, and ways that children might be exposed to lead in drinking water are identified. This report does not provide a comprehensive review of the current scientific literature but builds on other comprehensive reviews, including the *Toxicological Profile for Lead* and the 2005 CDC statement *Preventing Lead Poisoning Among Young Children* (1,2). When investigating cases of children with BLLs at or above the reference value established as the 97.5 percentile of the distribution of BLLs in U.S. children aged 1–5 years, drinking water should be considered as a source. The recent recommendations from the CDC Advisory Committee on Childhood Lead Poisoning Prevention to reduce or eliminate lead sources for children before they are exposed underscore the need to reduce lead concentrations in drinking water as much as possible (3).

Background

Lead is a relatively corrosion-resistant, dense, ductile, and malleable metal that has been used by humans for at least 5,000 years. During this time, lead production has increased from an estimated 10 tons per year to 1,000,000 tons per year, accompanying population and economic growth (4). The estimated average BLL for Native Americans before European settlement in the Americas was calculated as 0.016 $\mu\text{g}/\text{dL}$ (5). During 1999–2004, the estimated average BLL was 1.9 $\mu\text{g}/\text{dL}$ for the noninstitutionalized population aged 1–5 years in the United States (6), approximately 100 times higher than ancient background levels, indicating that substantial sources of lead exposure exist in the environment.

BLLs of U.S. children increased sharply during 1900–1975 as increased lead use and emissions caused widespread environmental contamination across the United States. Changes in federal laws to limit the use and emissions of lead have reversed this trend. Effective regulations include reducing or eliminating lead from gasoline for on-road vehicles, foods and food packaging, house paint, water pipes, plumbing fixtures, and solder used in plumbing and drink cans.

Effects of Lead Exposure

Effects on Children

The health consequences of lead exposure depend on the cumulative dose of lead and vulnerability of the individual person rather than the environmental media (i.e., food, water, soil, dust, or air) in which the lead exists. Compelling evidence has established the cognitive effects of childhood lead exposure since they were first described in 1943 (7). To date, no safe blood lead threshold for the adverse effects of lead on infant or child neurodevelopment has been identified (2). Recent evidence suggests that the dose-effect relationship might be supralinear, with a steeper dose response and potential risk for an adverse health effect such as IQ loss at BLLs <10 $\mu\text{g}/\text{dL}$ compared with BLLs $\geq 10 \mu\text{g}/\text{dL}$ (8–10). The developing fetus and child are more sensitive to lead exposure than adults because of the immaturity of the

blood-brain barrier, increased gastrointestinal absorption, and hand-to-mouth behaviors, all of which increase exposure (11). Comorbidities such as iron deficiency also can enhance lead absorption.

Evidence from several prospective studies suggests that the adverse effects of early childhood exposure on neurodevelopment persist into the second decade of life (12–16). The mechanisms by which low levels of lead exposure might adversely affect neurobehavioral development remain uncertain, although experimental data support the involvement of many physiological pathways.

Effects on Adults

Overall. Adults with occupational exposure to lead report more colds and influenza and exhibit suppressed secretory immunoglobulin A (IgA) levels, demonstrating lead-induced suppression of humoral immunity (17). Adults with occupational exposure also might have neurotoxic effects, including peripheral neuropathy. Motor nerve dysfunction can occur at BLLs as low as 40 $\mu\text{g}/\text{dL}$ (18). Lead also is nephrotoxic and can cause progressive nephron loss leading to renal failure, gout, and hypertension. In a meta-analysis of the relationship between BLL and blood pressure, a small but statistically significant association between increased BLL and increased blood pressure was identified (19). BLLs ≥ 40 $\mu\text{g}/\text{dL}$ have been associated with increased risk for cardiovascular, cancer, and all-cause mortality in several epidemiological studies. These effects might not be limited to adults with the long-term, high-dose exposure common in occupational settings. A study of approximately 13,000 adult participants in the third National Health and Nutrition Examination Survey (NHANES) with 12 years of follow-up found that adults in the highest tertile of BLL (≥ 3.6 $\mu\text{g}/\text{dL}$) were at increased risk for all-cause mortality and cardiovascular mortality but not for cancer mortality compared with those in the lowest tertile of BLL (< 1.9 $\mu\text{g}/\text{dL}$) (20).

Reproductive and Prenatal Effects. Lead exposure remains a concern for pregnant and lactating women, particularly those who have an occupational exposure to lead, who are recent immigrants, who are engaged in home renovations, or who have pica. Prenatal lead exposure resulting in maternal BLLs < 10 $\mu\text{g}/\text{dL}$ has measurable adverse effects on maternal and infant health, such as fertility, hypertension, and infant neurodevelopment (21). In addition, because lead persists in bone for decades, as bone stores are mobilized to meet the increased calcium needs of pregnancy and lactation, women and their infants might be exposed to lead long after external sources have been removed (22). Adverse reproductive effects are not limited to women. In males with occupational lead exposure, abnormal sperm morphology and decreased sperm count have been observed at BLLs < 40 $\mu\text{g}/\text{dL}$ (23).

Carcinogenic Effects

Based on limited evidence from studies in humans and sufficient evidence from animal studies, the U.S. Department of Health and Human Services (HHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens, and the U.S. Environmental Protection Agency (EPA) has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer also has determined that inorganic lead is likely carcinogenic in humans (1).

Scope of Public Health Concern

In 2004, 143,000 deaths and a loss of 8,977,000 disease-adjusted life years were attributed to lead exposure worldwide, primarily from lead-associated adult cardiovascular disease and mild intellectual disability in children (24). Children represent approximately 80% of the disease impact attributed to lead, with an estimated 600,000 new cases of childhood intellectual disabilities resulting from BLLs ≥ 10 $\mu\text{g}/\text{dL}$ each year (25).

In 1987, one study estimated that reducing water lead levels to below the maximum contaminant level for lead (which was 20 parts per billion [ppb] during 1986–1991) would save nearly \$400 million per year (1985 dollars) (26). Although estimates of the reductions in lead concentrations for various media, air, dust, soil, and water are unavailable, reductions in BLLs were observed for each subsequent cohort of children aged 2 years who were not exposed to lead at the concentrations experienced by the cohort of children aged 2 years in 1976. As a result of the overall reduction of lead in the environment, including fuel, house paint, and drinking water, there was an estimated decrease in BLLs of 15.1 $\mu\text{g}/\text{dL}$ and a related estimated economic benefit of \$110–\$300 million in earnings for children born after 1976 who were not exposed to high levels of lead (27). A recent cost-benefit analysis suggested that for every dollar spent to reduce lead hazards, \$17–\$220 is saved. This cost-benefit ratio compares favorably to that of other public health interventions such as vaccines (28).

Historical Trends in Blood Lead Levels

Since the 1970s, NHANES data have been used to track BLLs for the noninstitutionalized U.S. population (Figure). In 1978, approximately 13.5 million children aged 1–5 years had BLLs ≥ 10 $\mu\text{g}/\text{dL}$, which is generally considered the threshold for housing inspection, health education, and home visits (i.e., case management) by local and state public health agencies. By 2007–2008, this number had decreased to approximately 250,000 (29). In addition, in the early NHANES data from the 1970s and 1980s, 12% of black children had BLLs ≥ 30 $\mu\text{g}/\text{dL}$, compared with 2% of their counterparts who were white. Children living in low-income families also were at greater risk for BLLs ≥ 30 $\mu\text{g}/\text{dL}$ (10% of children in households earning $< \$6,000$ per year compared with 1.2% living in households earning $> \$15,000$ per year) (30). By the 1999–2004 surveys, the percent differences in BLLs ≥ 10 $\mu\text{g}/\text{dL}$ for children aged 1–5 years, by race and family income, were no longer statistically significant, a trend that continues today at levels ≥ 10 $\mu\text{g}/\text{dL}$, demonstrating the impact of policies at the federal, state, and local levels (6).

In the 1991–1994 NHANES, the overall prevalence of BLLs ≥ 10 $\mu\text{g}/\text{dL}$ was 2.2% but decreased to 0.7% by the 1999–2002 survey. Overall, the geometric mean (GM) decreased significantly ($p < 0.05$; two-tailed t-test) from 2.3 $\mu\text{g}/\text{dL}$ to 1.6 $\mu\text{g}/\text{dL}$ during the same time period. Among children aged 6–12 years, boys had significantly higher GM BLLs than girls in all age, racial, and income groups (6).

Despite the considerable progress in decreasing BLLs, children aged < 6 years continue to be exposed to lead. Although disparities among various subpopulations of children with BLLs ≥ 10 $\mu\text{g}/\text{dL}$ are no longer significant, disparities in risk for exposure have persisted over time. In addition, mean BLLs continue to be higher for children from low-income families, non-Hispanic black children, and children living in older housing (i.e., built before 1950) (6). For example, the mean BLL for non-Hispanic black children (1.9 $\mu\text{g}/\text{dL}$) was significantly higher (36%) than that of white children (1.4 $\mu\text{g}/\text{dL}$) during 2007–2008.

Although the decrease in GM BLLs in women aged 20–59 years from 1.8 $\mu\text{g}/\text{dL}$ in 1988–1994 to 1.2 in 1999–2002 was similar to that seen in children, in utero exposure is also a substantial public health issue for certain populations, particularly new immigrants (31–33). In a 2003 study conducted in New York City, New York, BLLs ≥ 5 $\mu\text{g}/\text{dL}$ were more prevalent among pregnant women who were born outside the United States than pregnant women born in the United States (odds ratio = 8.2, 95% confidence interval = 3.8–17.3) (34).

Lead in the Environments of Children

A review of the sources of lead in the environments of U.S. children discusses the contributions of various lead-contaminated media to BLLs in children (35). Deteriorating lead paint and lead in house dust and soil are the primary, and often the most concentrated, sources of lead. However, lead paint contamination is not the only source of exposure for U.S. children.

Lead is used in thousands of applications, each constituting a potential exposure source (36). Case reports from local and state lead programs indicate that up to 30% of children with BLLs $\geq 10 \mu\text{g/dL}$ do not have an immediate lead paint hazard. For example, in 2004 in Arizona, lead-contaminated soil was the most commonly identified proximate exposure source, accounting for approximately 24% of increased BLLs in children, followed by paint (17%), folk remedies and pottery (17%), dust (15%), and miscellaneous other sources (19%). In 8% of cases, no lead hazard was identified (37).

In field investigations, nonpaint lead exposure sources might be insufficiently characterized and their importance underestimated. Lead program inspectors look for lead paint hazards in places where children with BLLs $\geq 10 \mu\text{g/dL}$ spend time. Often, lead exposure sources other than paint are sought only when no lead paint hazards are found. Of 35 CDC-funded childhood lead poisoning prevention programs, only 15 reported that they routinely tested lead levels in water in homes where children have increased BLLs (CDC, unpublished data, 2009). Thus, for some children with BLLs $\geq 10 \mu\text{g/dL}$, important nonpaint sources such as water might not be identified.

Evidence also suggests that for children with BLLs 5–9 $\mu\text{g/dL}$, no single source of exposure predominates. For these children, the contribution of multiple sources, including drinking water, seems likely, particularly for children who do not have well-established risk factors such as living in old housing or having a parent who is exposed to lead at work (38). CDC and its Advisory Committee on Childhood Lead Poisoning Prevention concur that primary prevention of lead exposure is essential to reducing high BLLs in children and that reducing water lead levels is an important step in achieving this goal.

Lead in Drinking Water

Lead is unlikely to be present in source water unless a specific source of contamination exists. However, lead has long been used in the plumbing materials and solder that are in contact with drinking water as it is transported from its source into homes. Lead leaches into tap water through the corrosion of plumbing materials that contain lead (26,39). The greater the concentration of lead in drinking water and the greater amount of lead-contaminated drinking water consumed, the greater the exposure to lead. In children, lead in drinking water has been associated both with BLLs $\geq 10 \mu\text{g/dL}$ (40,41) as well as levels that are higher than the U.S. GM level for children (1.4 $\mu\text{g/dL}$) but are $< 10 \mu\text{g/dL}$ (42–44).

History of Studies on Lead in Water

In 1793, the Duke of Württemberg, Germany, warned against the use of lead in drinking water pipes, and in 1878, lead pipes were outlawed in the area as a result of concerns about the adverse health effects of lead in water (45). In the United States, the adverse health consequences of lead-contaminated water were recognized as early as 1845 (46). A survey conducted in 1924 in the United States indicated that lead service lines were more prevalent in New England, the Midwest, Montana, New York, Oklahoma, and Texas (47). A nationwide survey conducted in 1990 indicated that 3.3 million lead service lines were in use, and the areas where they were most likely to be used were, again, the midwestern and northeastern regions of the United States. This survey also estimated that approximately 61,000 lead service lines had been removed through voluntary programs during the previous 10 years (48).

Research on exposure to lead in water increased as concern about the topic increased, and efforts were made to establish a level of lead in water that, at the time of the studies, was considered acceptable. A 1972 study in Edinburgh, Scotland, obtained 949 first-flush water samples (i.e., samples of water from the tap that have been standing in the plumbing pipes for at least 6 hours) matched with 949 BLLs, as well as 205 running water samples matched to 205 BLLs (49). No dose-response relationship could be determined when comparing BLLs with four levels of lead in both first-flush water and in running water ($< 0.24 \mu\text{mol/L}$; $0.24\text{--}0.47 \mu\text{mol/L}$; $0.48\text{--}1.43 \mu\text{mol/L}$; and $\geq 1.44 \mu\text{mol/L}$). The study concluded that the findings challenged whether it was necessary to lower the water lead concentration to < 100 ppb, which at that time was the acceptable concentration established by the World Health Organization. However, the study also reported that low levels of environmental lead exposure could have adverse health effects; therefore, knowing the degree of lead exposure from household water relative to other sources is important. Another study, in 1976, of 129 randomly selected homes in Caernarvonshire, England, reported a similar finding (50), describing the relationship between blood and water lead as slight.

Comparing studies on the relationship between BLLs and lead levels in water are difficult given that the age of study participants, water sample collection methods, and duration of the exposure to high water lead levels vary considerably across studies. Quantifying the contribution of lead in water to BLLs in children can be particularly challenging because of the difficulty of collecting valid, reliable, and reproducible water lead samples. Relatively small fluctuations in factors such as temperature, pH alkalinity, and dissolved solids affect the solubility of lead (51). In addition, intake estimation is difficult because of the incomplete understanding of individual children's water intake patterns. Nonetheless, during the 1900s, an association between blood and water lead levels continued to be reported, particularly in sensitive populations such as pregnant women and children. For example, in the Glasgow Duplicate Diet Study, the correlation coefficient between infant BLLs at age 3 months and composite water samples was 0.59 (52). In a study of the association between children's BLLs and water lead levels, with a convenience sample of 320 households, water lead levels explained as much as 12% of the variance in BLLs (53). BLLs also were shown to decrease when lead lines were completely replaced. In one study comparing water lead levels in housing of low-income persons before and after lead service lines were replaced, water lead levels decreased by 50% in the 3 months after total replacement of lead pipes from the distribution systems (54).

In the 1983 British Regional Heart Study, the BLLs of 7,378 men in 24 British towns were evaluated (55). All men were categorized based on lead concentration in domestic water, water hardness, and alcohol and cigarette consumption. The findings indicated that when first-draw home tap water measured 100 ppb, BLLs of the men were $1.00 \mu\text{mol/L}$, compared with $0.7 \mu\text{mol/L}$ in men with home tap water that contained undetectable lead levels. The study recommended that lead in water be given greater priority than in the past in any national campaign to reduce lead exposure. In a follow-up study in Glasgow, Scotland, tap water lead concentrations and maternal BLLs from 1981 were compared with water and BLLs from 1993 (56). In 1993, 17% of 1,812 homes had daytime, first-draw lead levels in 1 L of water that were ≥ 10 ppb, compared with 49% of 131 homes enrolled in a survey in 1981. Maternal BLLs decreased by 31% during the same period (11.9 $\mu\text{g/dL}$ in 1981 vs. 3.7 $\mu\text{g/dL}$ in 1993). Despite this decrease, the study reported that even the reduced levels of lead in tap water might have presented a risk for bottle-fed infants.

The lead studies discussed above exclusively assessed lead in water, and tap water was the only source considered as the cause of the increased BLL. One landmark U.S. observational study conducted during the 1990s studied 183 urban children aged 12–31 months (37%, 12–18 months; 31%, 18–24 months; 33%, 24–31 months) (57). Of these children, 63% had BLLs $<10 \mu\text{g/dL}$, 20% had BLLs of 10–14 $\mu\text{g/dL}$, 8% had BLLs of 15–19 $\mu\text{g/dL}$, and 3% had BLLs $\geq 20 \mu\text{g/dL}$. The study evaluated lead in home foundation perimeter soils, potable water, paint, and house dust. Lead-contaminated house dust was the major contributor to BLLs $\geq 10 \mu\text{g/dL}$. However, the study reported that although lead-contaminated water had a statistically significant effect on children's BLLs after adjusting for other sources of lead exposure, no statistically significant contribution for drinking water could be discerned at levels below the current EPA action level of 15 ppb (57). Lead dust as a primary source of lead for children with increased BLLs was further demonstrated in a subsequent pooled analysis of 12 studies; floor dust lead levels as low as 5 $\mu\text{g}/\text{ft}^2$ were associated with 5% of enrolled children having a BLL $\geq 10 \mu\text{g/dL}$ (58).

LCR and Control Measures

In 1991, EPA promulgated LCR. LCR sets an action level of 15 ppb of lead in 1 L of first-draw water taken after the water has been standing in the pipes for at least 6 hours. LCR also establishes a nonenforceable maximum contaminant level goal (MCLG) of 0, the level of lead in drinking water at which no adverse health effects are likely to occur. However, EPA has determined that MCLG is not feasible because many sources of lead in water are not under the control of public drinking water suppliers (i.e., water utilities). LCR requires water utilities to monitor lead in drinking water from a sample of customer taps in homes with plumbing materials that contain lead and copper. If $>10\%$ of the samples collected from a water utility serving $<50,000$ residents exceeds the lead action level, the utility must identify and install optimal corrosion control treatment. Utilities serving $\geq 50,000$ residents are required to have optimal corrosion control treatment regardless of level of lead in drinking water. Any size water utility exceeding the lead action level and covered by LCR is required to educate the public about lead in drinking water until water levels are below the lead action level. Utilities that exceed the action level must distribute public education materials on lead to customers and organizations that serve consumers with populations at high risk for adverse health effects from lead (e.g., schools, pediatricians, and child-care centers). The public education materials must include information about the health effects of lead, sources of lead, and steps persons can take to reduce their exposure to lead.

LCR requires that additional action be taken when a water utility with lead service lines and optimized corrosion control treatment still exceeds the action level in $>10\%$ of samples collected. In addition to public education, these utility companies also are responsible for replacing the portion of the lead service lines (the line connecting a house to the water distribution system) that the utility company owns. Utility companies must offer to replace the section of line owned by the customer (the section from the water meter into the house). However, the utility company is not required to bear the cost of replacing the privately owned portion of the line. When a customer does not agree to replacement of the privately owned portion of the line, the utility company must notify the residents at least 45 days in advance that they might experience a temporary increase in water lead levels as the portion of the service line owned by the utility company is replaced and must provide guidance on measures to minimize their exposure to lead. A utility company also must collect a water sample within 72 hours after completion of the partial replacement, test the sample for lead, and notify the customer of the results.

Most U.S. drinking water systems are in compliance with LCR. In 2004, the Congressional Research Service reported that an EPA review of its water monitoring data conducted during 2000–2003 did not find a systemic problem of increased lead levels among water systems. For systems that serve $>50,000$ persons, 27 (3.6%) of these systems exceeded the action level of 15 ppb at least once in the time period. For systems that served 3,300–50,000 people, 237 (3.4%) exceeded the action level at least once since 2000 (59). However, lead service lines remain in use in neighborhoods in many cities. These pipes range in age from those installed during the late 1800s through 1986, although the preponderance of lead service line installations occurred before World War II.

Changes in water treatment and disinfection practices can substantially undermine lead corrosion control (60). In the mid-1990s in the District of Columbia (DC), high levels of free chlorine were used to decrease coliform bacteria in water, a process that inadvertently changed the type of lead mineral coating in the water lines to one with very low solubility in the background pH of the DC drinking water. When the free chlorine was replaced with chloramines, the transformed highly insoluble lead scale minerals were no longer stable and dissolved. Therefore, a substantial level of lead was released from the lead service lines into drinking water at the tap (61). CDC reviewed the relationship between BLLs in children, the presence of a lead service line, and water disinfection practices in DC during 1998–2006 (62). The study reported that the presence of a lead service line was associated with higher BLLs in children. This relationship was most pronounced during 2001 through June 2004, when chloramines were used to disinfect the drinking water without adequate corrosion control (62). An observational study in which the BLLs of children were matched to population-based data of water lead levels during periods when water disinfection practices changed in DC concluded that the increase in water lead levels was associated with an increase in the BLLs of children (63). In a study in Wayne County, North Carolina, a unified geographic information system was used to link BLLs with water service lines made with or without lead. The use of chloramines in water predicted higher water lead levels and BLLs, controlling for well-established, known predictors of BLL (44).

Partial replacement of lead service lines might not effectively decrease the increased BLLs associated with lead service lines, as shown by one observational study in DC during July 2004–December 2006 that assessed the BLLs and type of water service line (62). Compared with children who had never had a lead service line, children having had a partial lead pipe replacement were at increased risk for increased BLLs, and BLLs of children with partial lead pipe replacement were not lower than those of children who lived in housing with a complete lead service line.

Water from systems that serve <25 persons and water from private drinking water wells is not regulated under the Safe Drinking Water Act, so LCR does not apply to these water sources, and they are not routinely tested for lead. Approximately 40–45 million people in the United States drink water that is not subject to the LCR regulations (64). The number of homes supplied by private wells or sources that serve <25 persons that have leaded plumbing, fixtures, or solder is unknown, as is the number of such homes that would benefit from appropriate corrosion control or water filtration at the point of use.

Since 1991, when LCR was finalized and enforced, tap water lead levels have substantially decreased (65). However, conditions still exist that could allow children to be exposed to water lead levels ≥ 15 ppb. Drinking water from systems with lead service lines that do not have optimized corrosion control might not be in compliance with LCR, which can result in this level of lead exposure. A system with lead service lines that is in compliance with LCR can still expose children to lead levels ≥ 15 ppb because LCR permits $\leq 10\%$ of sampled homes to exceed the action level of 15 ppb. Optimized corrosion control also might not completely prevent lead in plumbing materials from dissolving into drinking water. Persons who drink water from these sources might be exposed to lead levels >15 ppb.

Conclusion

Although EPA has the primary responsibility for ensuring the safety of drinking water, state and local childhood lead poisoning prevention programs are important partners in ensuring that the public is protected from lead exposure. These programs promote blood lead screening, conduct blood lead surveillance, provide clinician and public education and outreach, and provide case management for children with elevated BLLs. Because children with elevated BLLs might be exposed to many sources of lead, all sources of lead should be considered when their homes are inspected. Childhood lead poisoning prevention programs can obtain data on lead in public drinking water systems from the water suppliers (66). Drinking water in older housing should be tested as a source of lead exposure when the local drinking water system is not in compliance with LCR or when another source of lead exposure cannot be identified for children with high BLLs (67).

Data are not available to address certain issues regarding lead in drinking water. The effect of water lead levels on BLLs of children and other populations at risk for adverse effects is difficult to measure. Current water sampling protocols were designed to assess the adequacy of water treatment, not the level of human exposure to lead. Important fluctuations in water lead levels might be missed because of limitations inherent in sampling protocols developed for regulatory purposes. Future research efforts could validate the accuracy of sampling protocols for identifying fluctuations of lead concentrations, predicting exposure to lead at the individual level, and determining how best to measure lead concentrations in multifamily versus single-family homes, child-care centers, and school settings. As new alternatives to lead in plumbing are developed, they should be evaluated before being marketed. More research, surveillance, and intervention studies also are needed to determine the most effective ways to reduce the lead concentration of drinking water to meet the goal of eliminating high BLLs in children.

Childhood lead poisoning prevention programs routinely provide information on practices that minimize exposure to lead in water. This information can be updated with additional materials promoting lead-safe plumbing practices. Training curricula for lead exposure assessment protocols and case-management guidelines for children with elevated BLLs should incorporate lead-safe water and plumbing information. Appropriate risk communication materials for water customers that are accurate and reflect specific language and cultural factors might be beneficial.

Partial lead service line replacement has been associated with short-term increases in lead levels in drinking water (65) and has not been found to decrease risk for BLLs $\geq 5 \mu\text{g}/\text{dL}$ in children (62). These findings imply that the practice of partially replacing lead service lines as a method to comply with LCR should be reconsidered. One alternative is full replacement of lead service lines, regardless of whether the lead service line is owned by the water authority or the property owner. Lower BLLs could be achieved if plumbing components contained the lowest possible levels of lead and monitoring and enforcement activities were effective. Finally, information about lead in plumbing components, often available in tax assessor data, could be incorporated into information routinely provided to homebuyers or renters before they make the decision to buy or rent a property.

Since 1970, considerable reductions in lead concentrations have occurred in air, tap water, food, dust, and soil, which significantly reduced the BLLs of children throughout the United States. However, children are still being exposed to lead, and no safe blood lead threshold for children has been identified.

All sources of lead in the environments of children should be controlled or eliminated (2). For the many children living in housing built before 1978, lead sources include lead paint hazards as well as lead in plumbing components and fixtures. Children can still be exposed to tap water with lead levels of $\geq 15 \text{ ppb}$ if they live in older homes that are more likely to have lead water pipes or fixtures. To prevent lead exposure from tap water, persons involved with childhood lead poisoning prevention programs should be familiar with communities having buildings at high risk for lead and monitor whether local water providers are in compliance with LCR (66). EPA is currently reviewing LCR, which provides an opportunity for continued collaboration between EPA and CDC that focuses on reducing the public health consequences of exposure to lead in water.

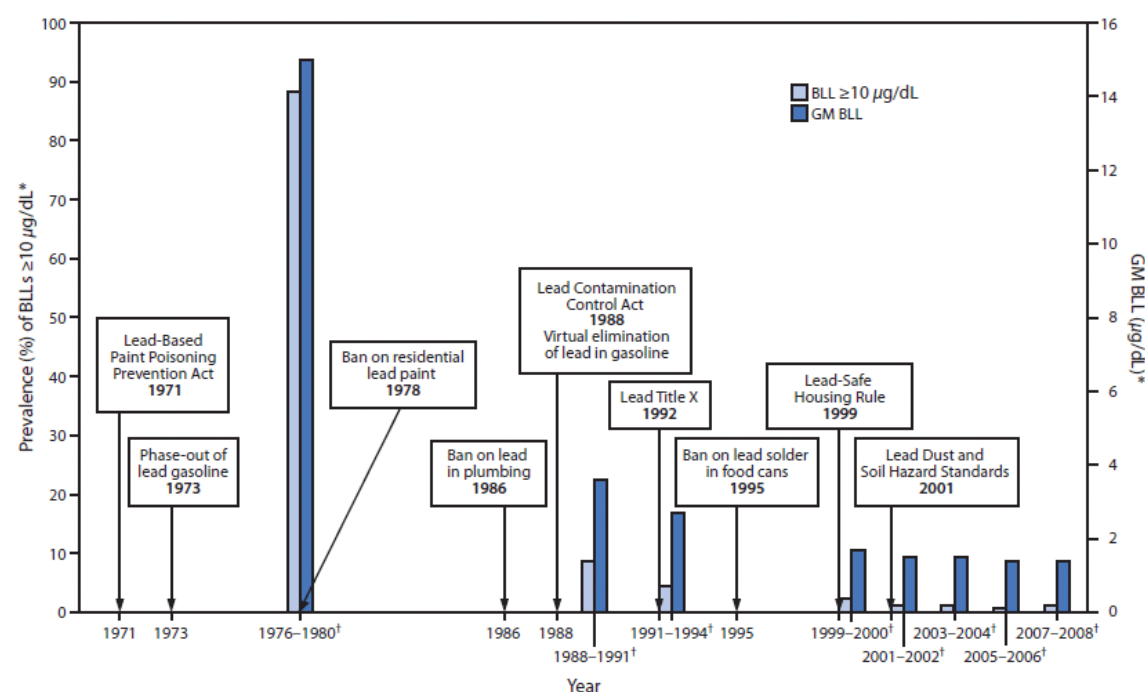
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FIGURE. Timeline of lead poisoning prevention policies and blood lead levels in children aged 1–5 years, by year — National Health and Nutrition Examination Survey, United States, 1971–2008



Abbreviations: BLL = blood lead level; GM = geometric mean; NHANES = National Health and Nutrition Examination Survey.

Sources: Mahaffey KR, Annett JL, Roberts J, Murphy MS. National estimates of blood lead levels: United States (1976–1980). *N Engl J Med* 1982;307:573–9. Jones R, Homa D, Meyer P, et al. Trends in blood lead levels and blood lead testing among U.S. children aged 1 to 5

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* National estimates for GM BLLs and prevalence of BLLs ≥ 10 $\mu\text{g}/\text{dL}$, by NHANES survey period and sample size of children aged 1–5 years: 1976–1980: N = 2,372; 1988–1991: N = 2,232; 1991–1994: N = 2,392; 1999–2000: N = 723; 2001–2002: N = 898; 2003–2004: N = 911; 2005–2006: N = 968; 2007–2008: N = 817.

† NHANES survey period.

Alternate Text: This figure shows a timeline of lead poisoning prevention policies combined with a graph of blood lead levels (BLLs) in children aged 1–5 years, by year, during 1971–2008. BLL data are from the National Health and Nutrition Examination Survey. The lead policies include the Lead-Based Paint Poisoning Prevention Act in 1971, the phase-out of lead gasoline in 1973, the ban on residential lead paint in 1978, the ban on lead in plumbing in 1986, the Lead Contamination Control Act in 1988, which led to the virtual elimination of lead in gasoline, Lead Title X in 1992, the ban on lead solder in food cans in 1995, the Lead-Safe Housing Rule in 1999, and the Lead Dust and Soil Hazard Standards in 2001. The left y-axis show the geometric mean (GM) BLLs. GM BLLs decreased from 15 $\mu\text{g}/\text{dL}$ during 1976–1980 to 3.6 $\mu\text{g}/\text{dL}$ during 1988–1991 to 1.4 $\mu\text{g}/\text{dL}$ during 2007–2008. The prevalence of BLLs ≥ 10 $\mu\text{g}/\text{dL}$ decreased from 88.2% during 1976–1980 to 8.6% during 1988–1991 to 1.2% during 2007–2008.

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CDC investigation: Blood lead levels higher after switch to Flint River water

Stark reminder of dangers of lead exposure for young children

This website is archived for historical purposes and is no longer being maintained or updated.

Press Release

Embargoed Until: Friday, June 24, 2016, 11 AM ET

Contact: Media Relations (<http://www.cdc.gov/media>)

(404) 639-3286

The Centers for Disease Control and Prevention (CDC) today released the results of its investigation into the potential health impact that lead contamination in the Flint, Michigan water supply had on the blood lead levels of local children. The findings indicate that when the source of the water supply was switched to the Flint River, without appropriate corrosion control measures, young children who drank the water had blood lead levels (BLLs) that were significantly higher than when the source of water was the Detroit water system. After the switch back to the Detroit water system, the percentage of children under 6 years with elevated blood lead levels returned to levels seen before the water switch took place.

“This crisis was entirely preventable, and a startling reminder of the critical need to eliminate all sources of lead from our children’s environment,” said Patrick Breysse, Ph.D., director of CDC’s National Center for Environmental Health. “CDC is committed to continued support for the people of Flint through our Childhood Lead Poisoning Prevention program and efforts to raise awareness and promote action to address the critical public health issue in communities across the country.”

To understand the impact of consuming contaminated drinking water on children’s blood lead levels, CDC researchers examined data on levels of lead in blood of children younger than six years before, during, and after the switch in Flint’s water source. The current CDC blood lead level of concern (also known as a reference level) is 5 or more micrograms of lead per deciliter of blood (≥ 5 $\mu\text{g}/\text{dL}$). This reference value is based on the population of children ages 1-5 years in the U.S. who are in the top 2.5% of children tested for lead in their blood.

From April 25, 2014, to October 15, 2015 (the period when the Flint River was used for drinking water), the levels of lead in Flint tap water increased over time and analysis of children's blood lead data detected an increase in BLLs ≥ 5 $\mu\text{g}/\text{dL}$. The likelihood that a child consuming the water would have a blood lead level ≥ 5 $\mu\text{g}/\text{dL}$ was nearly 50 percent higher after the switch to Flint River water. CDC continues to recommend that all children under age 6 living in the City of Flint have their blood tested for lead by a health care provider, particularly if they have not had a blood lead test since October 2015. All children with BLLs ≥ 5 $\mu\text{g}/\text{dL}$ should receive evaluation and follow up, including a home assessment for sources of lead, and health and developmental assessments.

The CDC study had limitations. Researchers were not able to account for all of the factors that might have contributed to a child's exposure to lead, including whether lead-based paint was present in the child's living environment. In addition, researchers did not have information on the amount of lead in or the amount of water consumed by the tested children, limiting the analysis to evaluation of changes in blood lead levels over time as the source water changed.

Lead exposure remains a health concern for young children in the United States. Risk varies across the country, but because there are often no obvious symptoms, the exposure frequently goes unrecognized. Even low levels of lead in children's blood have been shown to affect intelligence, ability to pay attention, and academic achievement.

"Parents and teachers can do a lot to help children grow up healthy and strong, even if they were exposed to lead," said U.S. Department of Health and Human Services' Assistant Secretary for Preparedness and Response Dr. Nicole Lurie, M.D., who is leading the federal response efforts in Flint. "We have followed up directly with the families in Flint whose children showed elevated levels of lead in their blood in an effort to ensure they are getting the additional assessments and case management services they need. We have also expanded Medicaid and strongly urge parents to enroll their children and schedule appointments for them to be seen by a health provider, who can follow their health as they grow and develop. It is also important to for families to take advantage of the programs we have made available that offer healthy foods, and to get kids involved in programs that stimulate their brains – like Head Start and summer reading programs."

CDC lead screening recommendations urge state and local health departments to review local data and develop recommendations for health-care providers that target at-risk children in their areas, focusing on children ages 1 to 2 years. Based on data in Michigan, public health authorities and health care providers recommend blood-lead testing for children living at or below the poverty level and children enrolled in Medicaid.

Flint residents are advised to use lead-certified water filters that are properly installed and maintained on their household taps and to use filtered water for drinking, cooking and brushing teeth. Regular household tap water can be used for bathing and showering because lead is not absorbed into the skin; however, parents should watch young children to prevent them from drinking bath water.

For more information about CDC's Childhood Lead Poisoning Prevention Program, visit <http://www.cdc.gov/nceh/lead/>. For the full article, visit <http://www.cdc.gov/mmwr/index.html>.

For more about the Obama Administration's efforts to help the people in Flint recover from the water crisis, visit <https://www.whitehouse.gov/the-press-office/2016/05/03/fact-sheet-federal-support-flint-water-crisis-response-and-recovery>.

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Page last reviewed: June 24, 2016 (archived document)

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Hemochromatosis and Iron Overload

Sept. 17, 2009

ICD-9-CM Coordination and
Maintenance Committee Meeting

Hemochromatosis (Iron Overload)

- Primary Hereditary Hemochromatosis
- Acquired (Secondary) Iron Overload
- Other Iron Overload (rarely as severe)

Hemochromatosis (Iron Overload)

- Primary Hereditary Hemochromatosis
 - HFE-associated (type 1)
 - C282Y homozygosity
 - C282Y/H63D compound heterozygosity
 - Juvenile; hepcidin and hemojuvelin mutations (type 2)
 - transferrin receptor 2 mutations (type 3)
 - ferroportin mutations (type 4)
- Acquired (Secondary) Iron Overload
- Other Iron Overload (rarely as severe)

References:

OMIM articles 235200, 602390, 604250, and 606069.

Conn's Current Therapy 2008, Ch. 14, Hemochromatosis.

Hemochromatosis (Iron Overload)

- Primary Hereditary Hemochromatosis
- Acquired (Secondary) Iron Overload
 - Iron loading anemias
 - Thalassemia major
 - Sideroblastic anemia
 - Chronic hemolytic anemia
 - Dietary iron overload
 - Parenteral iron overload (including multiple blood transfusions)
- Other Iron Overload (rarely as severe)

References:

Conn's Current Therapy 2008, Ch. 14, Hemochromatosis.

Hemochromatosis (Iron Overload)

- Primary Hereditary Hemochromatosis
- Acquired (Secondary) Iron Overload
- Other Iron Overload (rarely as severe)
 - Long term hemodialysis
 - Chronic liver disease (alcoholic; hepatitis C)
 - Porphyria cutanea tarda
 - Dysmetabolic iron overload syndrome
 - Post portacaval shunting
 - Iron overload in Africa
 - Neonatal iron overload
 - Aceruloplasminemia
 - Congenital atransferrinemia

References:

Conn's Current Therapy 2008, Ch. 14, Hemochromatosis.

Concepts for Coding in Iron Overload

- Hemochromatosis, unspecified
- Primary hereditary hemochromatosis
- Hemochromatosis due to multiple blood transfusions
- Iron overload due to conditions classified elsewhere
 - Code first underlying conditions
- Other iron overload
 - Other hemochromatosis

INFORMATION FOR PATIENTS AND THEIR FAMILIES

Hemochromatosis

AN IRON OVERLOAD DISEASE

*You can live a healthy life, **if** you get treatment early*



Department of Health and Human Services
Centers for Disease Control and Prevention



Iron overload

What is iron overload?

Iron overload is a serious chronic condition that develops when the body absorbs too much iron over many years and excess iron builds up in organ tissues (for example, heart tissue and liver tissue).

What causes iron overload?

Iron overload usually occurs as a result of a gene mutation that causes the body to absorb more than a healthy amount of iron. Iron overload less often occurs as a complication of other blood disorders, chronic transfusion therapy, chronic hepatitis, or excessive iron ingestion.

Is iron overload dangerous?

Yes. Iron overload is dangerous because it can lead to hemochromatosis, a disease characterized by fatigue, weakness, joint pain, abdominal pain, or organ damage. It can eventually become a serious health problem. The key to preventing hemochromatosis is early diagnosis and treatment.

How can I get tested for iron overload?

Simple blood tests can measure the iron levels within your body. The tests are inexpensive and can be done at your doctor's office.



"I have hemochromatosis, and so do my daughter, Ashleigh, and my son, Adam. We take this disease very seriously and follow our treatment regimen rigorously. Early treatment is so important to saving lives, improving the quality of life, and reducing health care costs."

Eric G.

Hemochromatosis (he-mo-kro-ma-toe-sis)

What is hemochromatosis?

Hemochromatosis is the disease that occurs as a result of significant iron overload. It can have genetic or nongenetic causes. In the United States about one million people have the disease, usually because of a gene mutation. When the disease is genetic, it is called hereditary hemochromatosis.

When do people with hemochromatosis begin to get sick?

The age varies from person to person. Usually symptoms begin during middle age. Some people get sick sooner, others later.

What are the early symptoms of hemochromatosis?

Hemochromatosis affects everyone differently. Early symptoms may include fatigue, weakness, weight loss, joint pain, or abdominal pain. There is no definite set of symptoms to indicate that a person has too much iron. Diagnosing hemochromatosis is difficult because the symptoms are like the symptoms of many other diseases.

What happens if I don't get treatment?

If hemochromatosis is not treated, it can lead to these conditions:

- Liver cancer
- Heart disease
- Impotence for men
- Infertility and premature menopause for women
- Diabetes
- Arthritis
- Cirrhosis of the liver
- Bronze skin

Treatment for hemochromatosis

Hemochromatosis can be treated by a phlebotomy (fle-bot-o-me).

What is a phlebotomy?

It's the same procedure that is used when you donate blood. A nurse takes about a pint of blood from a vein in your arm. The procedure takes about an hour.

Is a phlebotomy safe?

Yes. A phlebotomy is safe, simple, and effective. Because you will have frequent phlebotomies, your doctor will monitor your health more closely than if you were just donating blood.

How often must I have a phlebotomy?

How often you have phlebotomies—and how many you have—depends on how much iron has built up in your body. Most people have them once or twice a week for a year or more.

Must I have phlebotomies for the rest of my life?

Yes. The good news is that after your iron is lowered to a safe level, you will have phlebotomies less often, usually a few times a year.

Does a phlebotomy have side effects?

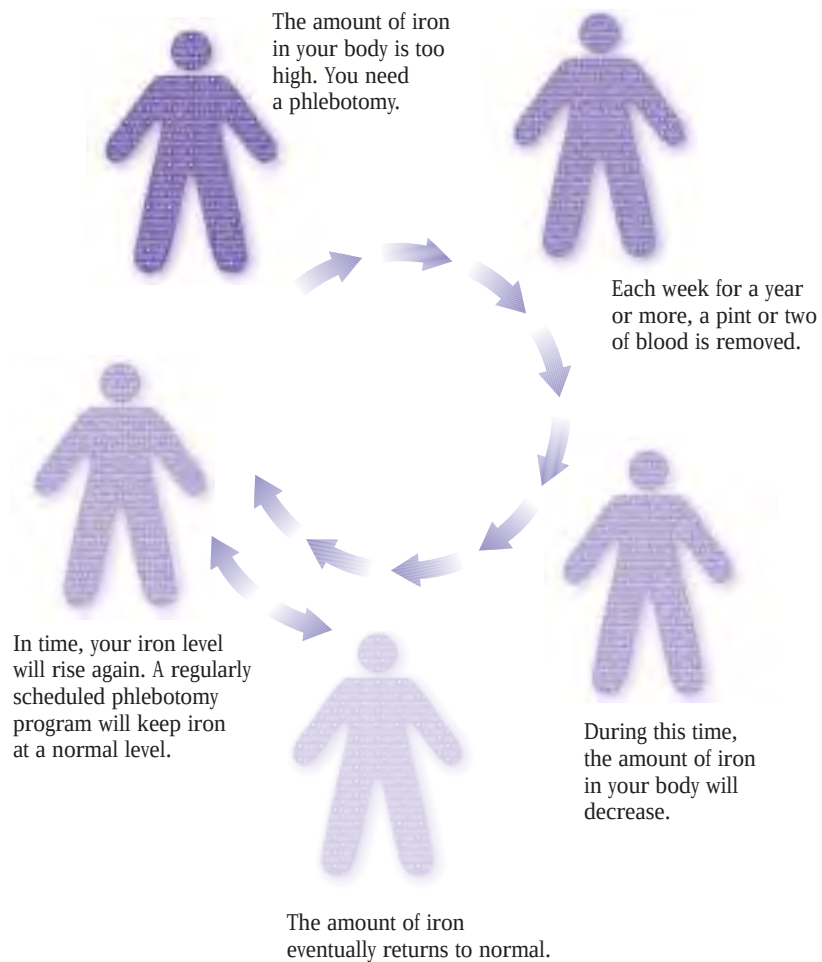
Most people feel just fine, but others feel tired afterwards and like to rest for an hour or so. It's a good idea to drink liquids (water, milk, or fruit juices) before and after a phlebotomy.

Where can I get a phlebotomy?

You can get a phlebotomy at many blood donation centers (for example, hospitals, clinics, and bloodmobiles).

Getting your iron level back to normal

Without phlebotomies, hemochromatosis can cause death.
Treatment is worth the effort.



My family and hemochromatosis

Hemochromatosis runs in families. So, your blood relatives—your parents, grandparents, sisters, brothers, or children—may also have it.

How can I help my family?

You can help by telling your blood relatives that you have hemochromatosis and they could have it too. Urge family members to get their iron levels checked by their doctors. The sooner they know whether they have hemochromatosis, the better. People who start treatment early can stay healthy.

Why does hemochromatosis run in families?

Hemochromatosis runs in families because the genes that we are born with typically cause it. We inherit genes from our parents, and our children inherit genes from us.



“I am one of the lucky ones—I got treatment in time. But my brother and sister were not so lucky—both died of liver disease due to iron overload. If their disease had been diagnosed earlier, they might be alive today. Please get checked if you think there’s any chance you might have the disease.”

Jack C.

How likely are my children to have hemochromatosis?

This is impossible to answer because children inherit genes from both parents. Talk with your children's pediatrician about your family history of hemochromatosis. Ask if your children should be tested to make sure their iron levels remain normal.

Indeed, it's important for all close family members to get their iron levels tested (parents, grandparents, sisters, brothers, and children) if anyone in the family has hemochromatosis.

The earlier family members find out if they have hemochromatosis, the better their chances of leading long, healthy lives.

"We see so many people who find out too late that they have hemochromatosis—after lots of damage is already done. It's vital that people with hemochromatosis urge family members to get tested immediately. Then, if they have the condition, they can get treatment before there's much damage."



*Prad Phatak, MD
Rochester General Hospital
Rochester, New York*

What can I do to stay healthy?

There is a lot you can do to take charge of hemochromatosis and to make sure your life is as normal and healthy as possible.



Checkups: Have the amount of iron in your blood tested regularly.



Phlebotomy: Make sure to get phlebotomies when you need them.



Food: Don't eat raw fish or raw shellfish. Cooking destroys germs harmful to people with hemochromatosis.



Alcohol: If you choose to drink alcohol, drink very little. Women should have no more than one drink a day. Men should have no more than two a day. If you have liver damage, however, do NOT drink any alcohol.



Iron pills: Don't take iron pills, supplements, or multivitamin supplements that have iron in them. Eating foods that contain iron is fine.



Vitamin C: Vitamin C increases the amount of iron your body absorbs. So, don't take pills with more than 500 mg of vitamin C per day. Eating foods with vitamin C is fine.



Exercise: You can exercise as much as you want. CDC recommends that everyone gets 30 minutes of exercise a day to stay fit and healthy.

Other information

Are people with hemochromatosis allowed to donate blood?

Yes. There is no medical reason why blood from people with hemochromatosis should not be used for transfusions. The Food and Drug Administration has special guidelines about handling blood donations from people with hemochromatosis.

If you are interested in donating your blood, contact your blood bank directly to find out about its policies.

“For a year now, we’ve been using blood from the phlebotomies of hemochromatosis patients for transfusions. The patients are pleased to help others in this manner, and the practice has helped greatly in a time of blood shortage.”



*Vincent J. Felitti, MD
Southern California Kaiser Permanente
San Diego, California*

How many people have hemochromatosis?

In the United States more than one million people have the gene mutation that can cause hemochromatosis; this gene mutation is most common among people whose ancestors came from Europe. Not all people with this gene mutation develop iron overload, and not all people with iron overload develop the clinical signs and symptoms of hemochromatosis.

How to find out more

One of the best things you can do when you find out you have any type of illness is to learn as much as you can about that illness. Talk with your doctor about what to expect. Ask questions.

Sometimes it's only after you've left the doctor's office that you think of questions. After learning you have hemochromatosis, write your questions down as they come to you, and then talk with your doctor again.

“CDC is interested in teaching physicians and patients more about early diagnosis and treatment of hemochromatosis. An important step that patients can take toward good health is to keep getting phlebotomies.”



*Michele Reyes, PhD
Centers for Disease Control and Prevention
Atlanta, Georgia*

Remember, every question is worth asking.

For more information, visit these Internet sites:

www.cdc.gov/health

Information on various diseases (including iron overload and hemochromatosis) from the Centers for Disease Control and Prevention.

www.genome.gov/Health

Information on genetics from the National Institutes of Health for physicians and nurses.

[*www.irondisorders.org](http://www.irondisorders.org)

Iron Disorders Institute (IDI) is a nonprofit National Voluntary Health Agency whose mission is to reduce pain, suffering, and unnecessary death by uniting resources to educate the public and medical community about iron.

You can get on the Internet free at all public libraries.

More than one million people in the United States have the gene mutation that can lead to hemochromatosis.

* Listing this Web site is solely a service to readers and does not constitute endorsement by the Centers for Disease Control and Prevention or the federal government.

Remember

You can live a long, healthy life when you take charge of your hemochromatosis.

- Have the level of iron in your blood checked regularly.
- Have a phlebotomy as often as needed.
- Don't eat raw fish or raw shellfish.
- Stay away from alcohol.
- Don't take pills with iron in them.
- Limit vitamin C pills to 500 mg or less per day.
- Follow your doctor's recommendations.

Begin treatment as soon as possible.

The earlier you get treatment, the better your chances of staying healthy.

Urge your family members to have their iron levels tested.



"I have hemochromatosis, so I had my son tested to see if he has it too. I'm glad I did because he does have the disease, and we found out early. The doctor says if my son watches what he eats and gets phlebotomies when he needs them, he'll probably never suffer any bad effects."

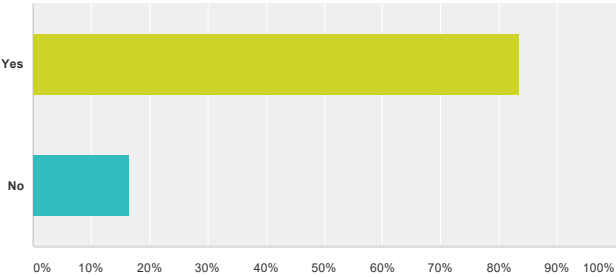
Carol S.

Appendix M:

2010 & 2016 Community Needs Assessment

Q1 Do You live in Roundup

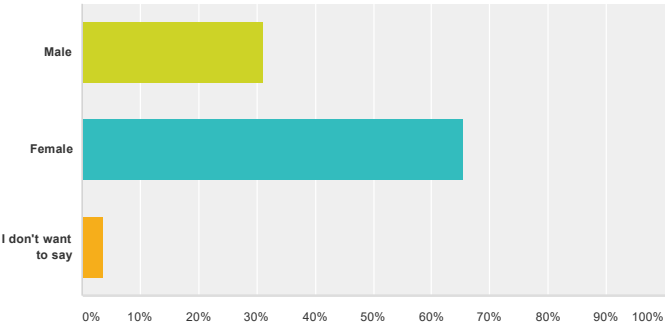
Answered: 194 Skipped: 3



Answer Choices	Responses	
Yes	83.51%	162
No	16.49%	32
Total		194

Q2 Are you male or female?

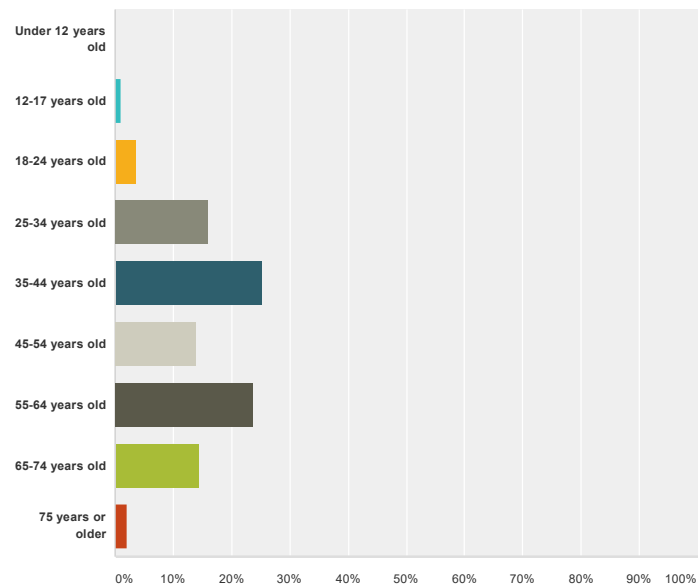
Answered: 193 Skipped: 4



Answer Choices	Responses	
Male	31.09%	60
Female	65.28%	126
I don't want to say	3.63%	7
Total		193

Q3 What is your age?

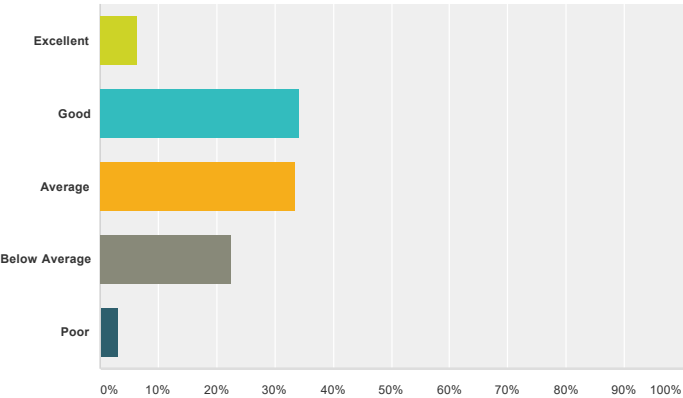
Answered: 194 Skipped: 3



Answer Choices	Responses	
Under 12 years old	0.00%	0
12-17 years old	1.03%	2
18-24 years old	3.61%	7
25-34 years old	15.98%	31
35-44 years old	25.26%	49
45-54 years old	13.92%	27
55-64 years old	23.71%	46
65-74 years old	14.43%	28
75 years or older	2.06%	4
Total		194

Q4 How do you grade the City of Roundup as a place to live? (select one)

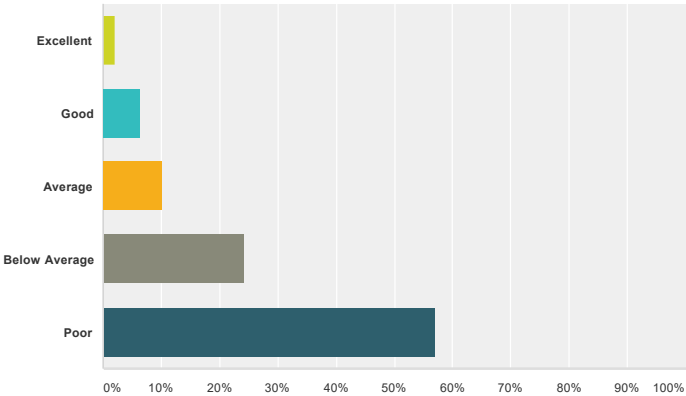
Answered: 187 Skipped: 10



Answer Choices	Responses	
Excellent	6.42%	12
Good	34.22%	64
Average	33.69%	63
Below Average	22.46%	42
Poor	3.21%	6
Total		187

Q5 How do you grade the following City service: municipal water (select one)

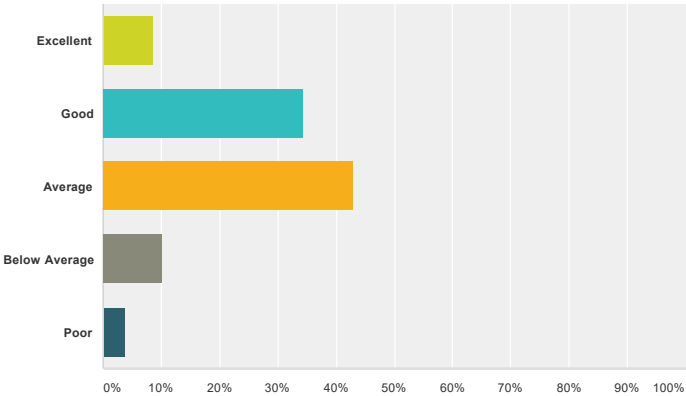
Answered: 186 Skipped: 11



Answer Choices	Responses	
Excellent	2.15%	4
Good	6.45%	12
Average	10.22%	19
Below Average	24.19%	45
Poor	56.99%	106
Total		186

Q6 How do you grade the following City service: sanitary sewer (select one)

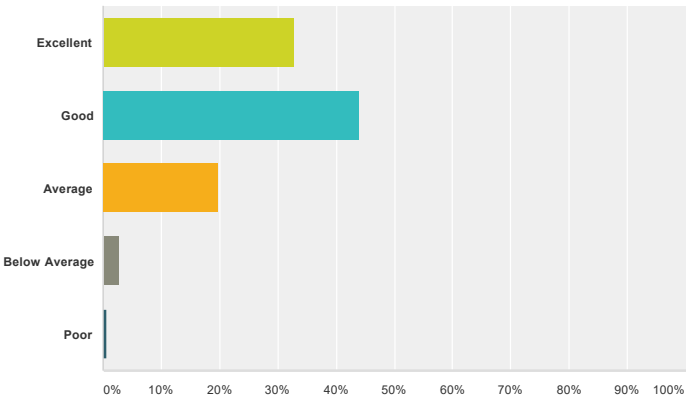
Answered: 186 Skipped: 11



Answer Choices	Responses	
Excellent	8.60%	16
Good	34.41%	64
Average	43.01%	80
Below Average	10.22%	19
Poor	3.76%	7
Total		186

Q7 How do you grade the following City service: garbage collection (select one)

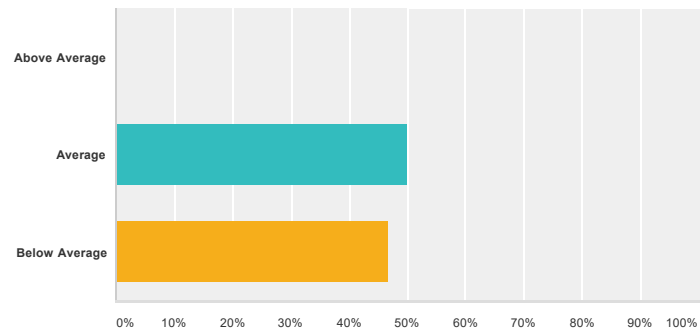
Answered: 186 Skipped: 11



Answer Choices	Responses	
Excellent	32.80%	61
Good	44.09%	82
Average	19.89%	37
Below Average	2.69%	5
Poor	0.54%	1
Total		186

Q8 Please indicate if you believe the condition of housing in Roundup is above average, average, or below average with respect to other housing in the Musselshell County region. (select one)

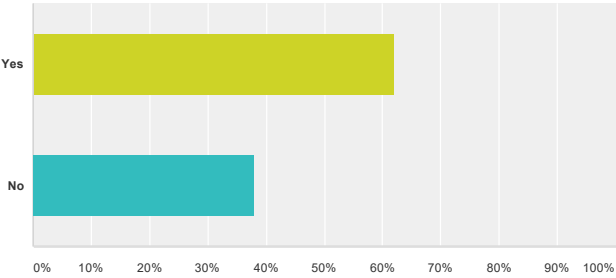
Answered: 158 Skipped: 39



Answer Choices	Responses	
Above Average	3.16%	5
Average	50.00%	79
Below Average	46.84%	74
Total		158

Q9 Do you feel the City needs more subsidized housing for lower income families and/or senior citizens?

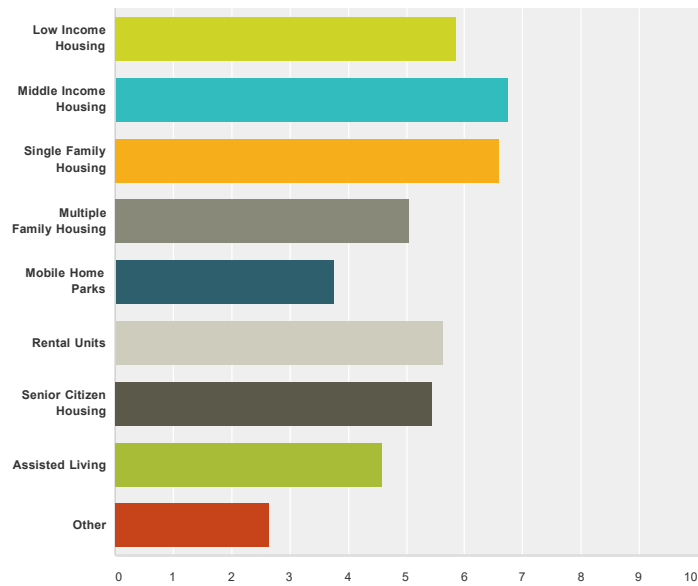
Answered: 153 Skipped: 44



Answer Choices	Responses	
Yes	62.09%	95
No	37.91%	58
Total		153

Q10 What types of housing do you feel are needed the most in Roundup? (rank your choices)

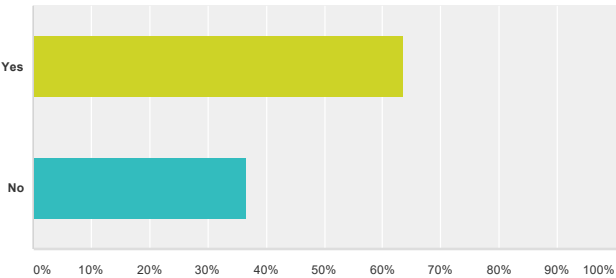
Answered: 144 Skipped: 53



	1	2	3	4	5	6	7	8	9	Total	Score
Low Income Housing	29.70% 30	11.88% 12	7.92% 8	7.92% 8	8.91% 9	9.90% 10	2.97% 3	7.92% 8	12.87% 13	101	5.87
Middle Income Housing	24.76% 26	27.62% 29	12.38% 13	4.76% 5	9.52% 10	10.48% 11	5.71% 6	3.81% 4	0.95% 1	105	6.74
Single Family Housing	20.91% 23	19.09% 21	20.00% 22	13.64% 15	9.09% 10	6.36% 7	7.27% 8	0.91% 1	2.73% 3	110	6.60
Multiple Family Housing	5.26% 5	5.26% 5	15.79% 15	18.95% 18	12.63% 12	13.68% 13	18.95% 18	7.37% 7	2.11% 2	95	5.05
Mobile Home Parks	5.21% 5	5.21% 5	7.29% 7	4.17% 4	10.42% 10	10.42% 10	12.50% 12	34.38% 33	10.42% 10	96	3.75
Rental Units	11.21% 12	13.08% 14	13.08% 14	14.95% 16	19.63% 21	10.28% 11	6.54% 7	7.48% 8	3.74% 4	107	5.64
Senior Citizen Housing	9.71% 10	9.71% 10	13.59% 14	14.56% 15	16.50% 17	17.48% 18	9.71% 10	5.83% 6	2.91% 3	103	5.44
Assisted Living	2.70% 3	9.01% 10	8.11% 9	13.51% 15	17.12% 19	11.71% 13	22.52% 25	9.91% 11	5.41% 6	111	4.59
Other	8.00% 4	0.00% 0	6.00% 3	6.00% 3	2.00% 1	0.00% 0	6.00% 3	16.00% 8	56.00% 28	50	2.66

Q11 Does your neighborhood have any problems with blight? (deteriorated or abandoned buildings, junked vehicles, weeds, trash)

Answered: 156 Skipped: 41



Answer Choices	Responses
Yes	63.46%99
No	36.54%57
Total	156

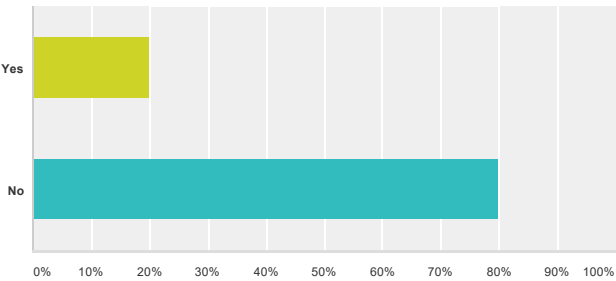
**Q12 Approximately how old is your home?
(years)**

Answered: 149 Skipped: 48

22	30	18	106	70	30 to 35	70 yrs	45 years old
38	41	15	60	96	30	38	110
60	15 years	20 years	50	40	2	100	100
100	100	100 plus	33 years	20	100	20	1910
70 years	1911	12	60	60	25	12	Over a 100 years old
107	104	60	10	100 yrs.	105 years	20	90
1950	100	45	111	100	1920	105	43
60	100	20	40	30	Not sure	40	33
70	100	30	5	1910	60	106	35
104	40	19	60	36	50	5	
13	100 years	70 years	100	65	20 years	4	
35	85	80	17	10	6	80 years	
55	86	96	Over 100	110	70 years	50	
60 years	40	20	100	110	40	5	
104	32	35	94 yrs.	35	80	I don't know (rent)	
8 yrs	60 years-old	50	90	10	1998	14	
98 years	30 years	80	105	30	80	30	
14	106	70	20	25	70	60	
8	13	90	10	70	6	110	
50	84	85 yrs	35	80	100	100	

Q13 Are any members of your household physically or mentally disabled?

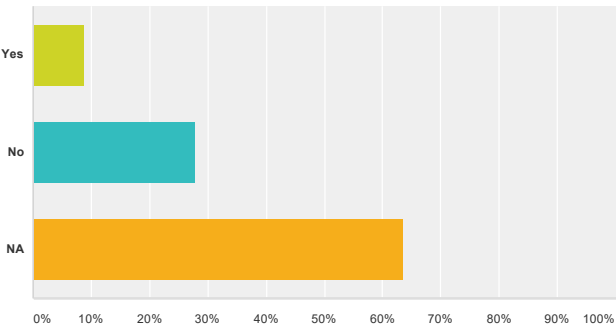
Answered: 158 Skipped: 39



Answer Choices	Responses	
Yes	18.99%	30
No	81.01%	128
Total		158

Q14 If you responded “yes” to question 13, does your dwelling need any special modifications to improve access or living conditions for the person or persons with disabilities?

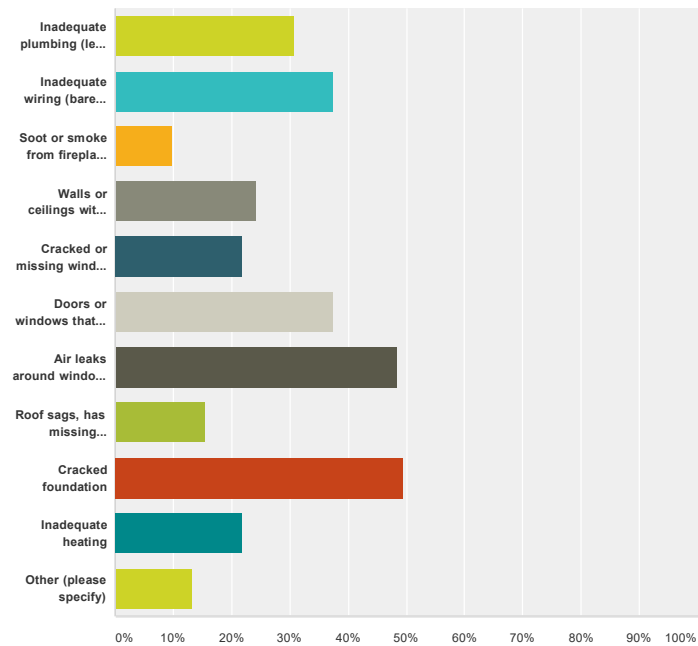
Answered: 115 Skipped: 82



Answer Choices	Responses	
Yes	8.70%	10
No	27.83%	32
NA	63.48%	73
Total		115

Q15 Please indicate if you feel your dwelling unit has any of the following: (check all that apply)

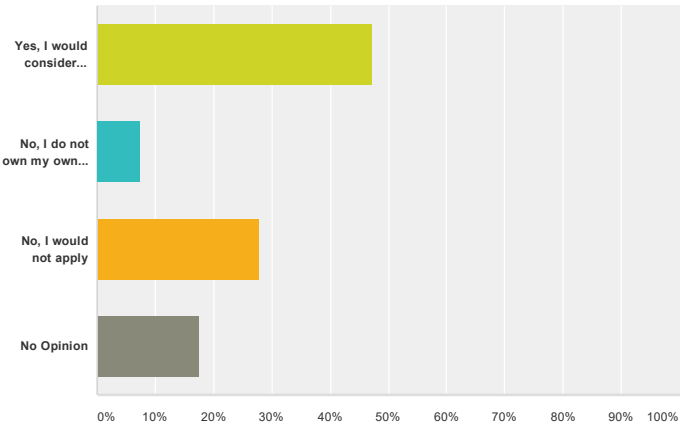
Answered: 91 Skipped: 106



Answer Choices	Responses
Inadequate plumbing (leaks in water, sewer, or gas piping)	30.77% 28
Inadequate wiring (bare or exposed wires, lights dim when other appliances turn on, less than two outlets ineach room, inoperable outlets, etc.)	37.36% 34
Soot or smoke from fireplace or heater, kitchen stove, or fumes from furnace or heaters, etc.	9.89% 9
Walls or ceilings with holes, falling plaster or peeling paint, or stains irremovable or unpaintable, etc.	24.18% 22
Cracked or missing window panes or plastic/cardboard in place of panes	21.98% 20
Doors or windows that stick or do not open	37.36% 34
Air leaks around windows or doors from cracks or other broken or missing parts	48.35% 44
Roof sags, has missing shingles or materials, needs patching, or in any way allows water to drain intodwelling	15.38% 14
Cracked foundation	49.45% 45
Inadequate heating	21.98% 20
Other (please specify)	13.19% 12
Total Respondents: 91	

Q16 If low cost funding were available to improve your home, and you were eligible for these, would you apply for this assistance? (select one)

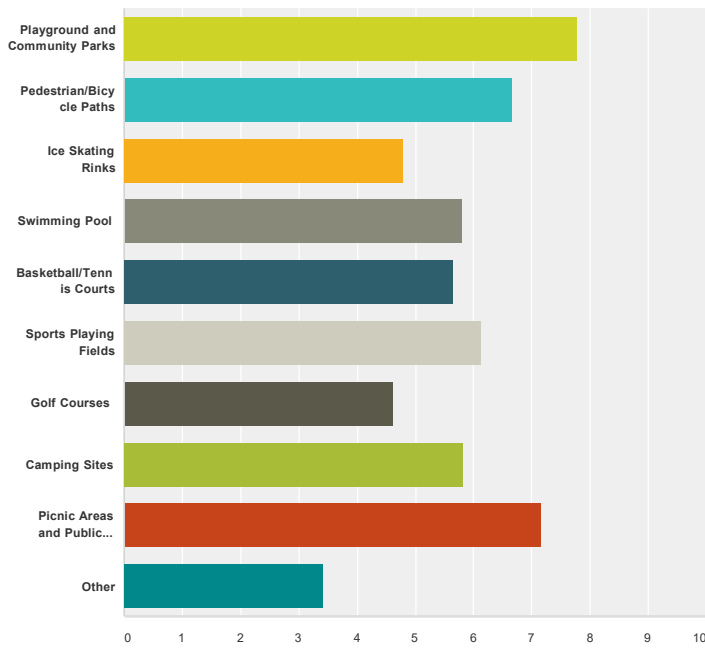
Answered: 159 Skipped: 38



Answer Choices	Responses	
Yes, I would consider applying	47.17%	75
No, I do not own my own dwelling	7.55%	12
No, I would not apply	27.67%	44
No Opinion	17.61%	28
Total		159

Q17 What facilities require the most improvements or developments? (rank from most important to least)

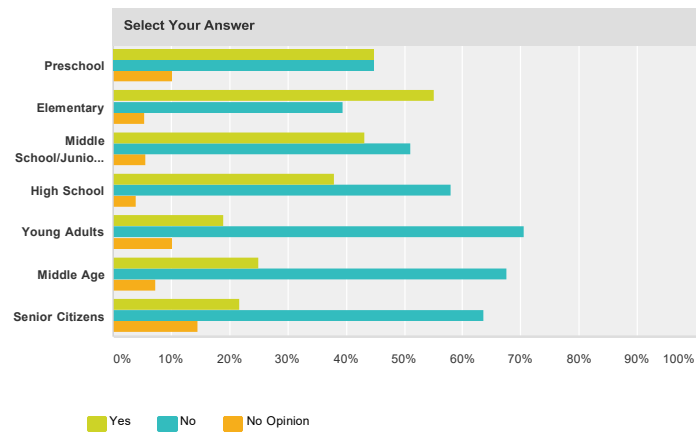
Answered: 131 Skipped: 66



	1	2	3	4	5	6	7	8	9	10	Total	Score
Playground and Community Parks	32.04% 33	20.39% 21	16.50% 17	5.83% 6	7.77% 8	5.83% 6	1.94% 2	2.91% 3	2.91% 3	3.88% 4	103	7.79
Pedestrian/Bicycle Paths	21.28% 20	13.83% 13	9.57% 9	12.77% 12	11.70% 11	3.19% 3	7.45% 7	9.57% 9	7.45% 7	3.19% 3	94	6.66
Ice Skating Rinks	11.11% 9	3.70% 3	9.88% 8	4.94% 4	7.41% 6	11.11% 9	8.64% 7	12.35% 10	19.75% 16	11.11% 9	81	4.80
Swimming Pool	3.49% 3	13.95% 12	11.63% 10	18.60% 16	11.63% 10	6.98% 6	11.63% 10	6.98% 6	9.30% 8	5.81% 5	86	5.80
Basketball/Tennis Courts	3.41% 3	3.41% 3	14.77% 13	15.91% 14	13.64% 12	14.77% 13	18.18% 16	12.50% 11	2.27% 2	1.14% 1	88	5.66
Sports Playing Fields	5.56% 5	12.22% 11	14.44% 13	12.22% 11	8.89% 8	20.00% 18	16.67% 15	7.78% 7	2.22% 2	0.00% 0	90	6.14
Golf Courses	6.82% 6	6.82% 6	6.82% 6	7.95% 7	9.09% 8	9.09% 8	6.82% 6	15.91% 14	15.91% 14	14.77% 13	88	4.61
Camping Sites	8.25% 8	6.19% 6	15.46% 15	7.22% 7	17.53% 17	13.40% 13	13.40% 13	9.28% 9	7.22% 7	2.06% 2	97	5.82
Picnic Areas and Public Restrooms	23.28% 27	23.28% 27	9.48% 11	10.34% 12	8.62% 10	3.45% 4	6.03% 7	4.31% 5	7.76% 9	3.45% 4	116	7.16
Other	10.00% 5	2.00% 1	6.00% 3	4.00% 2	4.00% 2	2.00% 1	2.00% 1	10.00% 5	16.00% 8	44.00% 22	50	3.42

Q18 Are the community's existing recreation opportunities adequate for the following age groups?

Answered: 130 Skipped: 67



Select Your Answer				
	Yes	No	No Opinion	Total
Preschool	44.88% 57	44.88% 57	10.24% 13	127
Elementary	55.12% 70	39.37% 50	5.51% 7	127
Middle School/Junior High	43.20% 54	51.20% 64	5.60% 7	125
High School	38.10% 48	57.94% 73	3.97% 5	126
Young Adults	19.05% 24	70.63% 89	10.32% 13	126
Middle Age	25.00% 31	67.74% 84	7.26% 9	124
Senior Citizens	21.77% 27	63.71% 79	14.52% 18	124

Q19 What additional recreation programs should be offered or organized?

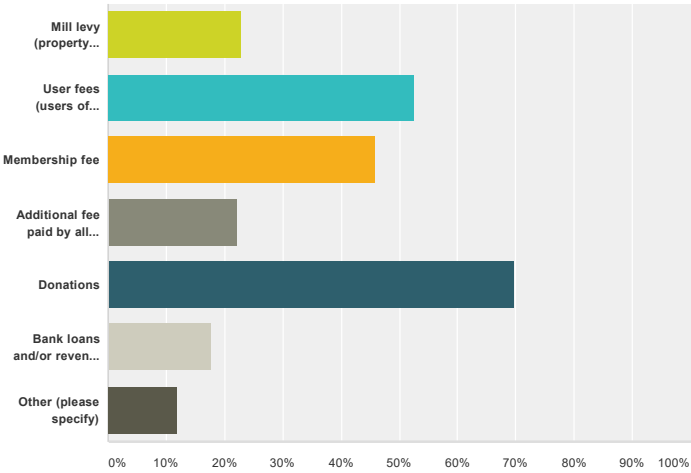
Answered: 59 Skipped: 138

There are programs for almost every sport, and there is a place for almost every recreational activity that comes to mind. The biggest thing is maintenance and improvements
Walking paths around the city
It'd be nice for all ages to have the bowling alley up and running again.
Adult exercise
Swimming other than summertime winter activities(indoor basketball, volleyball,etc) Exercise area
Skate board park
Ice skating, movie theatre, roller skating, bowling
A functioning bowling alley, bowling league, and a movie theater.
Wrestling in schools, teen/youth aimed gathering places and events
Bowling alley
More resturants, more places youn to old to mingle
Bowling alley
cutter races at the rodeo grands in the winter. and horse racing in the spring and summer
In the summer time maybe a morning outdoor exercise program for the older adults who like to stretch and walk, freesbee course in the park
Indoor swimming and water therapy. Indoor walking track Recreation director for city/county
I believe our community should have a park and recreational coordinator who helps organize events for students and adults.
Good luck. This town needs a miracle. Especially, if the mine goes.
Some sort of indoor fun for kiddos and adults. Bowling, roller rink, and/or movie
More organized groups that would be offered at the river walk or a bicycle group. Something that would involve the community.
Updated Play Structures at City Park, Skateboarding Park, Bowling Alley, Movie Theatre, Public Restrooms/Rest Area open year-round, Use of Fairgrounds, Internet/gaming cafe, Hiking/Biking/Walking Trail.
Bowling, softball, movie theater...
Better visibility for existing programs; community service programs; a Peer Court system.
There needs to be an additional community building that appeals to all age groups, such as a bowling lounge or indoor recreational area
youth and senior citizens
Skating rink, bowling alley, movie theater, arcade or dance hall, hangout spot other than just the one night a week for middle/high school, something separate for high school from middle school (they don't need to be mixing so much, it causes trouble)
after school programs, summer programs, programs to curb drug and alcohol usage
I think a skating rink would be great, but you would have to make sure the hooligans were supervised. Don't keep them out, just make sure they understand consequences for being ignorant, same I believe as the way they treat our parks and schools. I took my 3 year old to the elementary Saturday and she brought me a used condom off the equipment.
dog walks
Park and rec, comm education
Recreational director who plans, with community, programs for all age groups, using known facilities and planning ahead for future facilities to meet community needs.
soccer, indoor swimming for year round use, walking path for seniors, senior activities, youth summer camps,
Kid sports, dog park, outdoor programs for high school/middle school
More community shooting events A dog park,

Maybe a skate board park? More swimming lessons, with perhaps a movable cover over the outdoor pool to extend the season.
Outdoor basketball court, skateboard park, skate rink
The community needs a proper community center with exercise facilities and room for exercise classes.
Youth night for ages younger than 13 at the youth center
Preschool programs!!!!!! There's headstart and one church preschool that accepts a dozen kids and has a waiting list a mile long.
More preschool options!!!!!!!!!! Head start and a tiny preschool program at ONE church, which has a waiting list a mile long.
Something would be better than nothing.
There isn't consistent activities for any of the age groups.
Any type of classes or groups that encourage socialization among children of all ages. Examples: youth sports other than simply baseball, tumbling, dance, etc.
Bowling or extra activities for young people. Better downtown restaurants for middle age to young adults.
Parenting
Bowling, year round pool
Something
Sports, dance, theatre, agriculture, community involvement, really just anything
all sports
Na
summer lessons: basketball, volleyball, arts and crafts, dance or gymnastics
bowling alley - leagues and open bowling, discount theater possibly operated on volunteer - seen these before in successful small towns. Movies were \$5 or less per ticket and showed movies after they left the traditional theaters.
Anything to help kids stay out of drugs
Bowling, roller skating, youth helping the aged and vice versa
I would say more sports, soccer, wrestling, etc. but our community never has enough people volunteering to run the programs. A better park would be nice. With proper baby swings. Handicap swing would be nice. Outside of sports the only thing kids can get involved in is Taekwondo (which is great) and I believe someone offers ballet. (Not sure)
More activities that will teach life skills.
Would like to see more rec league type sports that don't cost an arm and a leg. I don't mind paying a fee, but the costs involved in the sports my children are interested in are beyond my means.
bowling alley, pool hall, gaming w/o alcohol for family environment. bike, walking, riding trails through out the county.
I'm not sure but if you want people to stay there has to be more for people to do here n around town
Civic center

Q20 What is the most effective way to fund recreational facilities? (check all that apply)

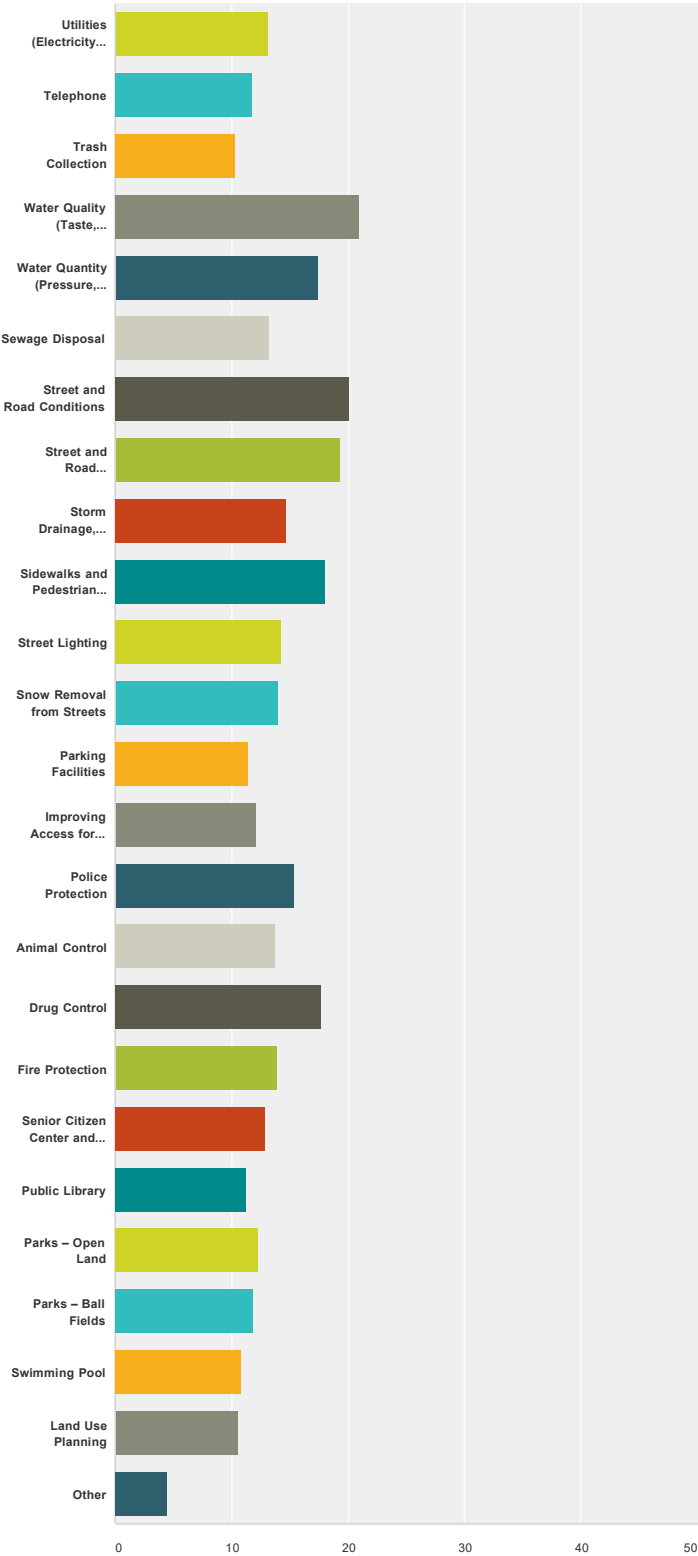
Answered: 135 Skipped: 62



Answer Choices	Responses	
Mill levy (property owners would pay)	22.96%	31
User fees (users of improvements would pay)	52.59%	71
Membership fee	45.93%	62
Additional fee paid by all residents	22.22%	30
Donations	69.63%	94
Bank loans and/or revenue bonds	17.78%	24
Other (please specify)	11.85%	16
Total Respondents: 135		

Q21 Please indicate what you feel should be the top priorities for the City to improve on in the Roundup area. (rank from most important to least)

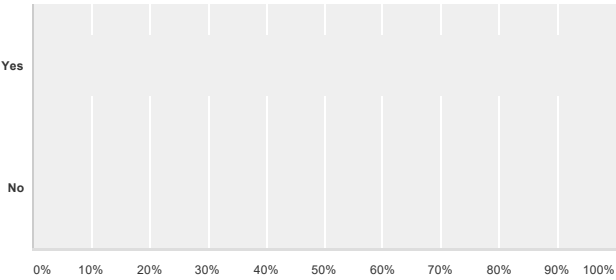
Answered: 127 Skipped: 70



Utilities (Electricity, Gas)	3.57% 2	5.36% 3	5.36% 3	0.00% 0	1.79% 1	1.79% 1	5.36% 3	5.36% 3	7.14% 4	3.57% 2	3.57% 2	7.14% 4	8.93% 5	1.79% 1	3.57% 2	1.79% 1	1.79% 1	1.79% 1	5.36% 3	8.93% 5	1.7
Telephone	3.39% 2	1.69% 1	3.39% 2	0.00% 0	5.08% 3	3.39% 2	5.08% 3	3.39% 2	5.08% 3	6.78% 4	5.08% 3	0.00% 0	6.78% 4	5.08% 3	3.39% 2	1.69% 1	1.69% 1	1.69% 1	0.00% 0	10.17% 6	6.7
Trash Collection	1.75% 1	3.51% 2	0.00% 0	1.75% 1	1.75% 1	0.00% 0	3.51% 2	5.26% 3	0.00% 0	7.02% 4	3.51% 2	3.51% 2	3.51% 2	7.02% 4	5.26% 3	3.51% 2	1.75% 1	1.75% 1	5.26% 3	8.77% 5	10.5
Water Quality (Taste, Clearness)	69.30% 79	7.89% 9	2.63% 3	0.88% 1	0.00% 0	0.00% 0	0.00% 0	1.75% 2	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.88% 1	0.88% 1	0.00% 0	1.75% 2	0.00% 0	0.00% 0	0.00% 0	1.75% 2	0.0
Water Quantity (Pressure, Volume)	3.95% 3	31.58% 24	3.95% 3	5.26% 4	3.95% 3	6.58% 5	2.63% 2	2.63% 2	3.95% 3	1.32% 1	3.95% 3	3.95% 3	0.00% 0	2.63% 2	2.63% 2	0.00% 0	2.63% 2	3.95% 3	2.63% 2	0.00% 0	1.3
Sewage Disposal	1.59% 1	1.59% 1	3.17% 2	4.76% 3	3.17% 2	9.52% 6	3.17% 2	4.76% 3	4.76% 3	4.76% 3	4.76% 3	4.76% 3	3.17% 2	4.76% 3	3.17% 2	4.76% 3	4.76% 3	6.35% 4	3.17% 2	0.00% 0	4.7
Street and Road Conditions	2.11% 2	24.21% 23	16.84% 16	12.63% 12	8.42% 8	6.32% 6	5.26% 5	3.16% 3	3.16% 3	2.11% 2	3.16% 3	3.16% 3	0.00% 0	2.11% 2	1.05% 1	1.05% 1	1.05% 1	0.00% 0	1.05% 1	1.05% 1	0.0
Street and Road Maintenance	2.33% 2	5.81% 5	26.74% 23	18.60% 16	3.49% 3	5.81% 5	11.63% 10	4.65% 4	2.33% 2	2.33% 2	1.16% 1	2.33% 2	1.16% 1	1.16% 1	1.16% 1	0.00% 0	2.33% 2	0.00% 0	0.00% 0	1.16% 1	1.1
Storm Drainage, Curbs, and Gutters	1.43% 1	0.00% 0	1.43% 1	11.43% 8	14.29% 10	1.43% 1	4.29% 3	7.14% 5	0.00% 0	5.71% 4	8.57% 6	8.57% 6	4.29% 3	1.43% 1	4.29% 3	4.29% 3	1.43% 1	4.29% 3	1.43% 1	4.29% 3	2.8
Sidewalks and Pedestrian Walkways	1.18% 1	8.24% 7	9.41% 8	15.29% 13	8.24% 7	9.41% 8	1.18% 1	5.88% 5	5.88% 5	5.88% 5	3.53% 3	7.06% 6	4.71% 4	4.71% 4	1.18% 1	1.18% 1	1.18% 1	1.18% 1	1.18% 1	2.35% 2	1.1
Street Lighting	0.00% 0	4.62% 3	0.00% 0	4.62% 3	4.62% 3	10.77% 7	3.08% 2	3.08% 2	4.62% 3	6.15% 4	6.15% 4	10.77% 7	13.85% 9	3.08% 2	3.08% 2	1.54% 1	1.54% 1	1.54% 1	7.69% 5	0.00% 0	3.0
Snow Removal from Streets	0.00% 0	2.86% 2	7.14% 5	4.29% 3	12.86% 9	5.71% 4	5.71% 4	4.29% 3	0.00% 0	2.86% 2	1.43% 1	2.86% 2	4.29% 3	4.29% 3	4.29% 3	2.86% 2	8.57% 6	5.71% 4	4.29% 3	4.29% 3	1.4
Parking Facilities	0.00% 0	0.00% 0	0.00% 0	3.13% 2	4.69% 3	3.13% 2	3.13% 2	4.69% 3	9.38% 6	0.00% 0	6.25% 4	0.00% 0	4.69% 3	7.81% 5	6.25% 4	7.81% 5	4.69% 3	7.81% 5	3.13% 2	6.25% 4	4.6
Improving Access for Persons with Disabilities	0.00% 0	1.67% 1	1.67% 1	1.67% 1	5.00% 3	0.00% 0	1.67% 1	3.33% 2	5.00% 3	6.67% 4	6.67% 4	1.67% 1	3.33% 2	10.00% 6	11.67% 7	8.33% 5	6.67% 4	0.00% 0	11.67% 7	6.67% 4	5.0
Police Protection	3.03% 2	7.58% 5	3.03% 2	4.55% 3	4.55% 3	9.09% 6	7.58% 5	4.55% 3	4.55% 3	7.58% 5	4.55% 3	3.03% 2	1.52% 1	1.52% 1	9.09% 6	4.55% 3	3.03% 2	1.52% 1	4.55% 3	1.52% 1	0.0
Animal Control	1.39% 1	0.00% 0	5.56% 4	4.17% 3	6.94% 5	11.11% 8	4.17% 3	4.17% 3	5.56% 4	4.17% 3	4.17% 3	1.39% 1	1.39% 1	2.78% 2	5.56% 4	9.72% 7	5.56% 4	4.17% 3	2.78% 2	2.78% 2	1.3
Drug Control	16.30% 15	11.96% 11	11.96% 11	4.35% 4	4.35% 4	3.26% 3	5.43% 5	6.52% 6	2.17% 2	3.26% 3	0.00% 0	5.43% 5	2.17% 2	0.00% 0	1.09% 1	1.09% 1	3.26% 3	3.26% 3	2.17% 2	3.26% 3	1.0
Fire Protection	1.61% 1	8.06% 5	6.45% 4	1.61% 1	8.06% 5	1.61% 1	4.84% 3	3.23% 2	0.00% 0	4.84% 3	3.23% 2	3.23% 2	4.84% 3	3.23% 2	9.68% 6	4.84% 3	3.23% 2	9.68% 6	1.61% 1	4.84% 3	0.0
Senior Citizen Center and Services	1.56% 1	1.56% 1	4.69% 3	3.13% 2	4.69% 3	3.13% 2	4.69% 3	3.13% 2	14.06% 9	3.13% 2	4.69% 3	1.56% 1	1.56% 1	4.69% 3	3.13% 2	4.69% 3	1.56% 1	6.25% 4	6.25% 4	4.69% 3	7.8
Public Library	1.52% 1	1.52% 1	0.00% 0	3.03% 2	6.06% 4	4.55% 3	3.03% 2	7.58% 5	1.52% 1	3.03% 2	1.52% 1	4.55% 3	1.52% 1	6.06% 4	0.00% 0	7.58% 5	6.06% 4	3.03% 2	4.55% 3	7.58% 5	7.5
Parks – Open Land	0.00% 0	1.52% 1	9.09% 6	0.00% 0	3.03% 2	6.06% 4	3.03% 2	3.03% 2	4.55% 3	6.06% 4	6.06% 4	4.55% 3	3.03% 2	3.03% 2	0.00% 0	4.55% 3	6.06% 4	7.58% 5	0.00% 0	4.55% 3	9.0
Parks – Ball Fields	0.00% 0	1.54% 1	1.54% 1	7.69% 5	0.00% 0	4.62% 3	3.08% 2	4.62% 3	0.00% 0	10.77% 7	3.08% 2	7.69% 5	4.62% 3	6.15% 4	1.54% 1	3.08% 2	7.69% 5	3.08% 2	6.15% 4	0.00% 0	3.0
Swimming Pool	0.00% 0	1.56% 1	1.56% 1	3.13% 2	4.69% 3	3.13% 2	4.69% 3	4.69% 3	7.81% 5	0.00% 0	6.25% 4	0.00% 0	1.56% 1	3.13% 2	6.25% 4	3.13% 2	6.25% 4	1.56% 1	6.25% 4	3.13% 2	4.6
Land Use Planning	0.00% 0	1.59% 1	1.59% 1	4.76% 3	3.17% 2	1.59% 1	6.35% 4	1.59% 1	4.76% 3	4.76% 3	1.59% 1	3.17% 2	6.35% 4	6.35% 4	1.59% 1	3.17% 2	1.59% 1	7.94% 5	3.17% 2	1.59% 1	4.7
Other	3.57% 1	0.00% 0	3.57% 1	0.00% 0	3.57% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	0.00% 0	3.57% 1	0.00% 0	0.00% 0	0.00% 0	7.14% 2	0.00% 0	3.5

Q22 Do you feel the City should pursue a financial plan for funding any of the priorities checked?

Answered: 123 Skipped: 74



Answer Choices	Responses	
Yes	95.12%	117
No	4.88%	6
Total		123

**Q23 Which streets, if any, do you feel
require the most attention for
improvements?**

Answered: 73 Skipped: 124

Main, 4th
Main street needs a theme, western
6th ave
all over
truck route
1st to 7th st w
4th street west and 4th avenue west
4th Street West
3rd street east and ave. street coming up in spots
4th street west
all
Main streets going to schools and hospital
All of our streets require attention but not until our water problem is solved. I believe planning in all areas needs improvement.
1st ave & whole East side.
6th Street West
6th Street West-Water damage 6th Avenue West-Water damage
The ones with holes.
Any with constant potholes
I think that we should start with the high volume streets. Example 4th west, and 7th west. I feel that we should make it a priority to have nice streets, curb, gutter, and sidewalks so people don't have to walk on the streets.
it would be hard to prioritize
Any that are half paved or half dirt after water pipe changes. 87/main street up laundry hill to Busy bee with all the patches.
side streets
1st St East
5th ave west
West side
5th St w...4th Ave w
West side streets as opposed to avenues. Start with 1st street west and continue through west side street still unpaved.
6th st. west , 4th ave west, 4th st. west.
6th st. w., Alec Roy S, First Ave E, 4 Ave W
4th st W
Most all street could use new asphalt properly laid. The cold asphalt does not hold up well
Several are disintegrating.
all of them
Streets on east side
I don't know
Most of them.
Stop light needed at 12 & 87 Pot holes on multiple streets Street by central school blocked & can't pass No turn lanes down laundry hill

Most of the back streets are terrible.
east side in general
In front of the high school and most of the west side of town.
Local side streets...sidewalk and curbs should be the cities responsibility like most major cities.
Side streets
All side streets
All
All
Pretty much all
all
The one down from the high school 6th?
in front of the high school side streets
many of the side streets, no preference
6th Ave east
Most of the residential streets
Almost all of the east side
The ones that are all torn up.
4th St W, The area around new elementary school.
6th st west
winter time: around the school areas
6Th ave west
All of them are terrible
Most of them

Q24 Where would you like to see sidewalks placed or improved?

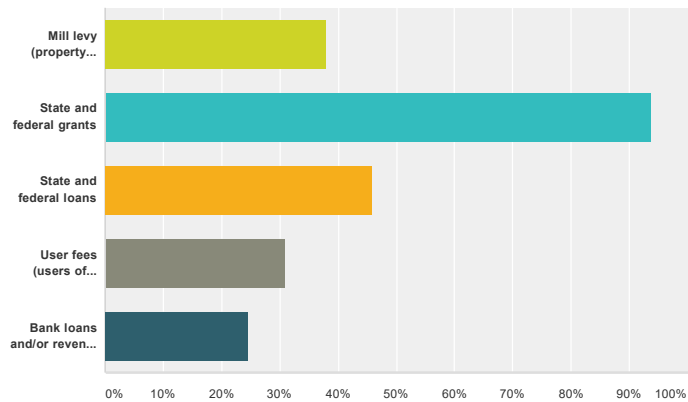
Answered: 73 Skipped: 124

Where would you like to see sidewalks placed or improved?
Open-Ended Response
On 6th Ave from Main to the High School, Main St.
9th ave East --to the pool
4th street
Main Street about 7th street up on the west side.
Around the new elementary school
Throughout town--there are so many that are old and cracked.
Every city block has some portion of sidewalk that needs to be replaced. Many are unsafe for walking
on the avenues 8 to the north
Busy streets
near elementary school
Community center area
everywhere
Near the new school
all over
streets where there are no curbs & sidewalks are deteriorated
700 block west side main
most in town
main street & 3rd street east
3rd Street East
Along Main Street where some of them are breaking up
Same as #23
start any where
Everywhere
Outside of main street we have very few sidewalks that exist and those that do are in poor condition
Everywhere
High School Hill on 6th Street West
4th Street West.
Areas where there aren't any sidewalks
all streets that don't have them so people don't have to walk on the street and deal with cars.
all over the city
Everywhere, especially around the schools or main walkways to new school
wherever there aren't any
Main
EVERYWHERE!
all bad walks
Both sides of the roads

5th St w
I live on 1st street west. Some sidewalks are very old and crumbled. I want to replace my sidewalk and curb but need financial help to do it. I'd thought of doing it myself but it wouldn't follow city codes. If the city expects us to follow codes, the city should help pay for it.
all over, and at the new school area
4th ave w
All streets currently not improved
especially in the neighborhood around the new elementary school
Main Street and then systematically thru town
Improve the ones that are broken or uneven due to age
Most sidewalks need attention. People walk in the street because sidewalks are in such disrepair.
everywhere
Main st needs improved in places
Residential
I love the Riverwalk. Lets continue improving that. Pretty much all of the city streets off Main have sidewalks that are hazardous.. Many sections of the sidewalk on Main are not even concrete anymore.
I love the Riverwalk. Lets continue improving that. Pretty much all of the city streets off Main have sidewalks that are hazardous.. Many sections of the sidewalk on Main are not even concrete anymore.
Most of them, when your walking on any side walk in roundup PAY ATTENTION! There are variations in the side walks all over town that are trip/fall hazards for all ages
The east side. There are no sidewalks for the children to walk to school.
For about a 2 block radius above and below main street
all
Main roads and improvements around the schools.
All side streets where there are none
Everywhere they don't exist or are not able to use because of plant life and deterioration
All side streets and avenues
All
Main Street
Everywheren
1st street
where ever they are not currently exisiting
Main school routes and near assistant living homes
In residential areas
East
All sidewalks should be improved and wheelchair accessible.
City wide.
through out the town
All over town
All over town
All sidewalks need attention

Q25 Please check funding sources that you feel should be considered for water, sewer, roads, and sidewalk improvements. (check all that apply)

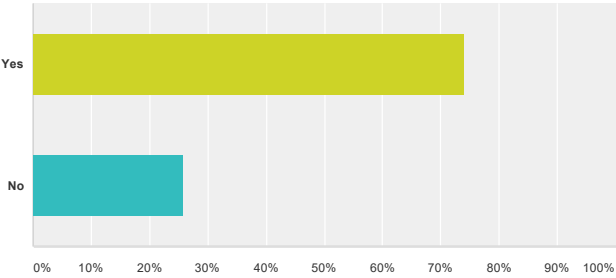
Answered: 126 Skipped: 71



Answer Choices	Responses	
Mill levy (property owners would pay)	38.10%	48
State and federal grants	93.65%	118
State and federal loans	46.03%	58
User fees (users of improvements would pay)	30.95%	39
Bank loans and/or revenue bonds	24.60%	31
Total Respondents: 126		

Q26 Should the City concentrate similar types of development (residential, commercial, industrial) inseparate areas?

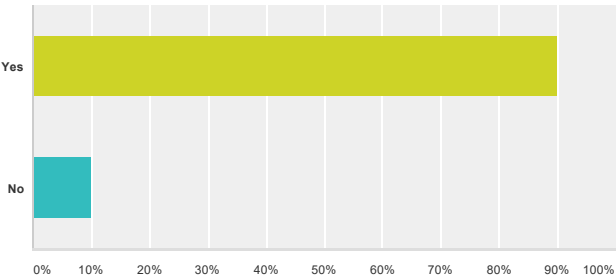
Answered: 112 Skipped: 85



Answer Choices	Responses	
Yes	74.11%	83
No	25.89%	29
Total		112

Q27 Should the City sponsor a community beautification/cleanup campaign?

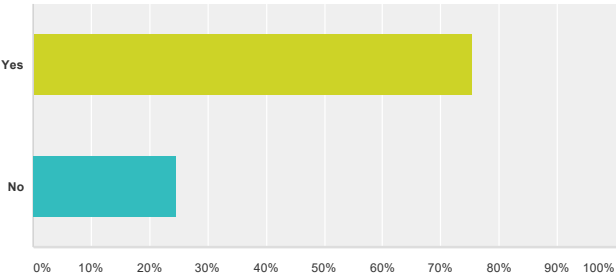
Answered: 123 Skipped: 74



Answer Choices	Responses	
Yes	89.43%	110
No	10.57%	13
Total		123

Q28 Would you support an increase in water rates to upgrade the water quality?

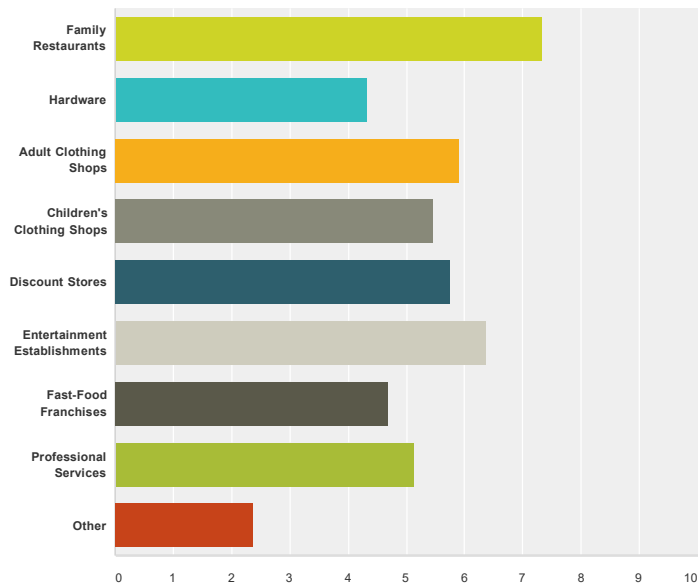
Answered: 126 Skipped: 71



Answer Choices	Responses	
Yes	75.40%	95
No	24.60%	31
Total		126

Q29 What additional commercial services are needed in our community? (rank from most important to least)

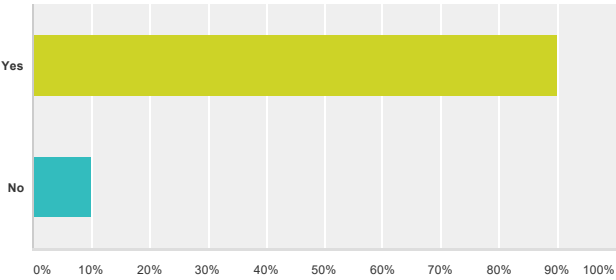
Answered: 107 Skipped: 90



	1	2	3	4	5	6	7	8	9	Total	Score
Family Restaurants	40.74% 33	23.46% 19	13.58% 11	6.17% 5	1.23% 1	6.17% 5	2.47% 2	1.23% 1	4.94% 4	81	7.32
Hardware	5.00% 3	8.33% 5	11.67% 7	0.00% 0	16.67% 10	8.33% 5	26.67% 16	18.33% 11	5.00% 3	60	4.32
Adult Clothing Shops	12.94% 11	16.47% 14	17.65% 15	12.94% 11	4.71% 4	18.82% 16	10.59% 9	4.71% 4	1.18% 1	85	5.91
Children's Clothing Shops	7.79% 6	11.69% 9	12.99% 10	16.88% 13	20.78% 16	10.39% 8	10.39% 8	6.49% 5	2.60% 2	77	5.48
Discount Stores	10.26% 8	12.82% 10	16.67% 13	11.54% 9	23.08% 18	12.82% 10	3.85% 3	8.97% 7	0.00% 0	78	5.77
Entertainment Establishments	25.61% 21	12.20% 10	12.20% 10	21.95% 18	4.88% 4	8.54% 7	7.32% 6	3.66% 3	3.66% 3	82	6.37
Fast-Food Franchises	8.22% 6	15.07% 11	8.22% 6	9.59% 7	9.59% 7	8.22% 6	8.22% 6	21.92% 16	10.96% 8	73	4.70
Professional Services	7.14% 5	14.29% 10	14.29% 10	12.86% 9	10.00% 7	4.29% 3	20.00% 14	14.29% 10	2.86% 2	70	5.14
Other	5.26% 2	0.00% 0	2.63% 1	7.89% 3	2.63% 1	5.26% 2	2.63% 1	7.89% 3	65.79% 25	38	2.37

Q30 Should the City of Roundup develop a Main Street program to promote and improve the downtown district?

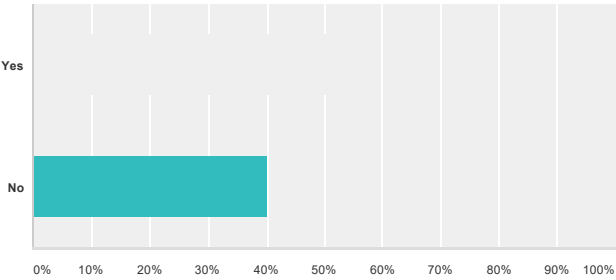
Answered: 116 Skipped: 81



Answer Choices	Responses	
Yes	90.52%	105
No	9.48%	11
Total		116

Q31 Would you support a sign ordinance and review process to promote improved business signs downtown?

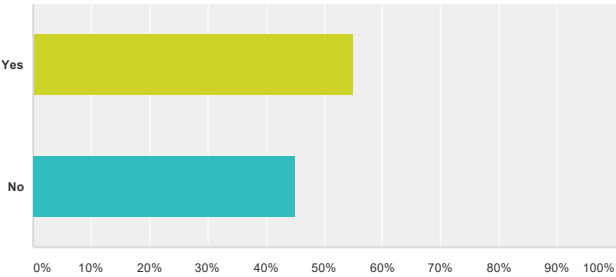
Answered: 116 Skipped: 81



Answer Choices	Responses	
Yes	58.62%	68
No	41.38%	48
Total		116

Q32 Is public parking in the downtown area adequate?

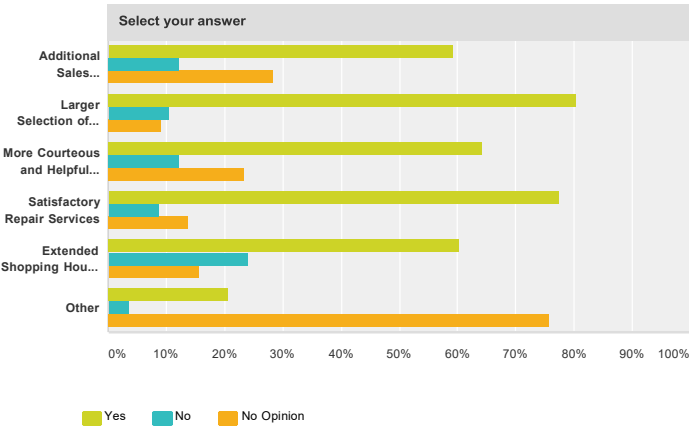
Answered: 120 Skipped: 77



Answer Choices	Responses
Yes	55.00%66
No	45.00%54
Total	120

Q33 What other services should local retail establishments offer?

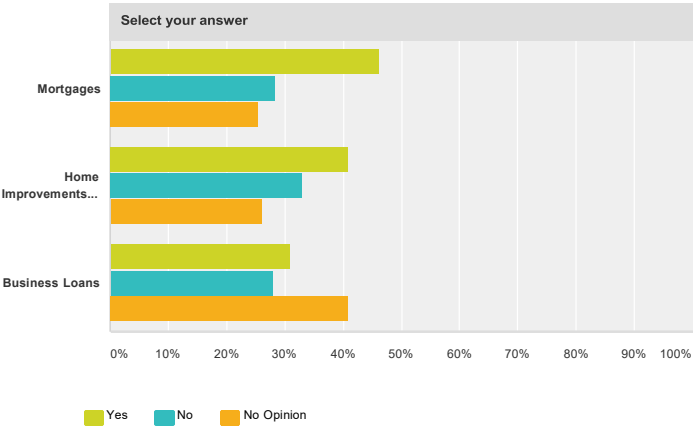
Answered: 95 Skipped: 102



Select your answer				
	Yes	No	No Opinion	Total
Additional Sales Promotions	59.26% 48	12.35% 10	28.40% 23	81
Larger Selection of Items	80.46% 70	10.34% 9	9.20% 8	87
More Courteous and Helpful Service	64.20% 52	12.35% 10	23.46% 19	81
Satisfactory Repair Services	77.50% 62	8.75% 7	13.75% 11	80
Extended Shopping Hours (Evenings, Weekends)	60.24% 50	24.10% 20	15.66% 13	83
Other	20.69% 6	3.45% 1	75.86% 22	29

Q34 Do you feel the following kinds of financing are sufficiently provided by sources in the Roundup area?

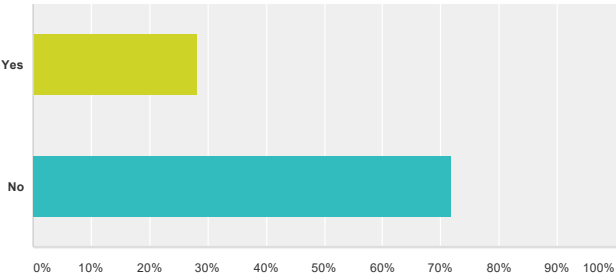
Answered: 103 Skipped: 94



Select your answer				
	Yes	No	No Opinion	Total
Mortgages	46.08% 47	28.43% 29	25.49% 26	102
Home Improvements Loans	41.00% 41	33.00% 33	26.00% 26	100
Business Loans	31.00% 31	28.00% 28	41.00% 41	100

Q35 Are members in your household looking for work in the area?

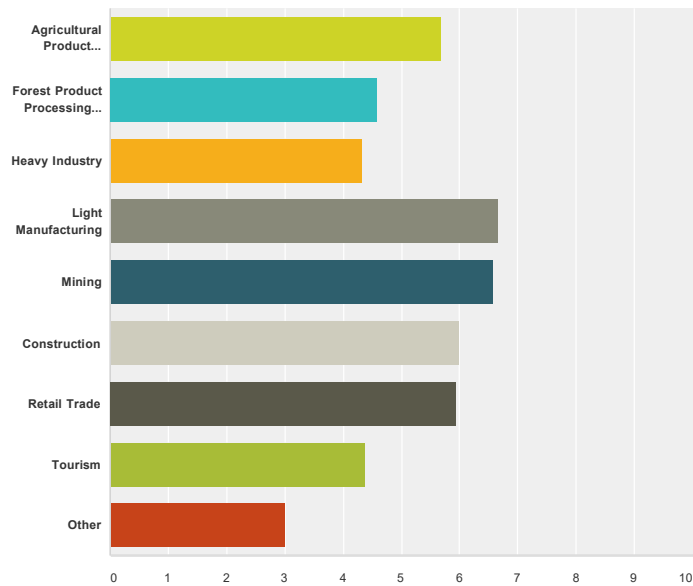
Answered: 117 Skipped: 80



Answer Choices	Responses
Yes	28.21%33
No	71.79%84
Total	117

**Q36 Please specify the types of employment opportunities most desirable.
(rank from most important to least)**

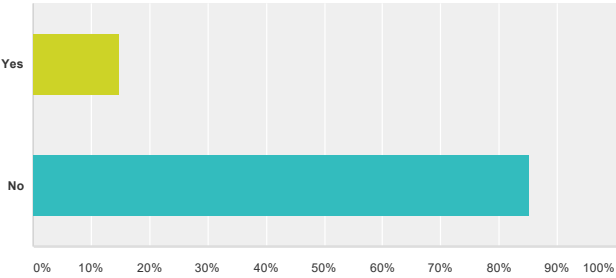
Answered: 92 Skipped: 105



	1	2	3	4	5	6	7	8	9	Total	Score
Agricultural Product Processing (Meat, Feed)	7.25% 5	8.70% 6	26.09% 18	13.04% 9	17.39% 12	14.49% 10	4.35% 3	5.80% 4	2.90% 2	69	5.68
Forest Product Processing (Lumber, Specialty Wood Products)	1.59% 1	14.29% 9	0.00% 0	17.46% 11	7.94% 5	23.81% 15	22.22% 14	11.11% 7	1.59% 1	63	4.59
Heavy Industry	3.13% 2	7.81% 5	14.06% 9	10.94% 7	3.13% 2	10.94% 7	21.88% 14	25.00% 16	3.13% 2	64	4.33
Light Manufacturing	23.38% 18	22.08% 17	12.99% 10	9.09% 7	14.29% 11	7.79% 6	9.09% 7	1.30% 1	0.00% 0	77	6.65
Mining	38.96% 30	14.29% 11	6.49% 5	11.69% 9	6.49% 5	1.30% 1	3.90% 3	10.39% 8	6.49% 5	77	6.57
Construction	5.56% 4	20.83% 15	19.44% 14	15.28% 11	15.28% 11	13.89% 10	5.56% 4	1.39% 1	2.78% 2	72	5.99
Retail Trade	21.74% 15	11.59% 8	8.70% 6	11.59% 8	15.94% 11	10.14% 7	14.49% 10	5.80% 4	0.00% 0	69	5.94
Tourism	6.15% 4	6.15% 4	12.31% 8	10.77% 7	10.77% 7	10.77% 7	7.69% 5	27.69% 18	7.69% 5	65	4.38
Other	15.38% 6	2.56% 1	5.13% 2	0.00% 0	2.56% 1	0.00% 0	5.13% 2	7.69% 3	61.54% 24	39	3.00

Q37 Do you feel the efforts to attract new industry and support existing industry are adequate?

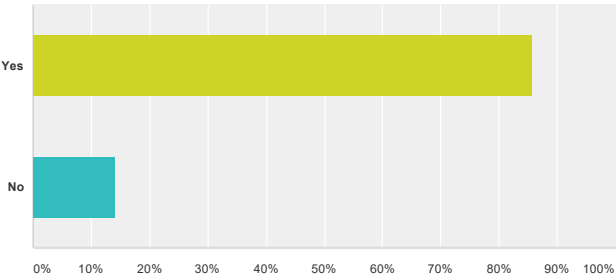
Answered: 115 Skipped: 82



Answer Choices	Responses	
Yes	14.78%	17
No	85.22%	98
Total		115

Q38 Should the City investigate the feasibility of developing targeted economic development districts or business improvement districts to support and encourage business development in Roundup?

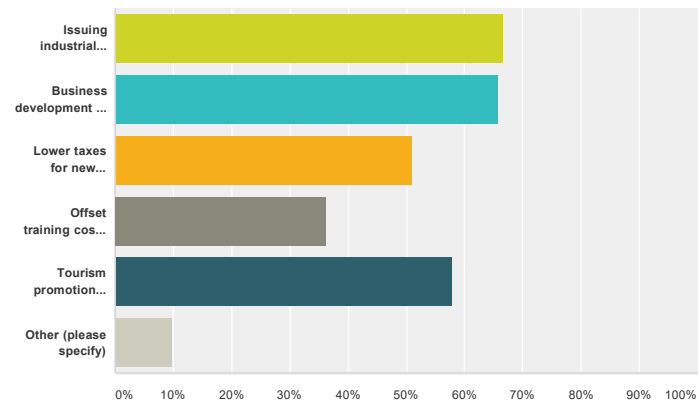
Answered: 112 Skipped: 85



Answer Choices	Responses	
Yes	85.71%	96
No	14.29%	16
Total		112

Q39 What economic development activities should be considered to promote new and existing industry? (Checkall that apply)

Answered: 102 Skipped: 95



Answer Choices	Responses
Issuing industrial development revenue bonds to help industries acquire land and construct building, without a County-wide tax increase for local citizens	66.67% 68
Business development and management assistance	65.69% 67
Lower taxes for new industry	50.98% 52
Offset training costs for new employees	36.27% 37
Tourism promotion program	57.84% 59
Other (please specify)	9.80% 10
Total Respondents: 102	

Q40 Please identify by percentage where you or your family shops?

Answered: 107 Skipped: 90

Answer Choices	Responses	
Roundup	100.00%	107
Billings	98.13%	105
Internet (Amazon, Overstock, Zulily, etc.)	82.24%	88
Other	5.61%	6
If other, please identify by name	1.87%	2

Q41 Please explain why you or your family shops some place other than Roundup?

Answered: 100 Skipped: 97

Please explain why you or your family shops some place other than Roundup?
Open-Ended Response
We live between Blgs & Roundup & prices are so much cheaper in Blgs.
No clothing or furniture stores
prices and availability of products
More choices availability
Organic produce
Can't get it in Roundup.
Because there are a lot of things you can't get in Roundup, and some things you can get here are cheaper in Billings
items not available locally--need a \$ Store
More selection, cheaper prices, delivery convenience (internet)
Lack of choices and prices
Long standing relationships with medical facilities, grocery prices too high
availability of goods and services
price and what is offered
It is cheaper to shop else where
Doesn't offer what is needed or already in another city for other business.
not enough options
Selection
Better selection, prices, and convenience
service, price, quality, availability
There are several things you can't get in Roundup
Prices are too high here for same product elsewhere.
Prices and variety
Variety & unable to get certain things in Roundup
Not enough stores
more choices
availability and price
Because we can't buy clothes here we don't have a Shopko or a target that has clothes for adults or children
Availability of items needed
costs and product selection
Choice and price
Don't have what I need
Most of our shopping for hardware materials are done in Roundup with the exception of items they do not have in inventory. Grocery items are more expensive so we go to Billings.

availability of items
There are things we can't buy in Roundup and things that are much more expensive here. Because we have family in Billings and do business there, we are in Billings weekly.
Prices are too high here. It's quite pathetic for a town to rely on another city almost 50 miles away for everything, when the same thing is offered at the local grocery store a couple blocks away.
Prices, availability
Not enough options
There is a wider variety at these stores for our needs, we shop locally most times, but for a big need of groceries it is better to buy bulk, for less.
Availability
Cheaper/Easier/Convenience
Needed items not available in Roundup, lower costs
We shop online or go to Billings for our clothing needs. Though it is more expensive to shop in Roundup for our groceries, it is more convenient for us to do so and we like to support Roundup businesses when we can.
Billings has better quality than Roundup; Amazon has a better selection than Billings.
prices are lower in Billings
Lower prices along with availability of additional items
we shop locally for all we can get, the things that aren't an option in roundup we go to Billings, or the internet for.
Better selection always, prices at times.
products not available here or more costly
Selection
Price, availability
Don't have what we need. Produce in stores are poor.
Hours and price
More places to get deals
Cost
Lower prices and greater selection
pricing and variety
cost
Cheaper, open 24hrs, hardware store closes when I'm getting off work. Shopko is barely open long enough If we rush home from blgs.
Selection
products are not available locally
I work in Billings so it is convenient to stop by. More choices also.
Nothing here but gas, food and alcohol
Products not available locally, major cost differences
too expensive
price and larger selection of products
Cheaper prices and more variety

Availability of products
Poor organic selection at grocery stores, so I do a lot of grocery shopping in Billings. I'd buy organic produce in Roundup (even at a slightly higher price) if it were offered. I buy from the internet because Roundup's handful of basic stores has poor variety and selection (except for Bull Mtn Trading for gifts--love that spot and all it offers)
Because roundup has poor produce and poor meat selections
Items not available in Roundup
More variety
Wider selection of products and professional services
Selection, cost, and fresh produce
Cost and more variety/ selection of products
In billings for work 5 days a week
More choices and lower prices
Larger variety, better prices
Unable to get items needed and costs
Prices, discounts
Billings has more options for the things we need
to expensive not enough choice
More products and better pricing
Poor selection
Cheaper
cheaper, more variety, more quantity for dollar value, not available in Roundup
Cost, selection, variety, entertainment
not everything yu need is readily available in Roundup
Larger variety and selection availability of products that we need
Prices and availability
cost, variety
Selection of products is low, prices are way too high, especially for groceries
Less expensive in billings. More options. GOOD produce in billings as everything you buy here in town is usually already bad when you get it in your home.
Because Roundup generally never has what we need.
better prices, wider selections, better quality of merchandise
Cheaper prices are higher here cause the distance to billings
price
Cheaper
Things are too expensive, not enough options
It is cheaper.
Availability

Q42 Describe improvements you would or would not like to see in the Roundup area. Discuss any other City related issues you would like the City Council to consider and/or tell us what you like (recent improvements that went well) and do not like.

Answered: 71 Skipped: 126

I love the "small town" of Roundup. People will try so much more to go above & beyond to help people. Only wish prices were lower & selection better. Would love to see the area coming in to town cleaned up.
Sidewalk, curbs and gutters repairs and updates More encouragement for people to fix up their houses -
need of bigger and better jail facilities; more attention on public services such as pet control and drug control etc but without more jail facilities there is no room for offenders!
Improvements on Main Street so downtown doesn't look so impoverished. Only solution seems to me to find a way to fill empty storefronts.
I as well as many other would like to see a nice shopko store and feel as though it is warranted
Get the run down houses tore down and lots cleaned up. Property owners down town should not be allowed to have broken windows and boarded up windows and junk around there buildings.
The stage looks great, and I am excited for the Commemorative Garden.
Excellent--new school, new trees, improved attitudes. City is doing an excellent job with the \$\$ available.
The biggest issues for me are water quality and street/sidewalk conditions. It is good to see the community come together for improvements--such as the new stage, new school & upgrades to high school, community garden, and recent clean up day. I use the river walk almost daily and really appreciate that it was fixed after our 2 floods. More areas like that would be nice.
Like high school upgrade
The completion of the water project throughout the city. Improvement to the park w/playground equipment and general upkeep of the grounds,ie weed control. Park did look better this past summer than in the past. Ongoing support of the outdoor pool. The community stage and the new trees around the ball fields are a great improvement. Coming into Roundup from the east shows a very positive look to the community.
full time activity director for indoor and outdoor pool activies , tennis horsr shoe, sand volley ball more to do
sidewalks
Replacement of broken and unusable sidewalks
There needs to be more for the children to do
As a teenager of Roundup, this town is awfully boring to live in. There is little to no local entertainment besides the Youth Center. Because of this, many of my peers have turned to unlawful, or dangerous activities to entertain themselves.
Priority #1 is a theme for main street. For Example see what Crowley Wyo had done to their main street.
Roundup has a public safety issue. The rust in the water can and has plugged fire hydrants and equipment. Thus, the #1 priority of the city should be to replace the water distribution system. Ten to Fifteen years is not an acceptable plan of "action" . The current system is placing the public at risk of property loss, personal injury, or God forbid Death (loss of family, community). The new stage (as well as the golf course) is a great asset, it needs to be managed in a manner which creates revenue for the city at the same time increases interest in our community and instills pride. We need to be proactive and constantly marketing (professionally)our community. Marketing needs to be the #2 priority of the City. Marketing will change economy and allow the #1 problem of the City to be rectified. Create a Progressive/Aggressive Marketing Plan and implement it through the use of the defined assets of Our Community. Thank You!
Improvements in enforcement of laws. Do something about drug problem and water issues. Housing needs to be affordable and more job opportunities.
Large franchise and chain type businesses don't belong in Roundup.
Would like to see water project completed as well as new sewer lines.
Improvements all areas to keep our graduated young people here
More restaurants and clothing stores

What do they have planned for all the empty store fronts? What about street maintainable. I do like that they finally got a tree in the garden and not just weeds
Remove junk buildings downtown to make room for new parking or new development.
Water quality solutions and improvement in community lifestyle. There is little to no recreational opportunities for our youth and young adults.
City does a great job handling current services. We know funds are limited, and thank the council and employees for managing finances to offer all the services we have.
The drug & alcohol scene here is outrageous. Give the Jr. High, High Schoolers and Middle aged folk something to do other than head to the Keg or take a drunken/high roadie.
The street on 6th Street West has been closed off since Christmas why? Get things fixed or let residents know what is going on.
WATER!!!! Stop talking about it and do something about it.
The river walk is looking better but still needs some work. The stage looks great.
Our kids NEED something to do and many are ready and willing to help build or establish things like a skate park, a movie theatre, and bowling alley, but they need funding, leadership, and organization in order to accomplish their goals. The water in Roundup has been atrocious forever and, in my mind, is the single LEAST attractive thing about Roundup that prevents new business, tourism, and population growth. Whatever it takes to fix Roundup water, it needs to be done!
I would like to see the development of new business and industry that is not tied to retail.
Water quality must be improved. Stronger drug control in town would be nice. Industry outreach is fine, but must be properly regulated (zoning/land management), enforced, and taxed. Roundup will never be a retail center and pursuing that goal is a waste of resources. That said, more restaurants would be nice, if equally unlikely.
I believe this community should invest more time into developing economic opportunities to bring money into the community on a consistent basis rather than just a few weeks out of the year. I strongly feel that the City Council must be open to new business ventures and be willing to look at potential growth for these business rather than just stick to traditional methods which has cost the city a great deal of money for improvements within the community. I also feel that Section 8 Housing needs to be provided on a limited basis due to the fact that it generally brings in the types of citizens that cause more damage than good
I am concerned that some people do new construction and a required to put curb, gutter and sidewalks, and then others are not doing this. I feel that this needs to be equal for all new development in Roundup.
the improvements to schools is terrific! Please look to encouraging some sort of recreation for kids so there is an alternative to drugs/alcohol. Get some Mental health/drug abuse services into town.
improve fire hydrant water pipes
Quality water; sidewalks; flood plain mitigation; clean up; economic development
Econ dev
City of Roundup need to support the mining industry and work to get more retail operations like a Family Dollar
I want to be proud about living in this community. It's important that Roundup looks neat, clean, well-maintained as people drive through. It's important that Roundup be welcoming to visitors, new residents. It's important that the community attract more diverse populations and adopt an openness to new ideas, new ways of doing things. Community cliques and narrow-mindedness do nothing to encourage new people, new ideas, or a desire to jump in and offer one's energies to improve the community. Adopting refugee families is one way to help others and, at the same time, pull together as a community to serve the greater good. Skills they could bring to the community could bring us a breath of fresh air.
water project is very important, improvement of main street says a lot about our town. improvement of rundown housing in the town, more opportunity for manufacturing in this area of some kind, we need to lobby for outside interests to locate here and put our people to work. If we had better housing that would develop our possibility to do that
I pay for water that I can not drink. For the cost, I should be able to drink it. Without costing me any more. Pet friendly Parks or dog park to make it more friendly for animal owners. Finish project that are started, 6th St. W. has been a mess for months now. Improve lighting on side walks and improve sidewalks. More kid activities for teens, they have nothing to do, but get in trouble.

We need dedicated police for city, we need paid city firemen We need alcohol and drug testing for city employees and volunteers, this town is full of functioning alcoholics who jeopardize public safety. We need less bars. We need to stop being a training facility for cops to leave after a few years. We need to stop arresting people for simple pot or paraphernalia possession- make it decriminalized. We need barking dog ordinances. We need to up speed limit by busy bee to out of town. We need a new jail and law enforcement center. We need new city policies regarding zero tolerance of alcohol and drug (narcotic & illegal) use in or on city owned facilities or vehicles/equipment. There are lots of employees and volunteers who abuse one or both before and during their shifts. Random alcohol and drug screenings by a rotating list. The new stage is a great benefit to our community. The city should cover the insurance for locally sponsored acts, events, shows. Not like the big bands or professional shows or events. Make its use accessible for residents with no cost to insure. Lastly, we should look at building a new city offices building.
I'm pleased that citizen groups are beginning to coordinate their efforts and collaborate to improve the economic and cultural climate in Roundup.
I would like to see: - Demolition of abandoned, not recoverable buildings. - Preservation of historical buildings on Main Street and throughout town. - A master plan for Main Street development included in the City Growth Plan.
I would like some of the downtown building eliminated and torn down so new businesses might build in those locations. If existing buildings are kept then a program to return them to a usable state would be beneficial.
The city water is poison! Don't care what any official report states and meets guidelines. Stop pretending it is ok, it is the number one issue within the city of roundup. Then you can bring in new business, promote tourism and new good residents purchasing homes in Roundup. Get it done!
Glad the City is pursuing development of a stand-alone Growth Policy and recently became affiliated with the MT Main Street Program. Would like to see better walkability, park improvements and better ordinances to address Main Street deterioration and decay.
better wate3r
The water HAS to get fixed. We work hard to fix our place. The water works harder to damage it (ruining plumbing, water heaters, faucets, etc). Very discouraging. Business district decay also seems to be a runaway problem. Use tax structure to encourage habitation of Main St buildings, rather than rewarding abandonment & neglect w/ miniature tax bills. Neglectful property owners should offset the damage they do to our community via the taxes they pay. Right now, it's reversed--- they're rewarded for their neglect.
I see with each passing year Roundup becoming more and more of a ghost town so to speak. In other words Roundup needs Major ATTENTION! Look at the old texaco on Main Street for example, it's a junk pile and drugy looking people there daily. I see Roundup as a whole needing ALOT of clean up and fixing up, the water is terrible as all of us know. There are out dated houses on every block of every street that are safety concerns, the streets are going down hill with more and more pot holes and bumps that are not being fixed and so much more that needs to be fixed in the town, the over all appearance of Roundup as a whole is very very poor. What I used to call home has become something that is an eye sore and safety concern to say the least. If it's not to late it would sure be nice to see the city of roundup cleaned up and fixed up.
Another pharmacy would be nice, a nursing home that can hold more than 18 residents, more for the kids to do, clean up the decay, good water, sidewalks
Upgrade the city park.
The water is obviously a major issue here in town. The other issues include a lack of opportunity for our youth. Unfortunately not many people are willing to involve themselves in efforts to improve the community.
I would like to see a revamp of city ordinances, especially code enforcement not done by law enforcement to try and get downtown under regulations to clean up the downtown district with uniformity in building codes to encourage a nice downtown that is unique and draws people in. Take red lodge or Bozeman ideas about city building codes and requirements so dumpy building don't sit vacant and crappy. Also install traffic lights at 8th ave, 4th ave, and first ave. but use the model of classy black signals and lighting that is more appealing to a modern look like billings downtown and Bozeman... Increase the fees so you start getting some revenue. And the water sucks which is a huge downfall. Starts with city code that is updated and get a educated city planner to help make the changes to get rid of the small town good ol boys club who own all the buildings downtown and discourage new business from moving in to take away their measly profits.
water is terrible worse than flint michigan probably illegal

The schools look nice, the bandstand is great but the rundown homes are awful, empty storefronts are bad. The city ordinances are NOT followed. Too much of the town looks like a ghetto. I believe that people that have been here forever are somewhat immune to what it has become, seeing instead what it used to be. This could be a great small town bedroom community for Billings but until it's cleaned up and repaired, we won't bring the kind of people and industry in that will create a tax base that the town needs.
I think we need more opportunities for families to be able to thrive here. With the oil rigs down and the mine on shaky ground it is hard for families to find work and so they leave. There is no reason to keep them here. We need a reason. We need to be able to give them opportunity to grow here. To put down roots. Or this town is going to suffer.
Water quality-tired of replacing dish washers, hot water heaters, sprinklers after a few years. What we pay for water is expensive when it's really not drinkable without a reverse osmosis.
Largest problems are the water quality - paying for water you cannot drink, and decline of main street - many empty and/or dilapidated buildings.
to continue with the water project to assure better quality of water
Would like to see an improvement in the overall service provided by the fire department including ensuring proper protective equipment so members can perform jobs effectively. And then the water infrastructure Improvement for the city
Work on he drug problems. Three bags of crystal meth were found in a local parking lot recently. That's a problem. I have a 1 ur old and she will not be going to public school in roundup for this very reason
The city needs better management of various departments who operate mostly autonomously, Roundup is very much a good old boys city- get rid of that. Require alcohol testing and drug testing for all departments that utilize city owned vehicles and equipment. There are a lot of functioning alcoholics within the city. The new stage is a great project, the new school is a great project, Provide city specific law enforcement. Pay firemen a response rate of pay per call out and or hire professional fireman 24 hrs a day
need better water, paying alot for water right now that cannot be used adequately.
I would like to see a movie theatre or the bowling alley opened instead of sitting there wasting away
The biggest improvement needs to be within the sheriff's dept. I've never seen such crookedness in my life..
The water needs to be improved without raising rates. Seniors needs adequate services and housing. Drug usage needs to be dealt with.
The members of the city council are I'll prepared to direct or assess community needs. The free market will do what needs to be done. The new grade school con job is a prime example of narrow thinking with no true perception of the future. Self important fools are the greatest theat to any community.

[HOME \(/\)](#) [LIVING \(/LIVING.HTML\)](#) [YOUR GOVERNMENT \(/YOUR-GOVERNMENT.HTML\)](#)

[DEPARTMENTS \(/DEPARTMENTS.HTML\)](#) [CONTACT \(/CONTACT.HTML\)](#)

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[\(HTTPS://WWW.MUNICODE.COM/LIBRARY/MT/ROUNDUP/CODES/CODE_OF_ORDINANCES\)](https://www.municode.com/library/mt/roundup/codes/code_of_ordinances)

[MORE...](#)

CITY OF ROUNDUP MONTANA

34 3rd Avenue West Roundup, Montana 59072

phone (406)-323-2804 fax (406) 323-2757

rndp@midrivers.com



The City of Roundup is a class III City located in Musselshell County. It has a population of approximately 1,859 people. The City was incorporated in 1909, and operates under a Commissioner-Executive form of government.



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Upcoming events

Apr

5

Tue

City Council Meeting

7:00pm-8:00pm

34 3rd Avenue West, City Office

[Read more...](#)

Apr

15

Fri

Spring Clean-Up

Fri, Apr 15 - Sat, Apr 16

2:00pm-7:00pm

2nd Avenue And Main Street

[Read more...](#)

The City of Roundup is conducting an updated needs assessments and we need your input!

We have created a survey that will require between 10-15 minutes to complete. The survey can be taken online or on paper. To access the survey:

1. **Online**, please visit this link:
<https://www.surveymonkey.com/r/B9R>
(<https://www.surveymonkey.com/r/B9I>)
2. **To download and print**, please visit this link:
<http://roundupgrowthpolicy.com/download documents>
(<http://roundupgrowthpolicy.com/download documents>)
3. **If you don't have access to a printer**, please visit our City offices to pick up a survey and ask for Tanya.

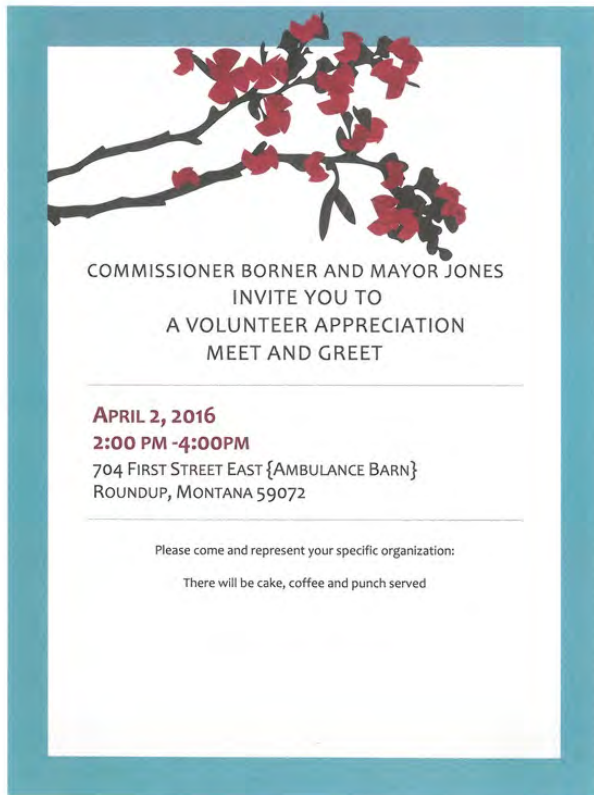
Individuals who need auxiliary aids for effective communication in programs or services of local government/org, please contact Tanya Lanter.

City of Roundup

Tanya Lanter

34 3rd Ave West, 59072 Roundup

Surveys taken on paper can be returned to



Roundup, Montana Tour



Roundup, Montana

Tanya at our City offices.

Licence renewals are now by appointment
ONLY!

<https://dojmt.gov/driving/appointments>

(<https://dojmt.gov/driving/appointments>)

You can also call 1-866-450-8034 to schedule
an app.

CLICK HERE PAYGOV.US

([HTTPS://PAY.PAYGOV.US/ENDUSER/PAYMENT](https://pay.paygov.us/enduser/payment).
TTID=14996)

NEW!!!!

The City of Roundup is now signed up to accept credit
and debit cards. Please use the link paygov.us to
payonline. You may also call the city office and
process a payment over the phone.
(terms & conditions- a 3% convenience fee is charged
by paygov.us.)

CURRENT MINUTES OF CITY COUNCIL



(</uploads/6/9/4/0/69402541/3-1-16.docx>)

March 1, 2016

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*Visit <http://roundupgrowthpolicy.com>
(<http://roundupgrowthpolicy.com>) to view
information on the Growth Policy*

Government Holidays

the city office will be closed these days

City of Roundup
34 3rd Avenue West
Roundup, MT 59072



The City of Roundup is the county seat of Musselshell County.

[*CLICK HERE MUSSELHELL COUNTY WEBSITE](http://musselshellcounty.org/index.cfm)

(<http://musselshellcounty.org/index.cfm>)

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M-F: 8am - 5pm

406-323-2804

rndp@midrivers.com

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Needs Assessment 2010



April 2010

Prepared for:

City of Roundup, Montana

Prepared by:



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1.0 INTRODUCTION & METHODOLOGY

The needs survey for the community of Roundup was conducted to assist in the future planning for the area. Many questions were taken directly from formats suggested by certain funding agencies, but the survey was expanded to ask questions of particular concern to the citizens of Roundup.

A community wide survey truly provides every citizen an equal opportunity to provide input as complete anonymity is maintained. Community members that are soft-spoken or feel uncomfortable sharing concerns at a public forum have the same opportunity to complete the survey as do out-spoken individuals. Additionally, public forums are often used as a venue for special interest groups to voice their views, overshadowing the voice of the quiet man or woman.

The survey contained 50 questions that covered a wide range of topics. The questions were grouped into seven sections (General, Education, Health, Housing, Recreation, Public Facilities, and Economic Development) to assist in analyzing the results. The survey form also provided an opportunity to give additional comments. One hundred thirty-one (131) respondents provided comments, which are included in the results.

Collections are made through tax assessments by the City. A survey form was mailed to each of the 575 known households in Roundup. Each survey included an ID number to track which households returned the survey. Two hundred forty-seven (247) responses were received from the mailing (or 43%). The response rate demonstrates the economic feasibility of conducting a community wide survey. Individual interviews with residents would have required hundreds of hours on the part of the City, and any anonymity would have been lost.

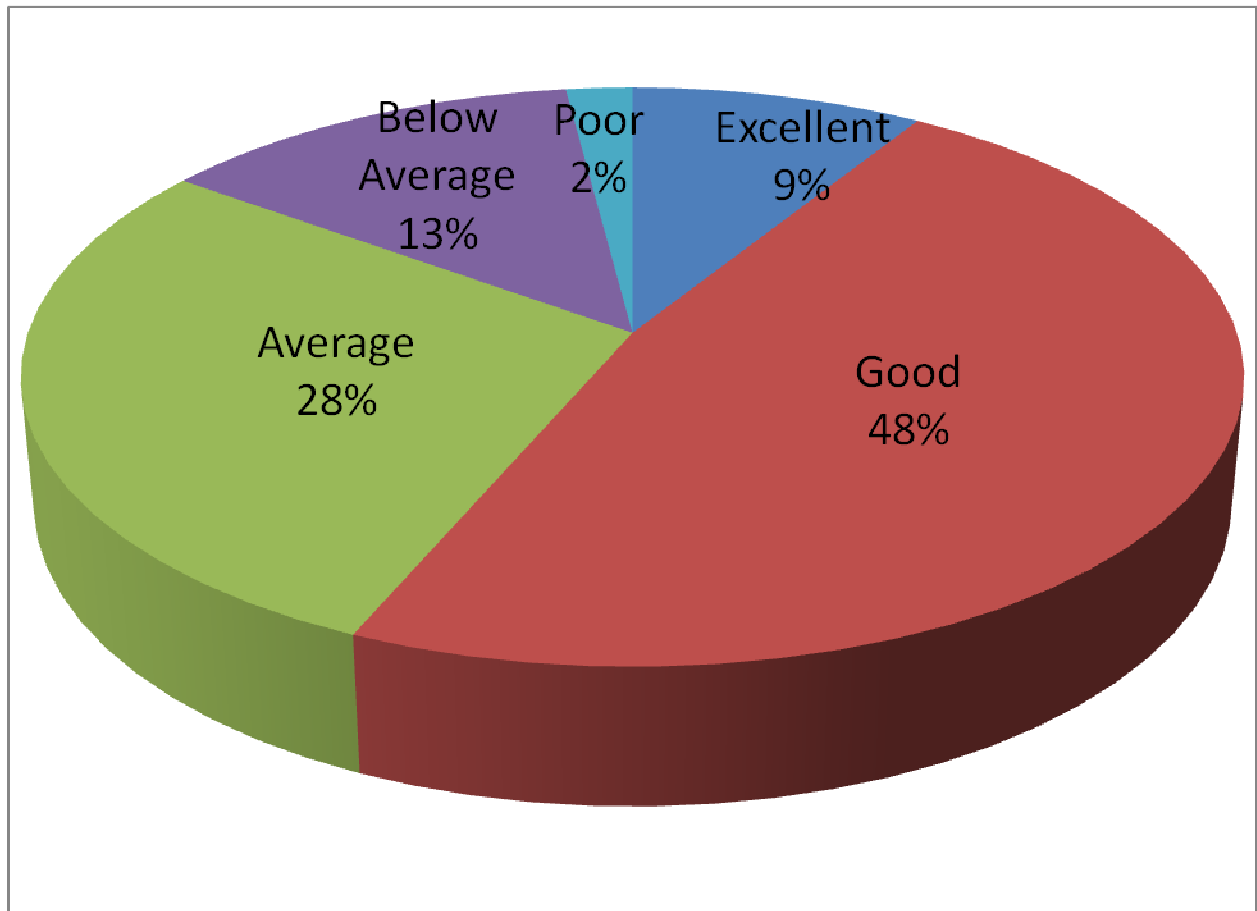
The following pages provide the compiled results of the survey. Comments by the consultant (*in italics*) are provided to assist interpretation of the data. The results were used extensively in the development of the CIP.

2.0 RESULTS - GENERAL

1. How would you grade Roundup as a place to live (A = excellent, B = Good, C = average, D = below average, F = poor)?

Average: 2.5 or B-

The majority of respondents graded Roundup with a B as a place to live. 1 respondent did not answer.



2. How would you grade local law enforcement?

Average: 2.0 or C

3. How would you grade the following City service:

- a) Municipal water?

Average: 1.1 or D

Respondents graded the municipal water system in Roundup with a D or below average quality. 1 respondent did not answer

b) Sanitary Sewer?

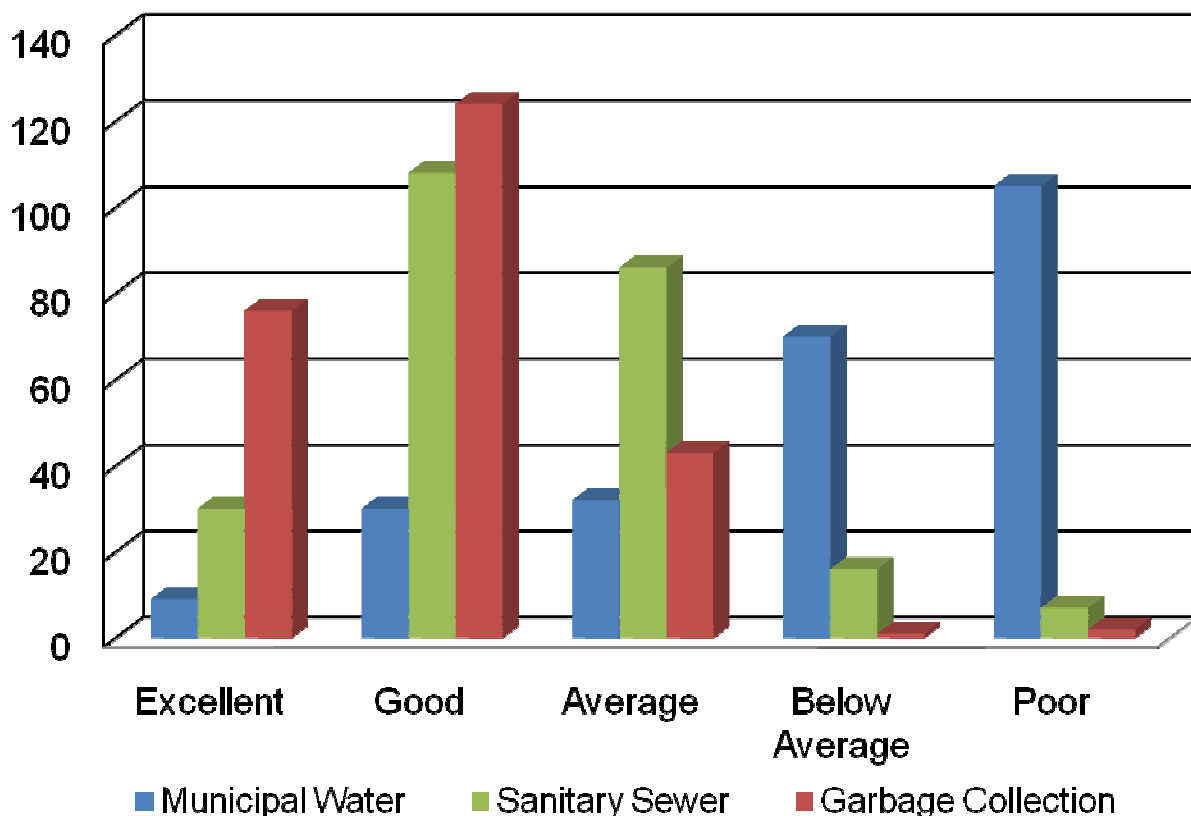
Average: 2.6 or C+

Respondents graded the sanitary sewer system in Roundup with a C+ or above average quality.

c) Garbage Collection?

Average: 3.1 or B+

Respondents graded the garbage collection in Roundup with a B+ or good quality. 1 respondent did not answer.



4. What do you like best about living in this area?

- o Small (103)
- o Friendly People (57)
- o Location (38)
- o Quiet (31)
- o Safe (17)
- o Scenery & Schools (11)

The majority of respondents liked the size of Roundup and the friendliness of the community the most. Many others liked the location of Roundup in regards to the access to the outdoors and access to larger Cities for shopping. Like most communities of Roundup's size, people liked the quiet neighborhoods, the safe community, the scenery, and the schools.

5. What do you like least about living in this area?

- o Water (95)
- o Lack of Shopping/Services (29)
- o Decay of Community (27)
- o Lack of Jobs/Low Pay (23)
- o Lack of Recreation/Entertainment (23)

The overwhelming majority of respondents are unsatisfied with the water in Roundup. Many others disliked the lack of shopping and services, the overall decay of the aesthetics of the community, the lack of jobs and/or good pay, and the lack of recreational opportunities within the community.

6. How many years have you lived in Roundup?

Average: 31 years

7. How many adults reside in your household between the ages of:

<u>43</u>	18 to 29 years
<u>55</u>	30 to 39 years
<u>72</u>	40 to 49 years
<u>170</u>	50 to 65 years
<u>95</u>	Over 65

The responses to Questions 6 and 7 indicate Roundup's population primarily consists of long-term residents.

8. How many dependents under the age of 18 reside in your household?

Average: 1 per household

3.0 RESULTS - EDUCATION

9. How much education has the head of household had?

<u>3</u>	< 9 years
<u>6</u>	9 to 11 years
<u>97</u>	High School
<u>16</u>	Vocational Training
<u>91</u>	College
<u>31</u>	Graduate School

10. Are you satisfied with the quality of the following education programs?

Category	Yes	No	No Answer
General Education	150	31	66
Vocational Training	52	66	129
College Preparation	97	36	114
Music	118	35	94
Athletics	85	71	91
Adult Basic Education	40	58	149
Adult Continuing Education	30	71	146

11. Does our public school system offer a quality educational program comparable to other public schools of similar size?

Yes: 178 No: 28 No Answer: 41

Questions 10 and 11 demonstrate the majority of the respondent's satisfaction with the public school system.

12. How do you rate our school system facilities?

Average: 2.2 or C

Respondents graded the school facilities in Roundup with a C or average. 26 respondent did not answer.

4.0 RESULTS - HEALTH

13. Do you feel improved alcohol and drug dependence programs should be implemented?

Yes: 170 No: 49 No Answer: 28

A trend has been noted for communities similar to Roundup to have an alcohol and drug problem in the adolescents and to express a great desire for alcohol and drug dependence programs. Roundup appears to follow this trend and expressed a high priority for drug control.

14. What additional health services are needed in our community? (Check all that apply)

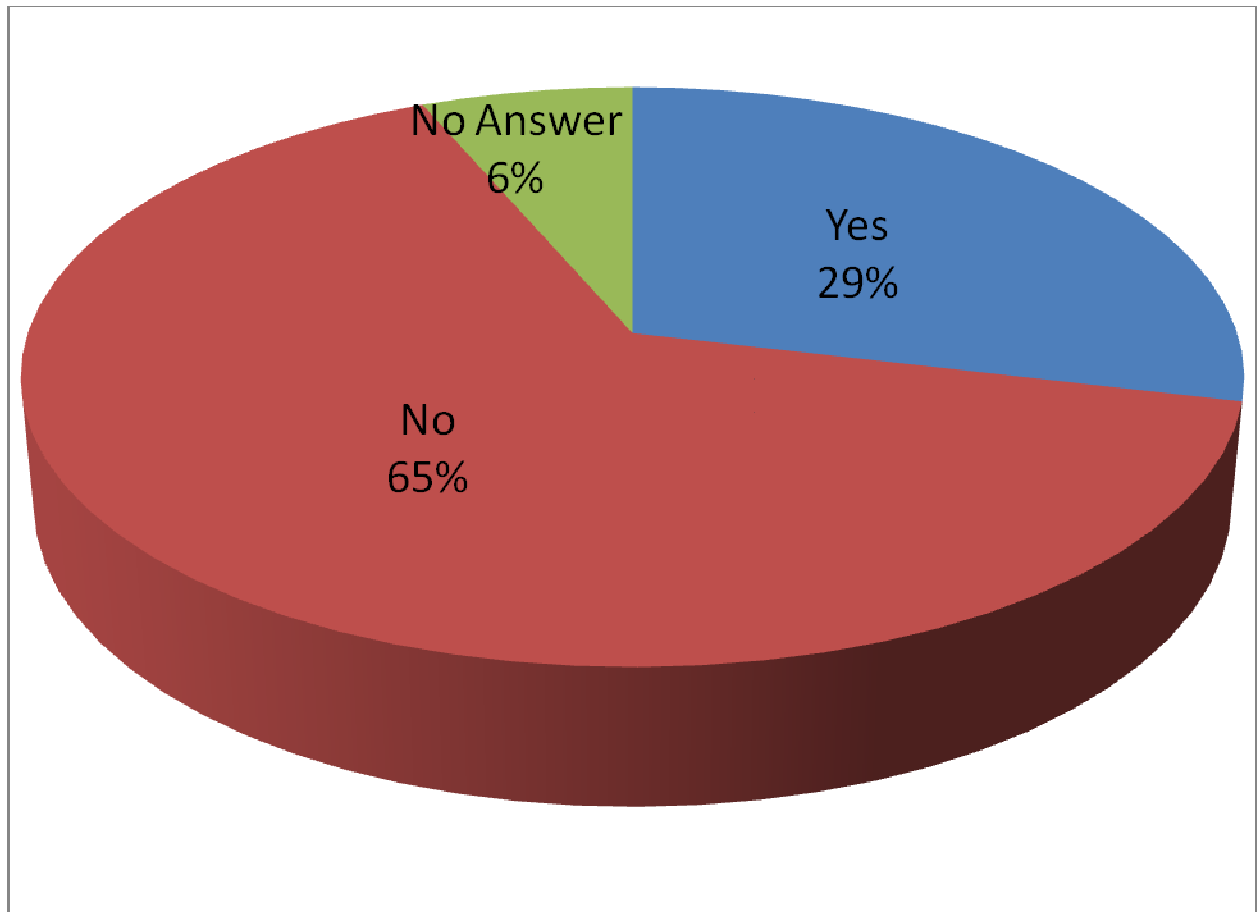
One hundred twenty-eight (51.8%) marked one or more medical service they desired for Roundup. Sixty-five respondents (26.3%) indicated that assisted living facilities are needed. The greatest concern of respondents seemed to be that the high turnover rate of physicians.

<u>54</u>	Women, infant and children programs	<u>25</u>	Convalescent Homes
<u>42</u>	Emergency Medical Technicians	<u>27</u>	Nursing Homes
<u>65</u>	Assisted Living Facilities	<u>38</u>	Visiting Nurses
<u>40</u>	Specialty Physicians	<u>46</u>	Dentists
	Other (Physiologist, Pediatrician, Family Counselor, Orthopedic, Chiropractor, OB/GYN, Oncologist, Orthodontist, Fitness Center)		
<u>38</u>			

15. Should the City allow the opening, operation, or licensing of establishments that grow, sell, or distribute medical marijuana?

Yes: 71 No: 160 No Answer: 16

One hundred sixty respondents (64.8%) indicated that they are against licensing and operation of medical marijuana establishments in Roundup.



5.0 RESULTS - HOUSING

16. Please indicate if you believe the condition of housing in Roundup is average, below average or above average with respect to other housing in the Musselshell County region.

88 Below Average 137 Average 11 Above Average

17. Does the City needs additional subsidized low-cost housing for lower income families or senior citizens in the Roundup Area?

Yes: 137 No: 85 No Answer: 25

18. What types of housing do you feel are needed the most in Roundup? (Rank your three most important choices as 1st, 2nd, 3rd)

Rank	Item
367	a. Low Income Housing
391	b. Middle Income Housing
322	c. Single Family Housing
113	d. Multiple Family Housing
49.3	e. Mobile Home Parks
286	f. Rental Units
212	g. Senior Citizen Housing
162	h. Assisted Living
41	i. Other (repair/rebuild existing, clean and affordable apartments)

A number 1 ranking was given 5 points, a number 2 was given 3 points, and a number 3 was given 1 point. Results indicate that the majority of respondents weighted middle income housing as their highest priority, followed by low income housing and single family housing for Roundup.

19. Does your neighborhood have any problems with blight? (deteriorated or abandoned buildings, junked vehicles, weeds, trash)

Yes: 146 No: 91 No Answer: 10

20. Do you own or rent your own residence?

Own: 229 Rent: 12 No Answer: 6

21. Approximately how old is your residence since original construction?

Average 62 years old

22. A. Are any members of your household physically or mentally disabled or handicapped?

Yes: 39 No: 196 No Answer: 12

B. If you responded "yes" above, does your dwelling need any special modifications to improve access or living conditions for the handicapped person(s)?

Yes: 11 No: 27 No Answer: 1

23. Please indicate if you feel your dwelling unit has any of the following (check as many as applicable):

<u>28</u>	Inadequate plumbing (leaks in water, sewer or gas piping).
<u>49</u>	Inadequate wiring (bare or exposed wires, lights dim when other appliances turn on, less than two outlets in each room, inoperable outlets, etc.).
<u>10</u>	Soot or smoke from fireplace or heater, kitchen stove, or fumes from furnace or heaters, etc.
<u>23</u>	Walls or ceilings with holes, falling plaster or peeling paint, or stains unremovable or unpaintable, etc.
<u>19</u>	Cracked or missing window panes or plastic/cardboard in place of panes.
<u>36</u>	Doors or windows that stick or do not open.
<u>59</u>	Air leaks around windows or doors from cracks or other broken or missing parts.
<u>25</u>	Roof sags, has missing shingles or materials or needs patching or in any way allows water to drain into dwelling.
<u>63</u>	Cracked foundation.
<u>19</u>	Inadequate heating
<u>5</u>	Other (poor water quality/pressure)
<u>31</u>	Other (3-lack of insulation, 2-water leaking, 2-siding, 2-need natural gas)

One hundred forty-two respondents (42.5%) indicated they had deficiencies with their dwellings, and more than half marked more than one deficiency.

24. If low interest loans or grants were available to improve your dwelling unit, and you were eligible for these, would you apply for this assistance?

<u>8</u>	No, I do not own my dwelling unit.	<u>130</u>	Yes, I would consider applying.
<u>54</u>	No, I would not apply.	<u>55</u>	No opinion.

6.0 RESULTS - RECREATION

25. What facilities require the most improvements or developments?

Each respondent was asked to rank their top three priorities. Each “1” was given a score of 5, each “2” given 3 points, and each “3” given 1 point. The responses were then totaled to provide a score for each choice.

<u>363</u>	Playground and Community Parks
<u>275</u>	Pedestrian/Bicycle Paths
<u>163</u>	Ice Skating Rinks
<u>99.8</u>	Swimming Pool
<u>73</u>	Basketball/Tennis Courts
<u>69.3</u>	Sports Playing Fields (Baseball, Football, Soccer)
<u>31</u>	Golf Courses
<u>311</u>	Camping Sites
<u>340</u>	Picnic Areas and Public Rest Rooms
<u>126</u>	Other
<u>4</u>	Other (Youth Center/Camps)
<u>4</u>	Other (Senior Center)
<u>5</u>	Other (Movie Theater)
<u>6</u>	Other (Indoor Pool)
<u>9</u>	Other (Workout Facility/Gym)
<u>10</u>	Other (Bowling)

26. Are the community's existing recreation opportunities adequate for the following age groups?

<u>Category</u>	<u>Yes</u>	<u>No</u>	<u>No Answer</u>
Preschool	118	42	87
Elementary	129	42	76
High School	86	88	73
Young Adult	68	107	72
Middle Age	55	110	82
Senior	56	103	88

27. What additional programs should be offered or organized? *Each of the following bulleted items was suggested by at least one respondent.*

- ☐ Indoor pool
- ☐ Soccer, Hockey, Baseball
- ☐ Skateboard Park
- ☐ Bowling Alley
- ☐ Senior Center
- ☐ Movie Theater
- ☐ Exercise and walking area
- ☐ Rec center for school age group

28. What is the most effective way to fund recreational facilities? Check as many as you feel appropriate.

<u>52</u>	Mill Levy (property owners would pay)
<u>130</u>	User Fees (users of improvements would pay)
<u>98</u>	Membership fee
<u>41</u>	Additional Fee Paid by All Residents
<u>134</u>	Donations
<u>45</u>	Bank Loans and/or Revenue Bonds
<u>22</u>	Other (Grants, Fund Raiser, County Mine funds)

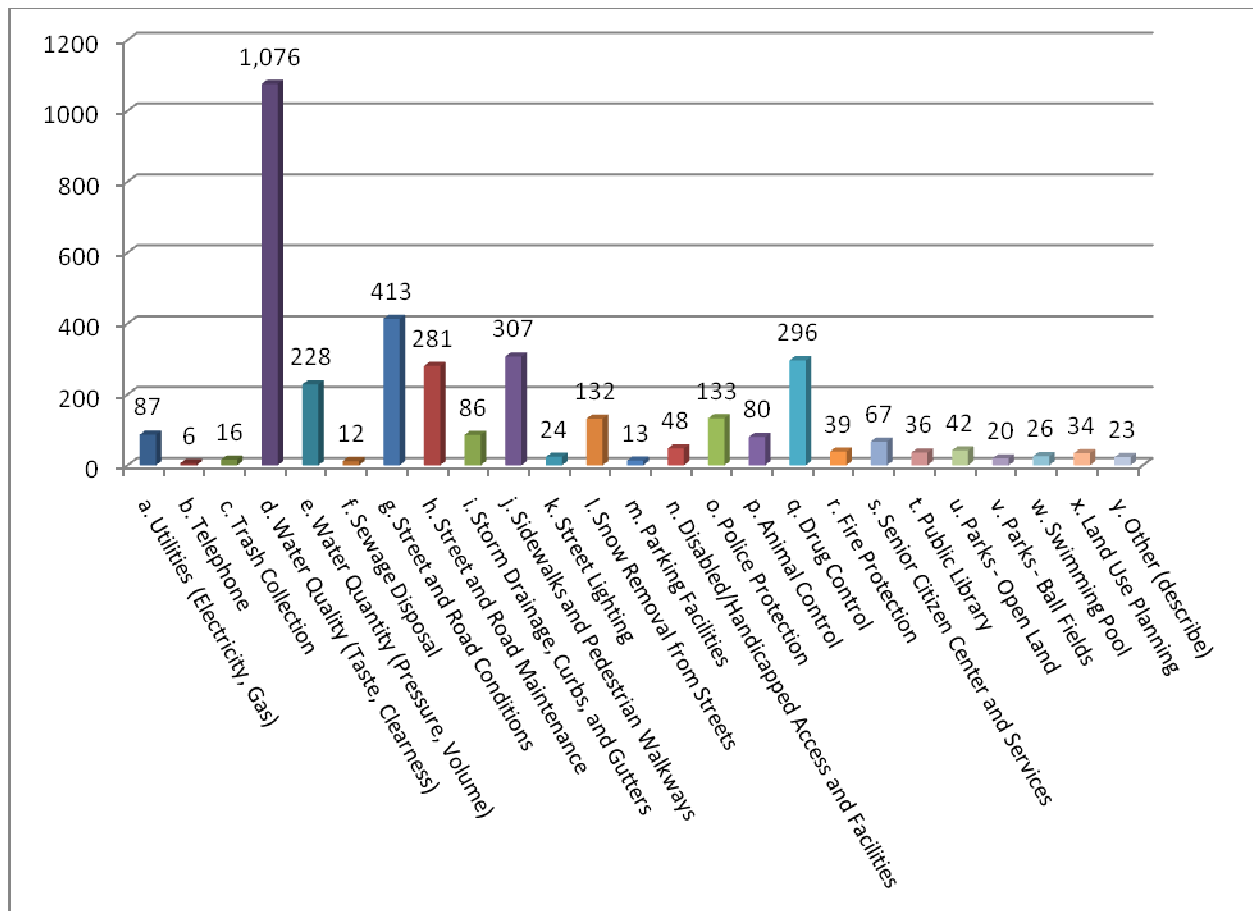
7.0 RESULTS - PUBLIC FACILITIES

29. Please indicate what you feel should be the top 5 priorities for the City to improve on in the Roundup Area.

Each respondent was asked to rank their top five priorities. Each “1” was given a score of 5, each “2” given 4 points, each “3” given 3 points, each “4” given 2 points, and each “5” given 1 point. The responses were then totaled to provide a score for each choice.

The largest concern expressed by respondents, was the water quality. Respondents indicated the water taste and cleanliness were a great concern for the whole community scoring 1,076. Street and road condition, sidewalk and pedestrian walkways, controlling drugs, street and road maintenance, water quantity, police protection, and snow removal were the next highest priorities with scores of 413, 307, 296, 281, 228, 133, and 132 respectively. The next two priorities rounding out the top ten were utilities and senior citizen center that scored 86.9 and 66, respectively. These results clearly illustrate that the water system is the primary concern for the residents of Roundup.

The resulting scoring for the various categories is summarized in the following pages by a table with the scores for each item and a graph ranking the top ten priorities as determined by the survey.



Rank	Item	
86.5	a.	Utilities (Electricity, Gas)
6	b.	Telephone
16	c.	Trash Collection
1076	d.	Water Quality (Taste, Clearness)
228	e.	Water Quantity (Pressure, Volume)
12	f.	Sewage Disposal
413	g.	Street and Road Conditions
281	h.	Street and Road Maintenance
85.9	i.	Storm Drainage, Curbs, and Gutters
307	j.	Sidewalks and Pedestrian Walkways
24	k.	Street Lighting
132	l.	Snow Removal from Streets
13	m.	Parking Facilities
47.9	n.	Disabled/Handicapped Access and Facilities
133	o.	Police Protection
80	p.	Animal Control
296	q.	Drug Control
39	r.	Fire Protection
66.9	s.	Senior Citizen Center and Services
36	t.	Public Library
42	u.	Parks – Open Land
20	v.	Parks – Ball Fields
26	w.	Swimming Pool
34	x.	Land Use Planning
23	y.	Other (describe) _____

30. Do you feel the City should pursue a financial plan for funding any of the priorities checked?

Yes: 198 No: 14 No Answer: 35

31. Which streets (if any) do you feel require the most attention for improvements? *The most common answers are listed with the number of responses received in parenthesis. All others received ten or less.*

- ☐ All (33)
- ☐ Side Streets (27)
- ☐ 6th Avenue (13)
- ☐ 4th Street (13)

32. Where would you like to see sidewalks placed or improved? *The most common answers are listed with the number of responses received in parenthesis. All others received less than five.*

- ☐ None (4)
- ☐ All (54)
- ☐ Main (25)
- ☐ Side Streets (9)
- ☐ Residential (8)
- ☐ 1st Street (8)

33. Please check funding sources that you feel should be considered for water, sewer, roads, and sidewalk improvements? (Check all that apply.)

<u>85</u>	Mill Levy (property owners would pay)
<u>209</u>	State and federal grants
<u>102</u>	State and federal loans
<u>48</u>	User fees (users of improvements would pay)
<u>45</u>	Bank Loans and/or Revenue Bonds

34. Should the City concentrate similar types of activities (residential, commercial, industrial) in separate areas?

Yes: 136 No: 55 No Answer: 56

35. Should the City sponsor a community beautification/cleanup campaign?

Yes: 188 No: 41 No Answer: 18

8.0 RESULTS - ECONOMIC DEVELOPMENT

36. What percentage of your family purchases are made in the Roundup community?

56 Less than 25% 72 25% to 50% 76 50% to 75% 38 More than 75%

37. What products/services do you generally purchase outside the City?

- ☐ Clothing (119)
- ☐ Groceries (83)
- ☐ Medical/Dental (42)
- ☐ Household Goods (30)
- ☐ Vehicle-New and Repairs (21)
- ☐ Building Supplies (21)

Clothing and groceries were the most commonly purchased items from outside the community with 48% and 33% of respondents, respectively. Next, were medical services, household goods, vehicles including maintenance and repairs, and building supplies with 12% and 8%, respectively. Finally, furniture, appliances, fuel, and entertainment rounded out the top ten.

38. What additional commercial services are needed in our community?

Each respondent was asked to rank their top three priorities. Each “1” was given a score of 5, each “2” given 3 points, and each “3” given 1 point. The responses were then totaled to provide a score for each choice.

<u>298</u>	Family Restaurants
<u>30</u>	Hardware
<u>444</u>	Adult Clothing Shops
<u>257</u>	Children’s Clothing Shops
<u>378</u>	Discount Stores
<u>312</u>	Entertainment Establishments
<u>135</u>	Fast Food Franchises
<u>153</u>	Professional Services
<u>69</u>	Other (Recreational)

By far, respondents expressed a much greater desire for retail clothing stores than any other commercial services. Respondents also highly favored “discount stores”, “entertainment establishments” and “family restaurants” over other commercial services.

39. Do you think that improving the appearance of the downtown business buildings would significantly attract more customers?

Yes: 165 No: 72 No Answer: 10

40. Would you support a sign ordinance and review process to promote improved business signs downtown?

Yes: 129 No: 92 No Answer: 26

41. Is public parking in the downtown area adequate?

Yes: 175 No: 63 No Answer: 9

42. What other services should local retail establishments offer?

Yes	No	No Opinion	Item
98	22	127	a. Additional Sales Promotions
144	16	87	b. Larger Selection of Items
93	36	118	More Courteous and Helpful Service
86	29	132	Satisfactory Repair Services
81	49	117	Extended Shopping Hours (Evenings, Weekends)
13	2	232	Other

43. Do you feel the following kinds of financing are sufficiently provided by sources in the Roundup area?

Category	Yes	No	No Answer
Mortgages	83	53	111
Home Improvement Loans	83	56	108
Business Loans	64	54	129

44. Are members in your household looking for work in the area?

a.

Yes: 57 No: 178 No Answer: 12

b. If so, how many? Total 84

45. Are more economic opportunities needed in the community?

Yes: 224 No: 4 No Answer: 19

46. Please specify the types of employment opportunities most desirable, placing a 1 on what single item you feel is the highest priority, a 2 for the next highest and a 3 for the third highest.

Each respondent was asked to rank their top three priorities. Each "1" was given a score of 5, each "2" given 3 points, and each "3" given 1 point. The responses were then totaled to provide a score for each choice.

<u>113</u>	Agricultural Product Processing (Meat, Feed)
<u>130</u>	Forest Product Processing (Lumber, Specialty Wood Products)
<u>129</u>	Heavy Industry
<u>404</u>	Light Manufacturing
<u>248</u>	Mining
<u>268</u>	Construction
<u>372</u>	Retail Trade
<u>148</u>	Tourism
<u>56</u>	Other

47. Do you feel the efforts to attract new industry and support existing industry are adequate?

Yes: 33 No: 186 No Answer: 28

48. Should the City or County use tax dollars to support additional development in Roundup?

Yes: 138 No: 71 No Answer: 38

49. Should local government expend more effort to encourage businesses to expand rather than attract new industry?

Yes: 84 No: 123 No Answer: 40

50. What economic development activities should be considered to promote new and existing industry? Check all activities you feel would be appropriate.

	Issuing industrial development revenue bonds to help industries acquire land and construct buildings, without a Town-wide tax increase for local citizens
<u>133</u>	
<u>98</u>	Business Development and Management Assistance
<u>132</u>	Lower Taxes for New Industry
<u>81</u>	Offset training costs for new employees
<u>77</u>	Tourism Promotion Programs
<u>10</u>	Other

9.0 ADDITIONAL COMMENTS

1. City Council is a closed club of appointed people that are really not interested in public involvement.
2. I think that promoting our town would help local economy. Perhaps Roundup-specific gimmick, such as Darby Logger Days. Put us on the Map! Roundup water sucks. I don't care what the City says, it's not drinkable. Do you drink it?!?! All in all, I think the City does a good job, but we do need a fresh source of revenue for this town. A think tank to come up with something other than ordinary. Perhaps have a contest (for new ideas)?
3. We would like to be able to drink the water we pay for in our lifetime.
4. I feel drugs and alcohol needs to be out of Roundup, MT. Out of our schools and way of life. Drug peoples like low income programs. We do not want them in Roundup, MT. Keep them all out of Roundup.
5. I feel that all the old empty buildings on Main Street should be cleaned up, windows repaired or taken down to the ground. The old Montana Power Building is about to fall apart on Ave. side. It needs something done before it falls on its own and hurts or kills someone. And the awning over the Pioneer Cafe is leaning out more and more all the time. This could fall and injure someone also.
6. Roundup is a great little town. Too bad the water conditions were let to get to the point that it's just plain bad; bad for people, pets and plants. Also bad for appliances in the home too. We could also use something to get the parents interested in the situations that put their kids into the drug and alcohol culture.
7. We need to get grants or monies to replace old water and sewer pipes. If a few areas could be done each year, it would sure help. Also forget the crazy idea to pipe water from Utica to Roundup. Let's improve our existing water system with a filtering system and then the water would be drinkable. This might also attract people and businesses to this area.
8. The courthouse is not handicap accessible. It needs an elevator. River Walk is a nice improvement. Ice removal is essential for safety. Minors in bars are a problem. Drug and alcohol issues are rampant in this town and destroying our youth and community. Need more for families and youth to do besides drink on weekends. Justice System: Minors should not have to wait 6-9 months for a hearing if they have been charged with a crime. Need more and better qualified public defenders. Definitely more job opportunities.
9. We have enough bars and gambling places. We do not need cancan girls like the history of early Roundup. We need more Artist Guilds Artists of Roundup. We need to improve our museum so that elderly tourist that used to live here could get up the steps to view our GREAT MUSEUM. Our museum is one of the best that I have seen in Montana, But I cannot get up there because it is not wheelchair accessible. Thanks to Margaret Keciskemeti, myself, and a few others, we have a great museum. I'm sorry that I cannot see their special events in June. Elementary and High School artworks are great. Roundup has such a fine musical and artistic heredity. Our County does not maintain many rural Bed and Breakfast and horseback riding facilities. They usually go broke in 3 years. If petroleum prices keep rising, we will lose more people that would like to do workshops in our unique scenery, history of Musselshell County. May just a lovely place to spend a summer in fresh air, sunshine and digging fossils. The sky is so beautiful at night. Cool mountain breezes. We have that GREAT WIDE OPEN SPACES and sunshine and great summer climate. That is why I have stayed here since 1942.
10. The water is horrible the city needs more safe activates for families (bowling) - gym - rec center.

More job apps & daycare facilities also child care expense help for low income families

11. The water is horrible in taste and looks. I don't like brown water. Power at Cowbells at a price for camping. RV disposal cheaper than \$6.00. Thanks
12. I feel we pay enough in taxes now and use of coal board money should go to fixing streets, water quality, and other items needed. We were told years ago when water rates were increase was to replace old lines a few blocks code years. This seems to have stopped or slowed down and yes cost have risen but with proper planning and coal board money entire blocks could be replace and then paved over with hot mix asphalt not with cold mix
13. I feel roundup is a great place to live. We have good hospital, fantastic ambulance service, 2 fine grocery stores, a hardware store, etc. Plus we are close enough to Billings to be able to go there for specialized heath treatment, entertainment, etc. I would like to see the downtown are developed more so that there aren't so many empty buildings.
14. Clean up main street to many old buildings that make Roundup look like hell. Water in the city is bad, need better water to drink etc. Streets and alleys need a lot of improvements. Schools need a lot of maintenance work. Schools need better teachers. Sewer & water pipes are old and need to be replaced. Sidewalks on main street need repair. Side streets need cleaning of debris snow etc. People who make junk yards in front of their business or homes old cars farm equipment garbage etc.
15. The entire area continues to decay - downtown, schools, parks, business, etc. Without new business we will become a ghost town - no improvements to downtown in about 50 years. Our school are falling down and old - lack of community pride
16. Always need work, peoples trash piles and discarded junk needs to be removed by them, trees that need trimming, sidewalks that are crumbled and need repaired, needs keeping Roundup clean and safe, and dog doo on our sidewalks [*Unable to read next section*] I am close to grade school and that is no problem at all.
17. No one stays in Roundup after graduation, Why? Why do our kids turn towards drugs, alcohol? Why do we constantly rank last in sports? Why do people not take pride in being from Roundup
18. Fix the water & the pot holes, harass the vagrants so they move on.
19. Would be great if we had a movie theater. The River Walk Trail is most appreciated. The city council & mayor should be commended for agreeing to serve our community - it is a big commitment- Thank you. A community center/senior citizens center
20. Medical marijuana may be helpful to some Doctors' patients, but how can we trust or control the caregivers on the streets or highways. I don't want to be injured by someone high on dope.
21. Clean up all those ugly rundown business on main st. Would you stay or live here if you saw them? Clean up the drinking water for homes and business. It awful. Some sidewalks need replaced. And there's decent home to rent a lot run down and need fixed up. So how would want to live here, nothing to do? But be a couch potato if you are here now.
22. I love the fairgrounds & River walk. The Bull mts are a beautiful peaceful place to live. We have a nice school system and all the services a community needs are provided for. Especially the lower income. This is the problem as I see it : The assets this community has are not taken care of or capitalized on, Projects and ideas never get finished or are allowed to fall into disrepair, The city & the community do not work together for the whole of the community. ex. Surveys have been done before - nothing has been accomplished from them. Horizons project & main st

project - nothing if any concrete change happened. ex. Trees on blvds are cut down with no plan to replace them (no tree ordinance). Sidewalk to nowhere down at fairgrounds. Property that has been bankrupt - but nothing done. River walk allowed to struggle & few volunteers to maintain. Main st in disrepair. Main St looks like shit - property owners are allowed to let these big buildings deteriorate - i.e. no preservation of history. Putting a display in the window not enough. We have zero promotion of businesses. We need to separate the JR High from the High school. Rdp. desperately need to clean house. Apathy grips this town from the community leaders to the citizens - the community leaders seem to be frozen with fear of change & new ideas. People drive through our town & think 3rd world country or reservation seriously. We have a huge decay problem in the city and country. Aesthetics, aesthetics, aesthetics. Follow through, follow through, follow through. I pray something good & lasting comes from this survey. * no medical marijuana - it could be a take base - look @ other cities that are allowing it in their communities ... meth is the real drug problem. * On business signage - finally - we all know what the problem is - this is what people see when they come into our community. This is part of the decay problem - you must tell people to clean house!!!

23. I believe the city council has done what it could in the past. City Council is going to have an opportunity in the future to improve Roundup with tax revenue from the coal mine. City Council needs to spend some of that money to improve our town. Our hospital, police, fire department, city departments, garbage, and other workers all need improved vehicles, equipment, buildings etc. We need to fix or improve our water supply. I would like to be able to drink the water from my tap. Our water & sewer lines need to be replaced and then the streets, sidewalks, & curbs could be replaced and improved. Hopefully history will not repeat itself. The coal will not last forever. Our City needs to save 30% of the tax revenue every year and put it away so that when the mine is done we won't be instantly poor. We need to prepare for that day now. I want to thank all of you for serving on city council and doing what you can to improve our town.
24. Avenues and streets need to be finished within the city limits, including curbs & sidewalks, adequate lighting. The water system needs to be worked on & the quality of water needs to improve. The current plan needs to be pursued. More recreational opportunities need to be created. The golf course is a tremendous drawing card for our community.
25. New businesses, Recreational, New homes, New water system. Thank You
26. I think the housing in Roundup is terrible, the owners & renters need to lower their prices. Roundup is a depressed community and they are trying to sell houses for a huge profit. There isn't anybody that can afford them with the poor wages in this town. The rent prices are also ridiculous. Roundup's entire athletic dept needs to be fired. How can a town this size not win any games (or maybe 1) year after year? I can't imagine how the kids feel. Pamida was supposed to build a new store in town, I don't know what happened to that idea. We are forced to shop in Billings for almost everything because of our town's high prices and lack of stores. The only thing thriving in this town are the bars & casinos because that is the only entertainment. I have lived here all my life & it used to be a thriving community. When you drive down main street all you see are for sale signs and dilapidated buildings. We have a terrible deer problem in town. I try to have a beautiful yard because I live next to the highway. Last year my entire yard was wiped out by deer. I had spent over \$400 on plants & trees. We've got to do something about the deer. I'm afraid my garden will get hurt by them. I had 15 deer in my yard last night. There is only 1 family restaurant left in town & they close whenever they feel like it. It would be so nice to be able to use water out of our faucets or water your yard & not have everything turn white. My in-laws were going to move to Roundup but when they found out about the water they changed their minds. Very few houses on the market are in move-in condition. Tired of trying to improve things for the low income people, let's attract a better class of people to our town. Let's try to get better paying jobs in Roundup so our husbands don't have to go to Wyoming or the Dakotas to work.
27. I believe the law enforcement should concentrate more on the meth problem than simple things

like traffic, there should be more things for the kids to do on weekends like bowling, or roller skating or arcade games, I think most the sidewalks need to be fixed because you can barely push a stroller on them safely. I think there should be more clothing stores and restaurants.

28. What did this worthless project cost the citizens here? The question are all geared to a city of greater size. We are a town. The services and products described here are not sustainable for the budget of most people in this community. This sounds like a whole lot of government funding wish list. In the 40's and 50's there were more business just like in all small communities. Raising minimum wage, taxes, etc. has been progress that has pushed small business out of existence. They cannot compete with the box stores and cheaper imported goods. We are a quiet secluded community that has been taking care of itself just fine. Don't fix something that isn't broken. It will just invite problems we don't have & don't need.
29. Have been pleased with snow removal on Main St & 1st Ave west & 8th Ave E. Many sidewalks in need of repair and replacement. I believe city ordinances require property owners to keep sidewalks in good repair but law enforcements is neglected.
30. I would like to see more businesses in town. More things for families to do such as a theater, bike trails, walking trails. It would be nice if I didn't have to travel to Billings for everything. Prices here are high and not enough services offered. My kids will be looking for jobs here and without enough business they will have to travel to Billings to find work. Places like the A&W can only hire so many people, and where does that leave you people? If there were business like Target and Burger King here there would be places for young & old to look for work. Plus we wouldn't have to go to Billings for a pair of sneakers for gym. It gets awfully expensive to travel to billings for everything (i.e.) when gas was over \$4.00 a gallon. The schools (high school) need more classes such as shop, woodworking, etc. Roundup is dying and no one feels like living here. There is no opportunity for the young people in this town. No reason for them to stay unless their families own farms. Even some of the teachers travel from Billings to work here. We need enterprises and opportunity. Bring Roundup back to life.
31. The chamber of commerce new resident package. When I moved to Roundup lat year there was no help for me except by word of mouth. Who? Example phone, water, rentals, electricity, Drs, Dentist, garages, business, Pet needs, Vet. I still don't know where to find all this and chamber still doesn't have anything.
32. In regards to water issues, the citizens of Roundup were Promised new pipes 10-15 years ago, when we started paying for water. What happened and where is that money going today?
33. The vacant buildings on main street should be kept up better to look more attractive to visitors
34. We like the implementation of the maroon garbage cans. We would like to see the high school gym expanded to allow for more bleachers, thereby allowing for more school tournaments which could increase revenue for local businesses. However, room accommodations and parking could become an issue. We would like to see more than one police officer on duty on Friday nights and Saturday nights. Would like toss more police presence in residential area (side streets) inside city of Roundup. We would like to see sting operations run by outside officers for drug selling and producing homes. How about adding city police that do not leave the city limits.
35. Water is #1 need before this before this community will brow
36. The Police Department needs to not judge people or treat people bad all the time. More jobs needed badly in Roundup. More rentals for newer people who move here. New Coaches for our sports. People who knows the sport and not a favorite teacher!
37. We would like a better law enforcement who will deal with the problems. We like that the city has

attempted to clean some places up and are encouraging a better looking town. The swimming pool is a positive piece of PR nice job. I think Lon Sibley is a good leader for the city council. Bill Edwards works hard as mayor. He is good for Roundup

38. We would like the overall appearance of the city to improve. Enforce the laws on the books to have citizens maintain their properties and keep them looking good. Community Pride to have our city be pleasing to the eye of potential residents or people passing through town. Make the first impression a good one. Likes: We like the river walk. Don't like: The city and county fighting over it and it not being kept up or improved. Like: We like the past improvements to the fairgrounds. Don't like: Maintaining the fairgrounds is very poor, use the property that was purchased down by the fairgrounds, not many events @ fairgrounds. Why is that old bridge still down there? Do something or get it out of sight. What are you thinking with the sidewalk to nowhere. If for some reason it was a good idea why did it not get completed? Like swimming pool because of the hard working people associated with the pool money drive. Tree city USA: If residents are cutting down trees to have them carved up into a bear so be it, however they should have to plant another tree to replace it. Like: Block work and improvements on Laundry Hill. Little Park across road from Pepco Gas station. Maintain good fire and ambulance facilities. Very nice Golf course
39. There have been no improvements in the city infrastructure. The downtown area is an eye sore with over 12 empty dilapidated building broken sidewalks, looks like big city slums. Side streets are full of potholes, some needing road maps to get out of. The water system needs improving but the cause must be found before new wells are drilled. Main water in the 70's they were flushed twice a year. The water quality was good. Maybe the city should hire a city administrator and a elected certified city engineer. If your grass is over three inches tall you cut or get a ticket. New business will not come to the city until come officials get rid of the "what's in it for me" attitude.
40. Give a tax break instead of increase your taxes for improving the looks of your home siding and landscaping that does not include changing your square feet
41. I am 90 years old so I don't know anything about schools - recreation - never was active even when young. I enjoy the senior Bus. I don't drive. Sorry.
42. My hope for Roundup is that it continues to be a free from over governmental restrictions and tolerant place to live. I moved here and bought a home because it was not over regulated and full of ordinances. I use the parks a lot. The swimming pool and all of that area is wonderful, clean and beautiful. Please fix the road to the bridge and river walk. The "sidewalk" on the way to the Rodeo grounds is useless waste of money and could even be dangerous in bad weather. I have used it many times but do not find it necessary. Signs to the parks would be great. A little bit of parking at the North side of town to access the trails on the hills above town would be very helpful. The 2 blocks of downtown that are becoming more and more vacant are sad... This is such a beautiful town. I would love to see some light industry or small manufacturing attracted to fill them. Above all, keep the independent American Spirit alive here and use it. If Pamida really built a store and filled it this would be a perfect place to live and I would buy 75% here or more.
43. Improve water quality and have more doctors that stay long like we used to.
44. The city of Roundup is falling apart from the water system to the pavement on the streets. I have given this a great deal of thought and I offer some ideas. The city of Roundup could do away with the city,- county law enforcement agreement and out all of those funds along with water and street funds into one. This move would give the city much more money to repair and use for matching funds. Taxes would not have to increase one dime. The only down side would be that a few city ordinances would not be enforced. Let's be honest they are not being enforced now. The county sheriff's dept would still have to enforce all state laws within the city.

45. I understand that public funds for the hospital, water dept & playground disappeared. That seemed to get buried I thought a good explanations of that is in order. Also the quality of drinking water is appalling. Some days it smells & looks like the sewer has been emptied into the water supply. The old timers laugh - they think it's funny that people get sick have diarrhea if they drink the water when they get here. When I moved here and saw I started asking people some people say that if they use disinfectant soaps they don't get rashes. After I was here a few months and finally hauling water for all personal & cooking uses. I read that Roundup won a safe drinking water award. I knew something was rotten in the city of Roundup and a whole bunch of untruths, dangerous untruths are happening. Maybe Mr. Mayor you may care about these things cause the power that be up until now sure haven't. Main Problem toxic drinking water. Prob. 2 disappearing city funds.
46. The water sucks and we still pay a lot for it. The police here are a little mean to residents and I don't really like how they talk to people.
47. Continue to work on the water project. Enforce the existing ordinance & clean up Roundup. The number 1 priority right now is to keep the Hospital & nursing home open at all costs
48. Better water. Fireworks for July 3rd and 4th only. There are quite a few people who go to bed at 10 or 11 o'clock, only to be woke up in 2 hrs by fireworks. Also a lot of tied up dogs who in turn wake up everyone around. Thank you. Can you tell my dog and I do not like fireworks. They can almost put him in such a stat that he will have a seizure.
49. I think the city council should find a way to fix the water in Roundup. We have lots of rust in the Water
50. I would like to see more adequate housing instead of old fixer upper homes. Make an incentive like a tax break for substantial improvements. I would like to see more fitness based activities, skate park, ice skating ring, bike paths etc. Good working path for young and old. Health food store, or earthy establishment, more clothing places, not just western, more things to promote tourism as we live in a beautiful area. Cross country ski trails in winter make great hiking, biking tails in summer months.
51. Patrol 4th St W, for speeders and those not giving right of way. Fine junk cars, clean up prerelease, old gas station on main and 3rd Ave. Clean up junky area in town. Get a police force that will enforce the law, go after the drug dealers.
52. Become more progressive in thinking, maintenance is no progressive, it only maintains. Think about the economic future, what can be done to attract the next generation of dwellers to Roundup. What are the assets we have and can build to create a great economy? Studies prove art changes economy.
53. Do not do street repair until you done the water and sewer project other then the chosen few in town. Start somewhere when you ran out of money you can continue on at a later date. Water and sewer is a must to be done. Do not waist our \$ by doing street repair then tearing up to replace a water line or sewer. Be smart with process.
54. Definitely improvements of water quality. It is undesirable and for the most part unusable. The cost for this is fat to high
55. That need better doctors in the area. They do not have any doctors for newborn babies
56. Roundup has many state and Federal agencies, however if the communication within these agencies is not improved, Round Up in its present state will cease to exist

57. First, determine the demographics of the city. It is believed it is an aging community and will continue as such. Therefore we need to concentrate efforts on keeping seniors local and attracting senior who desire a rural lifestyle. The city should concentrate on a more senior friendly life style, and promote low income, senior housing, assisted living, and nursing homes. By playing in older areas of town the city can clean up old residences and improve water lines at the same time this requires extensive land use planning. As to our younger but untrained people new programs would provide vocational training and education in health and home care. Medical and holistic programs would improve and employee other as well. Most people prefer rural setting and seniors and their assistants could get out and about most of the time to enjoy the city and the wildlife at their front door. Second, the city also needs to plan for agricultural interest. Perhaps helping to sponsor more programs related to agriculture, educational training and facilities to help our ranch and farming people. Incentives to agricultural related business to open outlets to be closer to their customers. Consult with the local ranchers to determine what needs could be provided by the city. There are other areas to look at, mining, green industries, etc. But the city must develop a plan to specialize in 2-4 industries and offer the best little town for those services, use the services to improve water lines, better use of land areas and new roads and sidewalk (contributed by the service providers). Roundup, like any business, needs to find its niche before it can grow. If we3 are just a town with a little of everything we are doomed to fail. Roundup, "the greatest little" retirement, agricultural, green living (pick 2-4) community, will grow and keep growing focused. Just an idea.
58. More retail services, better maintenance of neighborhood streets and sidewalks, Improved water quality
59. The swimming pool should be enclosed so it could be used year around - plus the PE classes from the school could make use of the pool. There is absolutely nothing for the youth of Roundup to do here - starting from pre-school through high school - other than the center on Main Street which is not open all the time. A movie theater, roller/ice skating would be great for the kids as it could also be used my everyone from small children to adults.
60. We used to have an ice skating rink for the kids in winter. We need to get the skating started again. The indoor pool should be in use. Fix & clean up all the buildings in town, replace windows, etc. Repair all sidewalks. Yards should be mowed & weeds cut or sprayed while they're small. Junk cars removed from yards.
61. Fixing the stuff they call water would make Roundup a more desirable place to live!!!
62. I understand that the city has applied for and received several grants in the past to fix the water quality we have and they just used the funds for other stuff. Also several years ago an extra \$10 per month per user was added to the water bill for - they said - to replace pipes. Replacing pipes will eliminate the rust but won't get rid of the gas smell. Mine smells like it comes from an alkali pond. And if you take out the magnesium rod out of your H2O tank you void the warranty. Who can afford 2 tanks a year which I've had to replace 3 years in the running now. If you cleaned up the town; weeds, junk vehicles (some places look like junk yards), tear down rotten houses, etc. You just might get more business and people here. The old Vickar's Drug store building on Main Street is an eyesore. Our walk path down by the river has become a smelly place thanks to people letting their dogs run loose while they walk there. Is there any way to remove some or all the deer in the town?
63. I recently repoed a rental property. I was not surprised by disappointed in the way the city and county handled things. The city allowed a \$200 + water bill which was given me although the buyer still had an account for water. Why not reassign their water bill to their house? That seems to be the fair way to handle this! I also found the county had allowed them to pay the first half taxes only of each year. What's that about? Evidently you can call your shots in the tax office! Again, if they owe taxes, why not assign it to their other property? I guess that's too complex an item to deal with too. Not a problem to put my name delinquent tax list; I try to keep

my bills paid and then you see this kind of mess. Don't think people in Roundup don't know these little ways of ducking their bills and passing them on! I was also billed for \$100 for sheriff department serving notice of this repo . . . wonder who gets that?!

64. Most business development appears to be dependent on natural resources and utility development. Otherwise it is quite limited by the relatively small market being served. Direct support, promotion and investment by local financial institutions is nearly nonexistent here. It is common in many other areas. Quit whining. Be willing to invest some of your time and money to improve things.
65. Sheriff or deputy should follow up after report of a crime to let citizens know status of investigation. City needs water first, sheriff second.
66. Would like to see more activities for our children. Bowling alley, skate board park, movie theatre so our teen agers would have activities other than drinking alcohol for MIP's and drugs. In the summer the swimming pool is a great activity!
67. I really would like a whole new water system. I'm tired of paying for it every month; you can't drink it, you can't wash your clothes without ruining them. It's just awful! (Thank you for allowing us to do this survey!)
68. We need manufacturing jobs that pay a livable wage so the young people will not have to move away to make a living.
69. When new houses are built in areas without curb/sidewalk and paved streets they should be required to get (can't read) to put those improvements in before new houses are built. Instead of having the rest of town pay for it later.
70. Better water is needed. A smaller/friendlier police force that doesn't constantly hire new officers to train here and there, they move away and are replaced by a new cop who's out to prove himself.
71. Pamida - where is the store?
72. It would be good to develop a "theme" to attract people to stop and live here. With theme I mean a project large enough for employment, infrastructure to create/development something the city could be known for!! That could take care of all other needed improvements.
73. Water - water - water - and the rude treatment by that woman who answers the phone there. If you complain or make any reference to the water quality. She has no business in that position.
74. We need more of a well rounded community. We need more input from the "lower class". There is just a select few who run roundup so decisions that are made tend to serve just that select few. Different sets of rules for different sets of people. This is what we have now!
75. The high school absolutely needs a cafeteria. It's sad to see high school kids walk down to grade school every day for lunch.
76. Main street needs to be cleaned up. The streets are dirty, sidewalks not swept. Some bldgs need to be cleaned, windows are dirty, some should be torn down. I liked the local paper giving a pat to yards that were cleaned up. An incentive to others! What happened to amide? The flower barrels are an added bonus in the summer. Keep the hospital & nursing home open. The school system spends far too much money on sports!! What's wrong with an intramural program - too many out of town trips. And too many coaches!

77. Everyone having opportunity for "cut to the chase" feedback to community needs questions makes this survey better than the census. Good go! City Council! Grow the city with safety, services, and funding utilizing all energies available. Youth court, community service hours, RSVP, HRDC, non-profits, and fundraisers inclusive of community sprucing and grooming would soften the "nothing to do here" chats. "Ownership" of local amenities could easily result. Potential residents will appreciate the welcoming surroundings and positive citizen involvement. Many concessions were given mine scouting and potential (can't read) offers. Okay Roundup's willing to go the second mile to stimulate local economy. Does light manufacturing, phone order answering services for U.S. businesses i.e.. TV ads, coupon redemption center, or wagon train cattle drive, exercise center, bed and breakfast spiced by bowling and golf venues have a glimmer for community? Thanks for your time to better our community.
78. Dear Sir,
- I would love to help by completing this survey but I don't want to be a negative to the percentages of people's opinions counted. Due to the fact that I have only lived here for 4 months, I am not & have not obtained enough familiarity or knowledge of this community. I apologize for not being able to help you with this survey at this time. I do endeavor however to be an asset to the town in which I live and hopefully would be able to assist you in the future.
79. The biggest improvement that is needed to Roundup is to have more businesses open up & stay in business for a long time. This way people can work in Roundup instead of having to travel.
80. Our new outdoor pool is a great addition to the community but only a few months of use. We need an indoor pool for all year and all age groups. We need to make sure our local medical clinic and hospital stay in business. It is such a community asset. Main street has to be improved. More people would stop and eat or spend money if it did not look so sad.
81. Get us some decent water. Forget that ultra dream and either drill wells or a treatment plant. All in all I don't have a lot of complaints; just what you find in the survey. Thank You.
82. Only two things I can think of; the water and higher wages for public systems. If you don't mind the drive, you can get hired in Billings for twice the salary without experience than most public safety officials make in this county.
83. The most important to me is our water condition. It's terrible to have to pay a water bill and still buy water for cooking and drinking.
84. 1. Fix the water!!!. 2. Improvement of looks for the town, especially Main St. Buildings (Can't read), sidewalks. 3. Encouraging new business to fill the empty stores
85. I do not like the city's policy of changing a set monthly charge for sewer water & garbage for houses unoccupied due to their owners being forced by poor health to move to assisted living or nursing homes. In some cases such as heating with boilers, the water cannot be turned off. A small charge for water would be acceptable - sewer & garbage charges are not. These folks are being forced to pay for the services they aren't using. The upgrading of the swimming pool was the best city improvement in years. We need more motivated realtors. We need a better public perception of our medical community. Main Street is extremely depressing. Somehow we need to get it cleaned up and businesses to return. I long for the main street of the 50's and early 60's. We did this to ourselves however. The road to Billings got much better. Senior health, home care, and assisted care (including hospice) needs to be accessed & improved. Schools in roundup have always been stellar . . . until recently. A feeling of apathy is arising - especially in the high school. I feel this is largely due to the loss of the local families, ranchers, miners, and business people. This is more of a societal issue and I am not sure how it can be turned around.

86. Need stuff for teenagers to do to lower crime throughout the youth. We need sidewalks to make it safer for children to walk around. The police force is targeted towards new coming residents & teenagers.
87. I would like to see some side streets being paved and some kind of snow removal on side streets. Definitely would like to be able to drink the water I am being overcharged for.
88. My main focus concerns are infrastructure needs for the city. Good water is number one on my list. But, before we can have H2O we need to improve our delivery system, i.e. replacing outdated water pipes. Streets and sidewalks need to be replaced and should be done as old H2O infrastructure is replaced. Again, before streets, sidewalks and gutters can be dealt with, proper storm drainage must be addressed. Not very sexy requests but essential. I know that Roundup desires revitalized housing and businesses but infrastructure must come first. Our biggest problem with funding lies with income levels and tax structure. Businesses struggle because of disposable income. Our future I believe relies upon local natural resources and development (coal). Hopefully it will provide more jobs & tax paying citizens. The only "pet" project that I would like to see is a community center. This facility would be geared toward providing citizens in Musselshell county a place for wedding receptions, dances, birthday/anniversary celebrations, etc. I would take a lot of pressure off of our current comm. center/gym which the school dist maintains. Just an idea. Hopefully this stream of consciousness will provide some ideas. Thank you.
89. We have too much law enforcement for a small town. More drug busts, there's way too much drug around here. When they bust them give them a pat on the hand and let them go.
90. Major Issue - Water. City streets are bad - one in from of our house has been dug up for water problems and not properly repaired. We were to have a nice big Pamida store and what happened to that idea? A grocery store owner didn't want it coming in (a council member)!!! Another council member thought it would heist his water supply!!! Bull!!!! We need a place with reasonable prices for family clothing, shoes and everyday needs.
91. We need a program to reduce the deer population in order to improve cleanliness and gardening. Improve the medical situation by encouraging medical personnel to remain at the clinic. The hospital needs to be financially stabilized or revamped.
92. Water that is drinkable. I pay 2xs for water, 1x for Drinking and 1x To have in the house
93. Enforce all decay ordinances. This will require cooperation between city and count--please! City-wide cleanup--free disposal offered--city and county--please. Downtown owners responsible for repair of buildings, sidewalk cleaning, etc. Trailer and commercial truck parking not allowed on residential streets. Property needs to be painted and inhabitable--or destroyed. Deer is a problem--addressed by Fish and Game? Do residents need to sign a petition? Folks can't enjoy their lawns for stepping in deer droppings (destroy small streets and plant). The above will improve property value--need not cost the city any money--and will make Roundup a more desirable community to line in!
94. We are planning to move this summer because there is no work here. Maybe to a different state. Many people are going to move out of Roundup. They cannot make it. Low wages if you can get a job or the drive over 100 miles in the winter on ice and snow road just to make \$8.00 an hour. Tell me how we can make it on that. Lots of people don't want Roundup to grow but if it don't it will die out.

95. Clean Roundup streets up by removing abandon vehicles, boats, campers, trailers etc... Boats, campers, and trailers should not be allowed to be parked on city streets more than a couple of days at a time. Roundup water pipes need to be updated. There are way to many water breaks in town. Alley ways have way to much garbage in them. For example old refrigerators, broken down cars, trash thrown everywhere. Holes in alleys need to be fixed. Old garages that are ugly and about to fall down need to be removed. Dogs should be kept in fenced yards or on a tie out. My neighbor lets his pit bull run around the neighborhood and thinks nothing about it. Gun control within city limits. My neighbor shots cats or dogs that come into his yard. He does not have a fenced yard. This is the same neighbor that lets his pit bill run around the neighborhood. Roundup needs medical staff that last more than 6 months at a time. What is wrong with Roundup Memorial? The people of Roundup need to know the truth.
96. There is no place for a new business on main street. Those old buildings are so poorly insulated and run down that too much money would have to be put into them for a small business to make it. Also, people who currently own building on main street should not be allowed to keep them vacant indefinitely. Main street should be the business hub of the city, and new businesses should not have to build new buildings off of main street. Schools and recreational opportunity for Roundup's youth should also be a priority in an effort to decrease the drug and alcohol use in our community. There is very little childcare in Roundup and adequately supervised "things to do" are lacking family oriented businesses and services are needed (i.e. a true community center, a descent park, a rink, an aquarium; anything that families can do together. Our community health care also needs to be maintained; including mental health and chemical dependency services. New, up-dated, adequate housing is also a huge need, but I don't want to see all of the rundown houses just left standing until they fall into a pile of rubble. The homes that are no longer habitable should be removed and new homes built on those existing lots. Keep the free swimming pool and update the park too.
97. Water quality, natural gas, Elementary school, more hunting access
98. Fix the water. Would like to see smaller businesses that cater to some type of manufacturing. Would like to see people for some things instead of always giving excuses why it won't or can't work. We have to get out of our ruts. It's hard and dangerous but we will never know until we try
99. Problem list: Drug problems esp. with young folks, unemployment, lack of entertainment, infrastructure problems, run-down and abandoned homes and buildings, streets and sidewalks in need of maintenance, poor water system. Police Problems, inexperienced officers, inconsistent enforcement of laws, poor traffic control, speeding, running stop signs. Medical facilities in need of updating, physician recruitment and retention problems
100. I would like to see Pamida in a larger building where they could have an expanded selection of items clothing etc. I would like to see the medical marijuana issue treated with fairness and respect. Like any other business. I don't think the excuse of the drug and alcohol use is valid. I don't see the bars and liquor stores being shut down because some people have alcohol use problems. Let's keep business here instead of giving people another reason to go elsewhere for their shopping. I would like to see the laws enforced concerning junk cars etc. I would also like to see the ban on chickens to the lifted. Seattle allows 3 chickens and we can have none. Not sensible in this time of basic need especially. I appreciate and commend all those that put in so much time and effort to make out city what it is. It is a great place to live with adequate programs and facilities.
101. Best thing to do is get rid of the Monty Sealey, Bill Edwards, and Gary Thomas. If they don't get their way, it don't get done!

102. Community need quality community center not school involved with good dance area, easy access rest rooms, good food prep area or kitchens large enough to promote community activities. Stop wasting money on existing community center school first community, second approach. Charge for swimming or establish family fee. Roundup has a very high percent population not working not looking for work promoting "B" town they have the funds for fair, concerts, gaming but do not own property or pay bills in community. Pal city street and sidewalk replacement one year in advance not patch and repair plan with water line sewer replacements.
103. I cannot answer all because I just moved here in October 2009. I came here from El Dorado County Lake Tahoe California, and for the Road Dept. I worked for 25 years. In Lake Tahoe the people paid \$50 a drive way so they could have all the streets plowed. Maybe that's something the city could do to help pay for snow removal. I am now retired and live on 1024 3rd St E and if the city would plow the streets I would like a part time job plowing snow. I like Roundup and think it is a great place to live
104. Communication would help tremendously. The general public is not informed as to what is going on in the public and all sectors. If there was a fast easy way for business, agencies, charitable groups, nonprofits, recreational groups and individuals to communicate, it may inspire more people, therefore more progressive and make positive changes and growth. The best way this day and age would probably be a fast, easy, up to date web page, with a full time employee. Need to continue to work on community decay. The city and county need interactive web pages and post minuets, etc so citizens know what is going on and can participate.
105. I would like to see businesses on Main St, but there again many problems, very few are up to code on wiring, plumbing, heating. A lot of them are homes for pigeons lot of cleanup work. Run down houses that are uninhabitable by humans should be condemned and torn down, the lots, then cold be put up for sale either modular's or new homes could be put on them. Some are so deteriorated, there just sores, all they house are Ferrell cats and other ornaments, skunks, raccoons, etc. The water is not a very good point on buying property since everyone has to buy drinking water, water softeners replaced water heaters. Nothing last long with this water. I really don't think this Utica water will come about in my lifetime. As far as I know there never has been snow removal or any of the side streets. Only reason Main St is done, is the state doesn't. Street cleaning seems like its done more on the west side then the east side. Why, no idea I've had leaves sit off the curb for over a year. Why build more housing when 1/2 of the houses are empty homes on the range are not filled. Do we need more empty housing?
106. I would like to see the city work together with the school to come up with a way to finance a new community center. This community desperately needs a way to keep kids active and away from drugs and alcohol. A community center would give kids to opportunity to socialize in an environment free of peer pressure, while giving them the chance to be physically active. A community center might also give adults to ability to become active and improve their quality of life. The water is terrible too!
107. Enforce clean up of parked old vehicles on street even if they own business. They are terrible eye sore for Roundup. Clean up and cover broken windows on main street. Finish walking path at River. Improve chamber of Commerce and use them for tourism. Developed county and city plan and coordinate efforts.
108. Potholes that never get repaired. Snow removal excellent on main street. None on side streets, ice stays all spring, side walks are not safe after dark. Speeders on streets near schools and everywhere. Junky yards and weeds not kept cut. Fire hazards. Drugs in schools, very scary especially for the younger ones going to upper grades
109. Improve water quality and processing. Enforce junk vehicle ordinances and enforce clean up of abandoned properties. Consider enforcement of tearing down old building that should be condemned. Develop the inner city before moving out to the west end. Improve city streets,

sidewalks and gutters.

110. Need curbs, gutters, repair alleys, fill up empty buildings

111. My first issue is with the city workers, managers, and maintenance. Why would anyone patch a pothole while the road is wet? Is that not a waste of time and material? I have traveled the roads and see this being done and within a few days the patch is gone, the hole is twice as big as it was before. This is a waste of time, material and frankly my tax dollars. The water/sewer mains are extremely poor I would even venture to say archaic. When the oil field were booming the income generated from them was going to be used to fix and update the water/sewer system, but that didn't happen. Now, it's the income that will be generated from the coal mine will be used to fix the water/sewer system. Enough already! I truly believe that because of the lack of maintenance on these systems it is going to be a bigger job than the city can handle. When we had heavy rainfall this last fall all the water comes from the west side of town and floods the storm drains and basements of the east side. The force of the water is so great that they run around and check the manhole covers. That to me says there is a big problem. We've had at least four water pipes break. Three on the west side and one on the east side of highway 12. At least one of those affected the elementary school. I was shocked that there were no calls, no letters sent home or anything letting the parents know what was going on. There was an article in the local paper, but do you think that everyone buys the local paper? Besides that it comes out once a week. I know as a parent that I would not have sent my child to school knowing that there was no water available. I feel that it was irresponsible of the superintendent and principal to subject our kids and those working at the school to that kind of situation.

The law enforcement is a joke. If you know the right people then you can get away with a lot. The drugs that are available here are nothing to over look. The people dealing and buying are no strangers to the law enforcement of this town. But how many of them actually get arrested or go to jail? I truly feel that in order to get out town back we need to contract with Yellowstone county, for our law enforcement needs.

Lets face it the schools are sub-par for educational purposes. The elementary school is really to small and inadequate for a good learning environment. The high school needs some serious help. The schools should both have a cafeteria, the elementary should be able to have band proactive, music, and choir all without leaving the school. The class rooms are congested, the ventilation is horrible, the space is just inadequate plain and simple.

There are a lot of abandoned buildings/houses that for whatever reason the owners are not made to maintain them and so they have become eye sores. If the owner is not willing to step up and take care of the dwelling then I think that they deserve to be fined for the cost that would be incurred for tearing down the building, house and maintaining the lot. If the owner does not pay the costs then the city can sell the property to recover the costs incurred. We need to show that we have pride in our town and how it looks. We cannot bring in business or expect them to come here with the way we look. there is real potential for roundup. We are on a main highway that so many people use and here we are letting all of that potential go down the drain!

I think this town needs to really work on providing places for kids to play basketball, baseball, volleyball, badminton, etc. We really need to have more grassy areas and maintained areas where you would feel safe letting your children play. The elementary school and the city park are really the only two places that they can go during the summer and I wouldn't want my children going to the school playground with all the broken bottles and garbage that is there. The city park isn't much better, the equipment safety is questionable the volleyball area (biggest litter box in town) has glass and who knows what else. I just feel that our kids and town deserve a place where they can do everything without having to go from one side of town to the other. In other words a true "City Park".

A lot of people in this community go to Billings to shop. I can't blame them either. When you are trying to live on a fixed income or just want more for your money, if you can go to Billings you do. The quality of food, choices, everything is better. When I have to look at every expiration date on every item I pick up at the grocery store and it costs me twice what I would pay in Billings why would I want to shop at the local stores? I have noticed that I shop less at one particular grocery store in town just because the customer service it has really gone downhill in recent years.

Public parking on main street is better here than in other towns, but I wouldn't advise parking on main in the winter. It's just a bad idea in general.

As a parent of school age kids I think that having one parent working in town would be a good thing especially for if something happened while your child was at school.. I know that this will likely not be possible because there are very few businesses who pay more than minimum wage and let's face it there's no business incentives that would bring a business here.

There are many homes in town that are not to code. there are homes without ventilation in the crawlspaces, or need more work done to fix them then is possible for the owner to come up with, or costs more than demolition and rebuilding.

Roundup really needs to address the sidewalks in town. there are some that are 12+ inches higher than the road and some that are crumbling or so mangled that it is really a hazard for anyone to walk on. Homeowners need to keep the bushes and trees limbs from blocking or interfering with the use of sidewalk and don't block the sidewalk with your vehicle. Just like you don't want someone blocking your driveway, don't block the sidewalk

My last comment is on wheelchair accessibility and safety of our seniors. Very few places in town are wheelchair accessible. this is a real concern especially where the seniors and handicap go to have their meals. I think we all know the basement of the Museum is inadequate for this function. There is no way if something happened that they could get everyone out safely. The windows are not functioning windows and it is a huge liability issue.

I know that this is a lot to hear and just writing comments for this survey was overwhelming, but I see this as a chance to make Roundup a better place to live and to see it thrive as a community that I think we would all be proud to call home.

112. Where are the children going to work?

113. I think Roundup needs to try and bring in entertainment industry for families and a retail store that would sell clothing and items of interest to all people or families. We also need more than 1 drive in to eat at. So that we can have a choice to eat at a drive in.

114. I am against paying school tax as I have not had any children in the school system for years. All the people that keep having kids and drawing welfare and food stamps should have to go to work and pay for their own kids to eat, go to school and generally grow up. The police dept does not enforce speed limits through town. If you file a complaint (like barking dogs or owning too many dogs). They talk to the owners and never follow up. Mostly they just sit on their dead butts and draw a check. If and when the city does any improvement on the water system it is always in the downtown area. The trailer across the street burned down over 2 years ago and when they finally got the fire hydrant open after (about 30 minutes). My water is my house was black tar about 2 days. They never flush the system and the pipes are corroded horribly. They raise water rates last year and we have seen no improvement in the system.

115. I enjoy living in Roundup, but the lack of entertainment makes for not much to do. The lack of jobs and low pay make living difficult, my children don't have much to do either. Fixing the indoor pool or opening a video arcade would be nice. I spend more time in Billing trying to entertain my children. The youth center is nice, but you must be a certain age to go there so it eliminates most young children. Roundup needs to work to make more to do for kids, or we will have to work on solving crimes and violence. The city should worry about fixing the drinking water and stop worrying about people growing marijuana. Alcohol is more dangerous than weed. Tests have proved this.
116. There is a great need to improve the water system. This survey should ask how much you spend on water each month over and above the city water for drinking, cooking, etc. I am sure it more than one would pay for the regional water system. There should be a focus of attention on the indoor swimming pool. When it was last opened, it was used by every age group 9 months of the year. It would be a recreational tool to advertise the progressiveness of the community when you try to attract new businesses and residents to the city.
117. I love Roundup MT. I moved here in 2001 with my wife Judy. Long story short, my wife was struck with cancer and died July 19, 2008. Someone drove through the cemetery with a car so the cemetery decided the gates would be locked, forever I guess. I appeared before the County Commissioner to request the gates be reopened. They gave me Fir, Sat, Sun, and Mon. I have lived in many places in my life. I have never seen a cemetery locked. I go to the commentary every day. I used to walk in until my hip went bad. My request is that the cemetery gates be opened 365 days a year. Thanks very much.
118. Unfortunately there's no magical overnight fix. And unfortunately we don't have more community involvement. If we would get more people involved there could be more of these suggestions, made possible. Too bad we didn't have something we were "known" for. Then we could expand on it and base functions etc on it. For example, huckleberries, then have a "Huckleberry" fair ok cheesy I know. Maybe a catfish derby. I also heard an idea of an old country fair, pie baking, jeans, jellies, chili cook off etc. Also we attended the lantern tour? During the fall, hosted by the museum, my entire family really enjoyed it. It would be great to expand on great idea, how more advertisement more involvement. Expand on it. Baked goods or more things to associated with it.
- We also need more business and ones that will stay.
- Better water, we hate paying for the water and having to rent an RO system, buy salt every month, rent a water cooler, and buy water to drink cook with.
- City Park improvements are great, pool park/picnic area, bathrooms and the ball field, concessions are nice. Would be nice to expand renovate and the fairgrounds. 4th of July events are great nice jobs to that committee.
119. I believe if the city had good water and decent distribution system more people and industry would be willing to move here.
120. Water - marked average - plentiful - not drinkable. Look into the possibility of putting up a community center for all citizens to use.
121. I wish something could be done to encourage more recycling to reduce our garbage problem. Even if we would all take a minute to smash cans and plastic bottles. So many sidewalks are in absolutely deplorable condition. They are really a danger to use.
122. R.I.D.E. is excluding the poor in our community with outrageous admission pricing and they are driving away tourists by not having the 4th of July Rodeo. We drove the bump-n-run out of town with ridiculous stipulations. We need to try and bring it back. We need more competent

business owners. There are way too many meth labs in town and I don't see how the police force can honestly be that blind. The playground in the city park needs more toddler play areas. Please fix the sidewalks. Please give us better water.

123. The charges that are made for the POOR QUALITY water are totally not acceptable! After watering your lawn you must spend a great deal of money to clean the stains from your structures and fixtures. This is not only inconvenient and time consuming. It is not fair that we pay these high fees for such a poor product! More needs to be done to stop the drug abuse in town. As a parent it is a great concern allowing my children to walk to different school functions knowing they could be approached and propositioned by one of the many drug using citizens of our town. The schools need to offer more sports opportunities to the older elementary school students so that they are learning and implementing learned skills earlier in order to perform better and as a team when they enter high school sports. Doing this may enable us to have more successful varsity teams.
124. A better police department that is willing to do drug busts and fight crime such as burglaries, spousal abuse, and any other big crimes that are going on. If the police we have now aren't trained adequately, then they need it to be going to schools that will train them and be more specialized so they won't screw up investigations. Clear intersections in the winter to allow better drainage when snow melts. Now most intersections are froze over with Huge ruts that it makes it very difficult to cross the ruts.
125. Detention facilities for juvenile offenders. Better enforcement equal justice for all. Task force for drug enforcement. Youth drug use and crime is out of control. We need help! Drug programs for pre-teens and teens activities supported at roundup youth center. i.e. grant money for purchase and construction. Single parent support. Domestic abuse & I know we have suicide support. Saves but they can only do so much. Children who are lacking nutritionally, clothing wise, activities care, love, etc. Not up to standards. It is quite apparent that way too many people here live a marginal existence! We need people to put their time, money, and energy in to giving these people a hand up not just handouts.
126. I am glad that we have a new swimming pool for our community. But the funding of it should not have had to all come from private donations. The county and city should have been a bigger player.
127. I would like to be able to have a job here not 50 miles away. Be able to make the wage I make without the cost of commuting. I would love to do my shopping here and only go to Billings for super special occasions. I would truly love to have my home in tip top shape without Roundup water destroying it!!! Best of all I would love to say I live in Roundup without people who think, oh that poor person. That town is dying and will never be anything. I just want a nice country town that is inviting to its residents and passerby (not I'm from Roundup).
128. More jobs. Put some money into our city park, it is old, outdated equipment - pathetic! Put more effort into something for our kids & teens to do - they will get into less trouble & maybe more families will be willing to move here instead of leave!!
129. The city of Roundup should take all funding for sheriff office away. These funds could then be used to elect a city policeman with all remaining funds going to repairs to the city infrastructure. By doing this, the sheriff officers could do more highway patrol work as they now do! A city police officer might get a handle on the drug problem in the city. 1) Also let the city police ticket (can't read) and collect the fee. This could go toward his wage. 2) Fine for stray dogs and cats and let the police write the ticket and this money could also go to his salary. 3) Fine people for buildings and yard decay. Put (can't read) in the ordinance and make it responsible for all citizens. 4) Stop selling fireworks in the city limits.

130. The buildings down town need a beautification project – [*can't read*], Pappaet, Leucas, Café 101, Bull Sessions, etc. It would be nice to get C-lanes up and running again. Consider a movie theatre. There are too many bars/casinos/churches for the size of the town. The water is horrible. I know this will be an ongoing issue but good water would be nice. It's nice to see FFA in the school system and the school - to - work program. However, drug awareness campaigns are needed and the kids need more to do. Ems & fire do a great job. The MCSO is underrated. Sidewalks on the north end of main need attention. The hospital needs a medical staff that is committed to the community. The doctors don't live here and patients have no continuity of care. My husband and I shop locally for everything that is available here. We drive Fords so we did not purchase our vehicles here - but we maintain them here. We buy our groceries here, get our medical care here, and for the most part enjoy it here.
131. I am sure you are doing the best job you can possibly be doing. Thanks
132. Larger public library. Sewer & water. Streets. Underground wiring.
133. I would like to see a fast acting traffic light on Main Street & enforcement of pedestrian right of way.
134. The water system is terrible (what happened to the wells was suppose to bring good water to Roundup and other small towns around here). They dogs are much better now but it needs to improve some more. The weeds need to be addressed. Owners of dogs need to clean up after their dogs and not let them go on everyone's lawns & gardens. It's awful to not be able to walk on your own lawn without dog poop on it, & cats.
135. The two main issues affecting Roundup is water quality, especially when considering the price of it. And, law enforcement which is a joke & very unprofessional. The attitude of a majority of the business owners is what ahs caused most of the businesses to close. Customers will not patronize businesses who have services. Roundup government has sought to maintain a high level of law - no income families there by decreasing the median income of the community then wondered why business don't open or stay open. Roundup should look to raising the income thereby offering opportunities for businesses to flourish instead of exporting the money to Billings. The vast majority of the money in Roundup is not made here nor is spent here. Law enforcement here is also pathetic. This is the most inept, unprofessional group. The appearance of favoritism & selective law enforcement leads most to believe that it is beyond corrupt. Roundup would be well served to get out of the current arrangement with the county. Install a police dept. that is above reproach. Avoid nepotism at all cost and raising the public opinion would be a priority.
136. Being close to Billings is definitely a tough pill to swallow and that cannot be changed. The type of low class people that seem to flock to Roundup is also hurting Roundup. The state, local, and federal government needs to cut a lot of the so called welfare programs. Heating assistance, rental assistance, etc. These people do not have to pay for anything themselves. They have figured out the system and it needs to be changed and changed in a hurry. This small community is like a safe haven for single mothers with illegitimate children. The whole system needs to be cut and scrutinized very carefully. There is no such thing as a work ethic, just go sign up for all the free programs.
137. Water Quality!!! The water ends up costing everybody money. Appliances, pipes, etc., deteriorate due to our poor quality of water. Also propane is way too expensive. I would like to see the option of gas. I don't know if there is gas resources around here, but bring in some competition so they can't rob us to heat our homes in the winter!
138. I think the City of Roundup should use money more wisely for instance, instead of buying a new

fire truck that will never be used, put it into the City park or something useful!!!

139. Need to get rid of the deer in town. They ruin all your flowers and trees. Water needs to be the #1 priority.
140. I live in Roundup because I choose to live here. I love this town and have enjoyed raising my kids here. The only issues I have are water quality and pressure. I cannot take a shower if someone else is washing dishes or doing laundry. The money we pay for water is very high for what conditions we have to endure concerning water quality. Thanks.
141. Two "recent improvements that went well" are: 1.) the renovated outdoor swimming pool; 2.) the River Walk Trail. Both were initiatives that emerged not from the public sector (city or county governments), although the public sector was involved in both because it owns both, nor do they emerge from the private-for-profit sector (businesses, banking), although donations did come from this sector. They arose from the private-non-profit sector. "Neighbors for a New Pool" and the Roundup Arts & Culture Committee, respectively raised funds for these projects. Both are part of the local Musselshell Valley Community Foundation. This may suggest that innovation tends to arise out of the non-profit realm of our existence and be supported by the public realm, and possibly expanded upon within the for-profit realm. What are Roundup's advantages? Beautiful natural setting - not spectacular (like Red Lodge), but attractive. Except for the water system, decent infrastructure, which includes everything from streets to schools. Disadvantages that could be turned into advantages? Lots of vacant buildings, both business and residential. Relatively low-priced buildings and (even) land, which could attract creative people of modest means who have the energy to rehabilitate what is here, underused resources into valuable resources. Who might these people be? Artists and crafts person - in the broadest sense. Small farmers aiming to grow local foods. People willing to work with the aging local population to meet their needs (home health care, weatherization, etc.) People seeking to develop an "eco-tourism" aspect of the local economy. How do we attract such people? First, decide we want to. Then find the innovators among us to make it happen. 3.) Water Quality is poor. Water system at least delivers adequate amounts. The need to reduce solid waste by effective reuse and recycle programs. 10.) Training needed for jobs of the future: renewable energy, energy conservation, smaller scale farming, various forms of system maintenance, information technology. A 1-to-5 scale would be more realistic. Yes-No is too stark (black and white). 26.) Middle Age and Senior Citizens - An indoor swimming pool would hugely enhance quality of life for these age groups. 35.) Beautification/cleanup campaign - There are far more pressing needs than this. 39.) Appearance of downtown businesses - It's not the appearance, it's the reality: an actual business there. 41.) Downtown parking adequate - Yes, for the moment. 47.) New industry - No. Too focused on large scale, ignoring myriad of small scale opportunities. 48.0 Support additional business development - No. Create infrastructure that enhances quality of life and the businesses will develop on their own.
142. #1. The water issue needs to be resolved! I have never seen or smelled such disgusting water and have no idea how it can even be safe or supposedly pass the test it has to be legal to charge for it!
- #2. The cost of the disgusting water is outrageous seeing the only thing you can really do is shower (which you still don't feel clean when done) and wash dark colored clothing.
- #3. Put in a child's park or child friendly equipment in the existing park.
- #4. Stop watering the park in the mornings! Do it late at night or in the middle of the night! It's no fun to walk all the way over there and the children can't play without getting muddy or having to jump over HUGE mud puddles to on the equipment! Huge disappointment.
143. I am pleased with the walking path and improvement - a welcome addition. I hate, absolutely

hate having orange clothing and rust stains on water fixtures, tubs, toilets and siding.

144. Water is the obvious issue. I understand we do not get support from law enforcement, but somehow we need to get buildings cleaned up in downtown. Possibly we should see how many building on Main Street are structurally sound. Start a program in which we help pay for taking some buildings down and create some parking.
145. I think the roads and sidewalks need repair, along with water pipes. Would be nice to have natural gas available. I think we need more recreational areas for all ages. I do like how peaceful the town is. That's why we are here.
146. I am sad that all grant monies obtained to improve our town are "always" devoted to certain businesses or individuals. There is great concern about community decay, but the majority of people living in Roundup cannot afford a "Great Cleanup!" Why can't grant funds be used to decently trim the trees in town? Let's get sidewalks installed so we can walk and not fall down. The streets are a mess! I agree with community beautification, but our city officials demand too much from the citizens. In the seven years I have been back home in Roundup, I've seen the officials do nothing to help the homeowners, such as trimming trees, replacing sidewalks or moving weeds and lawns. Please lead by example! We have so many elderly who are low income and unable to clean their own yard. Unfortunately, families and neighbors choose to overlook these elderly individuals rather than help. Now, if they can't clean their yard, the city will do it and add the fee to the homeowner's taxes. Another note: It is wonderful that Roundup has a senior center. It is a disgrace that it's in a basement where there are fire and safety concerns. Whenever the subject of building or finding a building for a new senior center is brought up, the decision is always "No!" This decision is not just based on necessary funds to obtain a senior center, but also that the rent that the senior center pays to the museum is necessary to keep the museum open. Our seniors' needs should not hinge on the museum's needs. I would like to see a community center building built to house a senior center and also be rented for weddings or community e4vents. This building could also be used for entertainment events for our teens. Another concern is our fairgrounds. The Old Timer's Rodeo used to be a grand event and the highlight of Roundup's 4th of July. While RIDE has be4en making this holiday a success, many people miss the Rodeo. Our fairgrounds are pretty nice and have a lot to offer. We have been attracting more events over the last few years, but I would like to see Roundup promote itself and bring in more tourists. Why can't we remember Roundup's roots and work to bring people to us? We need to be proactive and think positively to generate money for our community. It takes money to improve Roundup and the outlook of our town.
147. When did the sheriff become part of the highway patrol? And should they be in town more and out in the county and stay off the highway.
148. I like the improvements that are being done to the schools to get the most out of the old building. I think the County needs to start planning for building a new school to replace the elementary school. Stared street repair on 4th, let's see it continue and get the streets in town all paved as well.

APPENDIX A: COMMENTS FROM SPECIFIC SURVEY QUESTIONS

4. What do you like best about living in this area?

Summer.
Climate.
Small town.
Small, but not too small.
Quiet, calm, relatively safe.
Quiet!!!
Everything.
Small town friendly.
Small town living, but close to larger shopping and doctors, hospitals.
Small town, beautiful country, my church.
I love a small town where people care about each other.
Small town safe
peaceful
small town living
it is relatively crime free and close to a city (for entertainment and/or hospital service)
Pretty good people
small city and people
it used to have good schools
small town, relative quiet
less crime
normally quiet, easy access to stores
family
nature, people, freedom
my home is here- my job is here. The Roundup community has been very good to my family
small town - friendly people
school - people
small town
location - Bull mountains Musselshell River Valley
small town community, not too many Californians, space & personal freedom
Schools - job - friends
smaller population - but closer to big city, friendly safe
No crowds
small community
quiet & somewhat safe town
quiet
It is rural & we want people that want to make it upscale to go somewhere else we don't need the crime &
small town living
small community
the ponderosas
small town, low taxes
small community atmosphere
quiet

quiet little town
knowing the people & quiet peaceful
nothing it I did not own my house I would move
small town life
rural area / small town
small friendly
No crowds
It's home
the freedom (please keep it that way) It is clean & friendly. People mind their own business
you can go to the big city and come home from all the hubbub
climate
the people are kind and generous thoughtful good people and nice kids
it is quiet
not to loud
having come here 40 years ago from a large metro area, Roundup is great to know all
The schools are close to where I live and it is very quite neighborhood.
Small town atmosphere, location of town at base of Bull mts.
rural but still close to Billings
knowing most of your neighbors
great friendly community
The light space and landscape
nothing really, my home is paid for that is what keeping me here
In the mountain and country but still clot to city (Billings)
the people
it's my home, lived here all my life
location
it's quiet except for drugs
the scenery
small community
small town life
the quiet community, the majority of people
good, we have all things that we need in town all but clothes
peacefulness
small community, friendly neighborhood, good school system
Like small town living - plus close to Billings
Open
Quiet, clean
Living close to family & knowing neighbors
Close to family & friends
Small, friendly community
Good people, small town, close to Billings, great western wear store, two very nice flower shops
Sense of community
Peace and quiet
Its quaint quietness

My size town
Small town living but close to city services and entertainment
Relatively safe center environment, friendly town, proximity to Billings
Open range and mountains
Excellent location
Small community atmosphere, low crime rate
Small town living
Small town, you know your neighbors, pretty good schools, close to large cities
No traffic
Small towns
Small town atmosphere
Small town
Less crime, able to ride bike on road
The wide space, landscape, wildlife, small town
Quiet, peaceful, friendly
Minimal traffic, privacy, friendliness of residents
Small town America, less violent crime
It's a small town
The school system, grade school
Small town atmosphere
Many opportunities exist to serve fellow citizens increasing the desirability of this community. People
I've lived ere 79 years I like my family & friends
The friendly people & small town; love it!
It is a wonderful place to raise children
People
After 5 years I'm not sure anymore.
People and small town atmosphere
Fewer people and quiet
All Ok
Sense of community - affordable place to live
Close to Billings, quiet community, small community
Small town living
Rural location, less populated
Family, friends, school system, relatively low taxes
Accessibility to various activities indoor and outdoor
Location
Minimal crime, wildlife
Individual people care for each other, landscape
Good friends
Small town living
Small town
School, mostly quiet neighborhoods except dogs
Small community, quiet neighborhoods
Few people, but all basic services.

I feel safe
friendly, walking path, feeling safe
don't like this town and most of the people in it. I did when I moved here it just going to heck
the small community relationships
small community w/ opportunities to know your neighbor. The trees in the spring
0
climate and scenery
not so crowded
small size friendliness, availability of groceries
quiet small town atmosphere
nice community but very poor management
the people
location
quiet small town
Sonny, River walk, small town atmosphere
The community is great
Friendly people
people
because it is a small town, don't do large populations
small town atmosphere, friendly people, access to Billings
small town within reasonable distance from metro area
home town
Rural life, quality
own my home
hunting opportunities, weather, small town atmosphere, access to Billings
cost of living
crime rate is low and you can feel safe in your home
like to small town community and friendly people
nice community
small town
Rural area, with benefits of Billings
the people
small town to raise kids
It's home
It's quiet
Location
Not a lot of people
Small - slower place
Small town feel
Smaller school system, good people & neighbors, small town setting yet close to Billings
Small town atmosphere
People, church, cost
No congestion - friendly people
Having our privacy and peace and quiet

Availability of good basic services & shopping. Safety & comfort of small town life.	
Small community	
Quite low crime	
Small town. Close to Billings. Grocery store, banks, doctor available.	
Quiet	
Small town, no traffic	
Simple living	
Small town	
Excellent schools	
Small town living	
This is my home and it's a small town which I wouldn't live any other place	
Rural area close enough to Billings	
Rural living, airport, golf course, good weather, close to Billings	
low crime, small town, friendly	
small community	
The mountains. Lots of places to go for scenic runs.	
It's a quiet community, not a lot of crime yet!!	
The people.	
Clean air - small town close to city - climate.	
Small town.	
It is a great place to raise kids. We have an excellent school system.	
Rural setting.	
Access to nature.	
Nothing really, since we moved here it's just not a small town feel here.	
No traffic/congestion.	
Size, area, people.	
Small community setting.	
The people care.	
Proximity to Billings, small town, neighbors know and care for each other.	
Small town, family, atmosphere.	
Small town where our family and friends live.	
Not many people.	
It is friendly.	
Small town.	
5. What do you like least about living in this area?	
Winter.	
Cliquish natives.	
City water.	
No jobs, no recreation other than running and bars.	
The water.	
The quality of the water not fit to drink and we still have to pay for it.	
Nothing.	

The water conditions.
Wish the streets were better maintained (pot holes, etc.). Better drinking water.
drugs and alcohol, water quality.
I really enjoyed living on a ranch 10 minutes from Roundup! I miss the ranch animals and other things.
economy
drugs
all the welfare people moving here because it is easy to get
the fact that doctors keep leaving the hospital
the water
crime is on the increase
poor shopping not enough business lack of exercise areas (indoors)
highway running through middle of town
No Stores
I live in the middle of (the rest is unreadable)
can't drink water, nothing for our children to do
To many welfare people, water too rusty, mosquitoes, biting flies
The poor water quality
nothing for kids to do - a good place for men & women to workout
abandoned vehicles & junk
Decay, lack of athletics & preservation of history - lack of imagination & initiative on part of the elected
Our water supply
Water Quality & street quality
Lack of Services
Water
water system
Nothing to do for entertainment and no stores to shop other than grocery, losing athletic teams year
not enough for kids to do
All the hand out people that move in & expect that we owe them
water
not enough retail business
No shopping, deer eating my yard up
it is a small parties place. A ton of run down old crappy houses, business, and properties
lack of bowling alley & lack of community participation in some events
Meth drug dealers
satisfied with living conditions
law enforcement water which is really bad, depressed area, no shopping
no jobs - people are rude, police department, sports in school, school superintendent
cultural opportunities, limited shopping
between city and county officials nothing seems to get done because of bickering
small friendly
depressing appearance - Main St
The lack of entertainment
water
the toxic water that come out of my pipes

poor quality of water
water
Roundup looks like an Indian Reservation (barking dogs, junk etc.)
We're still small but accessible to large city conveniences
I think the water is bad
A lot of town is old and run down. There is no incentive for people to keep their place working nice
Water (poor quality) & run down buildings
Drugs rampant with no one doing anything about it
water service
non progressive, good old boy system
the water it stinks we pay 2 times for it, once home & then to have drinking water
The water is so bad, know one like to move here, business etc.
water cannot drink it or even bathe in it
I can't really say
the water
least thing I like is no pride left in the community, in keeping up housing, school
Too many people who don't bother to work
poor communication
Rusty water, can't drink it
the water
the water is non-potable, absence of businesses
the water and what we paid for all of this and no clothes stores
streets in neighborhoods are not maintained/ plowed by the city
water, high turnover with Dr.'s, poor streets-potholes
Not being able to drink the water
No work
No public help or commitments
Lack of adequate police protection/response, watching low life's skim the system and run off responsible
The water
Not enough jobs
The water
Poor shopping
The overall trashy look of the town. The water.
Quality of H2O
The water
Junky neighborhoods; abandoned main street buildings, lack of new housing
Crime
Poor wages
Very poor water. With whole house filter & water softener, water still poor quality & cannot drink. Need
The water
Can't drink the water, not a whole lot for kids to do
People are cliquish
Too much welfare people
Water

Need more stores
Mountains too far away, hot summers, long distance phone
County roads, miles & miles of dirt road, water in the city, so many dilapidated houses
Extremely poor water & service
Water quality
Nothing to do - places to go but casinos
Taxes are too high
Zero entertainment or family friendly shops
Lack of services like entertainment
Roundup water system is less than great. Water and sewer need to be economically available to more lots all over town. Community exercise/health needs addressed through covered swimming pool,
I don't like all the welfare people who have moved here
The need to treat the water as it isn't drinkable.
There is not a lot of work in Roundup & people here have to Billings or somewhere else
Sad looking Main St
The town has changed, don't know very many people anymore.
Not enough stores - shopping, i.e. clothes
Poor shopping, few restaurants, high water & propane prices
The water
No problems
Depressed Main Street, poor economy
Water, not enough stores and restaurants. Harder to get hunting permission than it used to be
Law enforcement, water system
Water of Roundup
No job opportunities
Water, community decay, employment opportunities
The water isn't very good and having to go elsewhere to lug coal when it should be available from our
Shopping
Lack of activities
Competitive atmosphere about projects, lack of cooperation and information
City water, no access to natural gas
Not much to do, no rodeo, no bump and run no nothing anymore
All the out of staters moving in bring big city problems with them
Places to shop like a Wal-Mart, where you can get everything. What happened to the big Pamida store
Traveling entertainment, high cost of basic essential like food, gas, heating fuel
Water is not drinkable
The inconsistent staffing at the clinic.
That I pay for undrinkable water. I pay for good drinking water extra
decay allowed
No job nothing but bar or churches. Nothing else to do we don't drink
the low life, rude, no nothing people that have moved into the city, and county and they want to change
Lack of community collaboration funding for law enforcement, run-down main street buildings
0
no natural gas and bad water

not as many services as I would like
lack of restaurants, no choice
Poor water, high unemployment, lack of activities for kids (sports, entertainment, movies theaters)
the bad water
water
the water
water quality
the water no snow removal on city streets
City water quality, resistance to change, turf wars
poor water quality and city streets and sidewalks, curbs
No Industry
water
Small town small minds
Water Quality, roads, lack of family activity opportunities
Unavailability of consumer goods
Water quality
water, transient population and junk, people yards
attitude
having water delivered to my home and the {can't read} water
bad drinking water, shopping lack of consistent medical doctors
drugs in the community
nothing to do, not enough jobs, high property taxes
the gate to the cemetery east of town should be open 7 days a week
not enough activities to do family things or things to do on weekend, have to go to Billings for everything
Drugs
Not much to do
There are inconsistencies in the way law is upheld; from the officers up to and including the judge.
Community decay, inadequate shopping, too much drug, alcohol, gambling abuse
The water, drug problems in the community, price gouging at grocery stores
Poor drinking water, not enough retail business for small daily consumer needs.
Not much stores for shopping
Can't think of any thing I dislike
Drug problems, lack of things to do here especially for teens. Law enforcement is lax.
We have to drive 50 miles to get clothing
The quality of water sucks
Taste of the water
No jobs, limited shopping, and most of all the water
The city water, I have to pay for city water and buy drinking water
Water, no entertainment (unless you're a drinker), outdoor activity
a dead town and no one works together
No job market, no retail, no housing
Nothing to do for families or teens, not jobs!
Water
The water

Lack of library, a good library	
Lack of opportunities the big city offers	
I am very disappointed with the way so many residences are maintained. It would be great to see some	
Water, lack of additional employment, streets bad	
Water & weeds on sidewalks	
Water	
Water quality	
The city putting rules on how your property should be and look	
The dumpy vacant places, the seeds	
City water is very poor	
Lack of quality water & it is very expensive, no economic development	
low income area, a lot of sub-standard families and individuals, welfare capital of MT	
The water is <u>horrible</u> - also the streets are very narrow.	
Can't wash clothes, drink or anything with water and there is nothing for kids, not even a decent park.	
Politics.	
Main Street.	
The water is very poor. I live on 1st Street West and I have no water pressure at my house.	
Occasional negative attitudes toward this area by some residents.	
The water, the park, the stuck up people.	
Lack of services/shopping.	
Decay of houses, buildings, yards.	
The small, tight knit clique.	
Poor water.	
Water, school system.	
Lack of jobs and more low income people are moving here making it more difficult to have funds for our	
Too much drugs.	
Limited stores.	
14. Other (please explain)	
Too much now - duplication.	
Physiologist.	
None.	
We don't need a specialty doctor just a couple of doctors that will stay for a while. The turn-over is	
Specialty Physician: Pediatrician; Other: Family Counselors.	
I think Lorelei is great.	
surgery	
I am in good health and so far I have enjoyed all useful facilities	
I don't use the health services too much - I don't really know what else we are in need of	
shrinks - chiropractor and therapy	
orthopedic	
Ortho	
Planned Parenthood	
Keep hospital & nursing home open	

Apartments or more housing so town will grow
Dr. that will stay
G.P. and maternity ward
orthodontist, internal
visiting nurses helps the old people { unable to read the rest}
General practitioners
County health dept.
GP
Counseling
Some not so expensive
Pediatrics
Orthopedic, naturopath
I haven't lived here long enough to know
Mental health physicians
OBGYN
Orthopedics
need for continuity in healthcare, management by are health care could professionals
OBGYN, Ortho, Cardio
General Proc and baby doctor
preventative programs
Dr's who will stay
Pulmonary
primary care physicians that stay for more then one year
OBGYN ,x-ray techs to read x-rays when processed
if hospital and clinic were managed by St V's and Billings Clinic, we could have access to specialty,
Doctors that get along & will stay
Oncologist, heart specialist
Pediatrician
Psychiatrist
A hospital run by a larger more organized hospital.
OB/GYN
less programs would be best, the tax payers are being ripped off because of all the "programs"
Fitness center.
Doctor that will stay.
a.) swimming pool (indoor); b.) Home health care program emphasizing preventive medical approaches.
Fitness center.
Consistent, ongoing physicians.
Stop continuous turnover at clinic and hospital.
OBGyn.
Good family MD.

18. Other

Low Income Programs are good only when it's not for drug peoples and others!

No Opinion

Use existing housing first

Upgraded housing; not more but repaired/rebuilt

condemn and replace junk houses

whatever is in demand

Clean, affordable apt's

A program to rehabilitate existing houses (for low to middle income dwellers.)

23. Other (indicate)

I can take care of my individual needs. I am very happy here preparing my food.

lousy water that you can't drink

low water pressure

wear and tare of 50 some house

I've kept all up so far so good

we take care of needs

building in good shape

flooring

only one source of heat

I keep up my home

most except water, in due to age and are being addressed

always need to be more work done on gravel roads so water will run off

Everything OK

None

Drainage in alley coming into basement

No basement finished with cement

Asbestos in attic

No curbs/gutters or sidewalks at street

Need insulation

Needs new siding and paint

No street

Stucco siding needs repair

need natural gas in Roundup

city needs natural gas

inadequate insulation

dirt basement caving in

garage leaks

Lack of wall insulation

everything adequate - could use upgrade

Bad public water makes watering lawn hard without turning all structures and things a nasty color!!

Spalling in basement
Some poor foundation walls (some crumbling)
Damage from corrosive H2O
flooding during extreme downpours, city storm drains inadequate, yard fills with water, and water soaks
we believe in keeping our house and property in nice shape
House in good shape.
My responsibility - constant upkeep.
Old nasty water pipes from disgusting water!
25. Sports Fields (type)
baseball
softball or b-ball
Baseball & bowling
Softball Fields
Community/youth center
football
Baseball
Youth center
Baseball
Baseball
25. Other
Wrote "N/A" across entire box.
Fairgrounds
None of above
indoor rec for teens - elderly - indoor pool
Community Center
bowling alley
we are just right
needs bowling ally
Fairgrounds
signs to each area
arts, fairgrounds
{nothing was enter hear}
Modern swimming pool and a gym with indoor exercise options
Bowling Alley
More emphasis on baseball, participation sports. Roundup sports needs to learn how to win, quit holding
Fairgrounds
Skateboard park
Something for teens to do. Maybe it would get rid of the underage drinking
Indoor pool
Fairgrounds

Community center or new community hall; school/community fitness center
d. Swimming pool - "Indoor."
roads, water system, sidewalk
Pet run field
community city center not court house
fair ground
Bowling Alley
Indoor swimming pool
weed control at the Roundup Public Cemetery gate should be open 7 days old people can't walk in more
Fairgrounds
Good Library
Lake, bowling, fishing, show - local entertainment.
d.) Swimming Pool (indoor, yes; outdoor is fine); j.) Other - Art gallery, theater space.
d.) Swimming pool - indoor pool.

27. What additional recreation programs should be offered or organized?

None.
Indoor activities.
Indoor pool - working, would be good for all ages for winter exercise.
Wrote "N/A."
An exercise gym for senior citizens to use. Bad sidewalks and streets to walk on.
Soccer, organized sports for teens and young adults.
I would like to have telephone pals to visit by telephone each day that talk to each other for 5 minutes or
Work out gyms rec. center, bowling alley
senior exercise classes, after school programs for kids
none
the town itself needs to be cleaned, nothing to be proud of
No idea I feel good neighborhood (exceptions of course) & I'm fenced in and I am not to recreational
any would be a start, kids in Roundup learn to group up and go to bars Run out of entertainment and turn
An actual senior community center for activities of all ages
A good place to workout, exercise
None
Bowling, adult activities
Recreation for Children, youth & adults
movie theater, bowling alley, ice skating
bowling, karate
this should be left to the private sector to make money not for the government to interfere
bicycle clubs, horse riding clubs, hiking clubs, explorer clubs
rec center, youth center that's not church orientated so we can reach all youth
bowling should be offered to all students and adults
Bowling, arcade, movie, theater - membership gym
clean friendly workout facility, movie theater, more baseball, bowling ally
city walkways not middle of street, youth outdoor activities, bike paths, Roller skating, baseball & softball

bowling, roller skating
Fun educational programs we have ENOUGH sports already
creativity programs
more time for kids to have a summer party that don't involve drinking there's to many kids drinking
Summer outdoor exercise programs, biking or running groups. A good sized fitness center
wrestling program, bowling for all ages, indoor swimming pool
summer camp, and or summer programs for youth
ice skating
Bowling
ones that are guaranteed to keep children out of trouble
this community is getting older, need community programs to keep seniors active, help others as well,
shuffleboard
bowling, racquetball, bike paths
Indoor gym with pool, exercise rooms, indoor track
Bowling alley should be repaired & opened for all ages. The indoor pool should be replaced; all ages
Indoor swimming
Non-electronic options
More activities for senior citizens
Skateboard park, volleyball site outside grass court, basketball court in the tennis courts, a gym in town
Health club at an affordable price
Movie theatre, indoor swimming pool
Skateboard park, reopen bowling alley
An active community center
Something for the teens
Soccer, hockey, ice skating
Intramural sports, indoor pool
Soccer, exercise stations at city parks, ball fields. Walking paths of mud surfaces. Bike paths for school and community general health. Indoor walk laps and exercise stations at long lab hospital hallway.
More things for young children teen agers to do all year long
Indoor swimming pool, senior citizen center, folf for kids, bowling lanes
Movie Theater
Basketball/tennis courts, skateboard park
Fitness centers & equipment for seniors
Fix the indoor pool at the community center, adult fitness center
Skate park, wrestling at high school, hockey
Rec. league for school children - i.e. - baseball, flag football, volleyball, basketball
Hockey, wrestling, movie theatre
Consistent and varied classes or activities through a central organization that would seek all ages' input.
Better places for teens and young people to recreate
Indoor swimming, especially in the winter.
A place seniors could walk on smooth surface
place to do winter time recreations
summer youth activity program, play equipment @ city park, skate park, movie theatre, fitness center, ski
something for teens to do

no opinion
youth soccer, hockey, cross country, bowling
soccer
bowling / scouting
we need hockey team elementary-high school, movie theater
Boys or Girls Club
No opinion
As most things in Roundup there is not a lot of participation. Sit back and let things ride when it's not
fitness center
Update the community center, open and staffed
Swim lessons
community health center like a YMCA
none as it would raise property taxes
Bowling would be something for all ages. Workout gym with full time instructors
any group events for couples
more outdoor activities in the summer, and rebuilding the indoor pool
family activities, teen activities
Indoor pool
School aged events in summertime
Possibly tennis, soccer, baseball, softball
Skate boarding, park for teens, soccer at schools
There need to be more place for older school age children & young adults to hang out with supervision so that they are not turning to drugs & alcohol as the only means of affordable entertainment. There is
Movie theater
Outdoor recreation encourage the kids to leave the house and computers
Indoor swimming, intramural sports in high school, middle age sports.
After school play areas - like game rooms, skating rinks, etc. Maybe a movie theater
Rebuild indoor swimming pool for use in winter months. Offer water exercise classes for adults and
Racquet ball court, skating park (ice, roller, skateboard)
There are none except or the bars those of us who do not drink have no where to socialize.
Indoor swimming pool, fitness center, Maine theatre, bowling alley
Accessible basketball courts day and evenings
Bus trips available for senior citizens. Bluebird bus 2x mo to Billings is not enough. These people need
unknown
Soccer for kids, just stuff for the kids of the community in general.
Skateboard, health club, indoor swimming, racquetball, hot tub.
Not much to do for our teenagers and young adults. Going to the bar is about all there is to do.
None.
Indoor swimming pool; public classes in yoga and other exercises programs like Tai Chi.
Something!
Work out/exercise facility.
Just upgrade facilities, bowling alley.
No opinion.
Ages 11-18 need something to do so the partying can decrease.

Try to get town functions for specific age groups on a regular intervals.

28. Other

Grants.

mine funds

coal board

Grants

Mine

leave to the private sector, if they don't fund it - then its not important we don't need

Improve the ones that we have, quality, not quantity

community

CDBG or other Program grants

Grants, income loans

government income

Grants

Scholarships, grants, gift memberships, memberships for security purposes.

Coal

Outside grants - presidential fitness program etc.

Grants

grants

baseball, flag, football, wrestling, Hershey track meets

New Senior center and community center

Fund raisers for specific facilities

County funds from mine

Grants

Grants

raffles, fundraisers

Depends on which we are talking about - private?

a.) Mill levy - implies facilities are public; c.) Membership fee - implies facilities are private.

a.) Mill levy - As long as when it's complete, it's dropped from taxes.

Grants.

29. Other (describe)

W. Swimming pool - indoor.

a gym for exercising - treadmills, bicycles, equipment, etc.

enforcing decay ordinances

bowling alley

Economic Development

corrosion & tired of replacing water heater

Food bank & Gold Thimble

remove decay and blight

Elementary school, sheriff office, Need a water treatment plant if the new water project does not go

p. Animal Control - Deer.
c.) Trash collection - effective recycling/reuse program needed to reduce solid waste, save some money;
u.) Parks - City needs to help maintain the portion of River Walk Trail that it owns; w.) Swimming Pool -
Child's park.
31. Which streets, if any, do you feel require the most attention for improvements?
All of them.
Up around Hiland Trailer Park and up passed that to the North Trailer Park.
4th Avenue, 6th Street and 7th Street. These get extra usage because of bus routes and high school
4th Avenue West. All streets need improvement.
The truck route by-pass at Main Street.
Side streets
All of them off main St people pay taxes and all work done to streets is band aid fixes Coal Board money
6th ave west 1st st west 1st st east 2nd ave east
All
4th st west and 4th ave west
most all the street and sidewalk is needed in Roundup
Around our schools
river run fairgrounds, access
4th Ave W most streets on east side
2nd st w by school - parking is limited
4th Ave West
all the streets. They look like a 3rd world country
All of them but they should replace water lines & sewer lines before replacing streets
5th St West - 6th St West
5th St West
all side streets
side streets
8th Ave W
side streets & ave
No Opinion
all
All
8th Ave W, 6th St W, 6th Ave W, 1st St E, major dip in road at 11th & 12 Ave E
side streets & Ave
the east sides. Truck route or 1 Ave East
streets around schools
1st Ave & Main street, we look like white trash along these streets
all
1
To the river walk and that area
most all
the ones with big gaping dangerous holes

camp ground
fix worst streets first
everywhere
1st St West
4th Ave W, 6th Ave W, 2nd Ave E, and 4th Ave E
2nd Ave W around grade school and community center
6th Ave W, Main St
side streets need plowing, in winter & sanded. Pot holes on the east side mostly
All but only after sewer and water line are updated then sidewalks and over lay
6th Ave W
Start with worst
side street
all of the side streets
streets that are not paved, graveled
4th St W
unpaved
anything off main
anything not on main street, all side street and not just fill holes with blacktop
all neighbor hood streets
Almost all of the side streets are in terrible condition
Lots
East side
Residential side streets
4th Street
All
4th Ave West
Railroad Ave
4th Street West
We have a lot of streets that are still gravel. Many potholes throughout town
Any torn up for water system repairs, new development areas
6th Ave W.
Alleys
The side streets are full of potholes; you could lose your cars in some of them
3rd St West, 4th St West, 4th Avenue
All
Most of them
Take your pick
East side of Roundup - all streets there
The ones with potholes
5th & 6th Ave West
3rd
Around the school
Fourth Street West north of Tenth Avenue to redirect water or storm drain water from McCaney's driveway
The streets by the hospital, clinic, and nursing home

10th Ave West, 1st St west, 6th Ave west
Main street from 6th to 11 hundred block and many side streets
Most of our streets could be improved
5th sty W 1100 block
Most streets & avenues
2nd Ave W, 3rd Ave W, 7th Ave W, 8th Ave W, 9th Ave W, most of the east side streets
All as funds become available
Side streets
4th Ave needs repaved
All
Almost all, esp. 6th Ave West and 5th St West
6th Ave West
All streets & Ave
Residential streets, preferably on the east side
Main routes to the schools, hospital, public buildings, and golf course
All streets
A lot of the side streets are a mess
The ones around elementary school, 4th St West & others (can't read)
4th Street West, 6th Avenue.
6th Ave W, 4th Ave W
all side streets
all streets around the grade school
4th Ave W, 4th St W, 2nd Ave E
most all of them east and west side of town
6th Ave
wherever repair is necessary
most streets other than main street. Potholes, non-patched areas after water main leaks, area by central
all bad
main arteries to, and from schools and business
Small removal on all city streets, repair, pot holes on the west side and fill in sunken pots on east side
around all schools and arteries
all they should be 40 feet wide
Some existing streets, new developments that have no streets at all
1st-5th St W
side streets
10th St W, 2nd St E N of 8th to 13th
1st St East 100-800 Blocks
most all streets
most of them
all
neighborhood streets, they are beyond horrible
alleys are dusty and muddy, should be paved
Residential streets
all avenues and streets and streets around community center

4th Ave West, 7th St thru 3rd St
4th Street West and 7th Ave West
east side streets
All side streets
4th Ave west
Streets with broken & sidewalks - no city 4th Ave east & west - pot holes
2nd Ave W, fairgrounds
All side streets/avenues. They all have terrible pot holes.
All but Main Street
Near schools most used, high traffic worse condition
6th Ave West
All
6th St E, 5th St E, 4th St E, 4th St W, 5th St W, 6th St W
Most of the side streets, Main Street is good
Side streets - not any particular one stands out
All side roads
All of them have issues
5th St. West, there is no street!
All avenues
4th Ave West
3rd Ave
6th St West needs to have a sign showing that it is 6th W.
5th street needs a paved street because the newest developments are there no other homes are being
2nd Ave west and entire east side
All city streets
All city streets
4th Ave West
4th Ave West
Around the school and most of the side streets.
East side of town.
Main.
Back streets.
The City seems to be upgrading streets steadily, as funding permits.
The one that goes past 1st Security Bank (runs East to West) all the way down to 6th Street.
All.
2nd Street West, almost all side streets.
Side streets.
East side streets are degrading along with sidewalks that are impassible for handicapped.
All of the streets in town require maintenance due to pot holes, missing pavement, and general wear and
Most of them.
Pave the rest of 5th Street West, finish 4th Street West like what has been started to allow for water

32. Where would you like to see sidewalks placed or improved?

Residential areas.

Almost any side street in town. I like to push a stroller and I have to do it in the road or on Main.

In front of the Catholic Church on Main.

On Main Street 600 block, 700 block, 900 block. All west side on Main.

1st Street East.

Most of the side streets on the east and west side are bad.

Corners should be handicap accessible.

I'm not sure. Tree roots have pushed some walks up and down.

5th Ave W 2nd Ave W

7th St W, 2nd, & 4th E

where ever they are cracked

Main street

Main street & 1st east

All broken ones within the city

All through town

In front of my place & towards IGA, breaking up

all over town duh

were needed all over town

In areas where there are no sidewalks 4th st W - avenues st on west side

too many to mention

No Opinion

further up on main st - not just the downtown area

Improve sidewalks as streets are improved

Schools & Ave around town

All residential areas

all streets & avenues

side streets

All along 3rd St W the W side of Main St

all over town

4th Ave W

around east side

everywhere

sidewalks or all side streets

West side of main (on main) 8th Ave (North Side) 9th to 10th Ave E side of main

side streets & Ave

side streets east side

N/A

1st W

Main Street, 1st Ave, all that are bad or need improvement or are non existent

main street

yes

all over
all over town they are bad with big cracks and holes
everywhere
one block east from the north end of the community center
everywhere
Yes and people should be fined if they don't shovel their walks
Where they are missing and need to be fixed. From Main St and then working to the west or east
most all of residential areas
throughout
1st Ave W, 6th Ave W, Main
improvements on the east side. Some on 2nd west and all the way up to the Hwy
all around town
Just about anywhere
Start with worst
where there are none
my own side walk
all over town
Everywhere
a plan to implement better street (paved streets) and side walks throughout the city
River walk, Main St
main street, hate falling through the sidewalk, Sidewalk are not a priority
We don't need to have a priority
all along main street and repair the ones in neighborhoods which are broken
No specific area
All sidewalks
All
Everywhere
We did our own sidewalk
1st St. West
Sidewalks on all residential streets
Improve existing city wide, begin adding to those areas without
City wide
On avenues
On some of the avenues
4th St West, 5th St West
On the River walk
Most of them
NA
All broken, main street between 6 & 7 St. W. - general redo
?
All around town, on every block would be nice
3 St
Sidewalks should be placed where they do not exist and improved where heaping, cracked, full distance or crumbling. Handicap approaches need to be at every other diagonal intersection or better (can't read)

All over
Main Street
Main Street
Over most of the city
Everywhere
Around schools and parks, seen children trip on sidewalks
yes
All over
Many places around town
9th ave - main street to the pool
East side and upper west side
The entire town
Any place where there should be one (a lot of places)
Don't Care
Replace all existing sidewalks that require it and then est. priorities for other areas.
All over
Main street, schools, all public places
Same as above
Main St & side streets
7th Ave West, 8th Ave west & others on the east side of town
On the avenues above (4th Street West, 6th Avenue), 7th Avenue.
in front of my house on my block and up to main
4th St W
on all sides streets
Avenues
4th St W, 2nd Ave E, 7th Ave W, Main St 600 block west
East side South of the park
wherever maintenance has been neglected
most residential area
main street and basically all over
city wide uniform policy
East side
East side
most of the whole town lacks mostly improved
all over
Around schools, parks
yes most areas
1st E N of 12th
1st St West 400-800 blocks improved
Most of the sidewalks are in poor condition most walkers prefer the streets
yes most areas
most of them
start with a plan and move forward on block at a time
side streets, neighborhoods some are 12 and above the street, or so crumbly and uneven they are

Main Street
residential
sidewalks on west side of main from 6th ave thru 9th Ave. Broken up sidewalks throughout residential
on all streets paid by property owner
lowest west side of town
There is a lack of sidewalks on Avenues
existing sidewalks that are broken up and are a risk of injury
all over side streets sidewalks are in very poor condition, some areas don't eve have sidewalks
West side of town
It is almost impossible to walk with a stroller on all side streets and between the 6th Ave W & 11th Ave W
All over town in many areas, they are uneven, cracked, chipped or totally nonexistent.
Main Street wherever the side walk is busted up.
1st West
Where they are dangerous to walk at night, especially high traffic areas
4Th Street West
Around high school - Perimeters about 4 blocks all around
East & west side in residential areas
The whole town!
Most every street!
I would rather have better pavement
All over town
We have to pay for improvements
East side
Side streets
Side streets
anywhere they are missing, broken, or deteriorated beyond use
7th St West
On Main Street.
East side of town.
Main.
Main.
From 4th Avenue up 6th Street West to library - on eastside of 6th Street would be sufficient. From 4th
All over town. We do a lot of walking with our children and strollers and biking and there really is no great
Most of town.
All of them.
1st and 2nd Street West, also Main Street.
Over 1/2 east side sidewalks are unusable.
All over.
The north end of Main Street is a priority, all attention is always given to the south end or business area
All.
4th Street.

37. What products/services do you generally purchase outside the City?

Vehicles.

Major groceries; baby products.

Clothing, building supplies, shoes, varied foods, etc.

Clothes.

Anything that a department store carries; shoes, furniture; appliances and some food that we can't get

Clothing.

Food, gas, water.

A few things that I cannot get at Pamida or Roundup Hardware.

bulk groceries home furnishing

Car Repair, Clothing

food hardware vehicles

clothing dental work other items not available here

Clothes groceries

All- no shopping except groceries - and their prices are high for quality of products

Clinics - where I'm send to for further test & docs.

Most

food, hardware

medical, clothing, appliances

clothing

Big Items

those that I can't get in Roundup

clothing - entertainment - eating out - some home improvement - some food.

Some groceries, household products & appliances

Food - clothes - entertainment

Clothing

clothing, house wares, appliances

diapers, pet food, clothes, shoes

clothes, entertainment, buildings supplies, fame supplies

cloths and shoes

clothing

everything, food, clothing, doctors, dentists

everything

some groceries

bulk groceries, doctor specialists, vehicles, movie theatre

clothes

clothing - GOC's coast

large appliances books, clothing

clothing medical

building materials

mostly medical, clothing

organic foods, office & business supplies, clothing

mail order, plumbing, hardware, lumber
clothes, shoes
most everything is not available here (clothes, furniture, buildings material, etc)
mail from catalogs for clothing
clothes, shoes, car stuff, home stuff
If I am going to Billings I will get groceries, hardware, electronics just because I am having to go anyway
clothing, medical or dental, building material, vehicles.
Clothes
some groceries, clothing, entertainment
Clothes, recreation
clothes wood pellets, most everything but our meat
Cloths, some food
unique retail items
food, clothing, auto
food and clothing
medical, hospital sends every to Billings
medical, hospital
mail order
clothing, a little food, items not available in town
Clothing, appliances, some groceries
Some medical
Clothing
Food, clothes, cars
Medical
Medical, clothing, hardware
Clothing
RX, healthcare
Building Material, Hair Cut
Groceries, clothes, automobiles
Major purchases and bulk of groceries
Clothes, furniture, entertainment
Electronics, travel
Automobile, clothing, books, lumber
Medical, sports equipment, grocery/household products, clothing
Supplies for my business & clothing
Groceries
What can't be bought in Roundup (not much)
Clothing
All/most food (monthly), household repairs
Ranch goods, bulk food, books
Groceries, automotive, most things
Home improvements, electronics
Clothes, shoes, etc. Yard stuff, grass seed, mower, etc. Building material
Clothes and come groceries

Groceries, doctors, home goods, clothing, etc.
Clothing, entertainment, food
Specialized medical treatment, sit down movies, orthotics customized
Clothes, shoes, gifts
Everything
Medical, major appliances
Doctors
Clothing
Clothing
Clothes, vehicles, furniture, Groc.
Groceries other than milk and last minute items, clothes, appliances, sporting goods
Material for serving clothes & etc.
Some clothes and shoes
Some groceries, clothing, medical, auto gas, appliances
Groceries, clothing, gasoline, household items
Food, gas, clothing, hardware
Food, clothing
Groceries, medical, dental
Groceries, household supplies
Clothing
Groceries, clothing
Medical, clothing and household goods, some groceries
Clothing, household goods
Appliances, furniture
Major appliances, doctors, clothing
Clothing - big ticket items
Groceries, clothes, household items
Household furnishings, clothing, transportation.
Paper products/clothing
medical, entertainment, vehicles, clothing
food
Doctors, dentist, clothing, building materials
household supplies (i.e. paper products, toys, clothing, baby needs, build items, building supplies)
gas, groceries, medical services, clothing, vehicle repairs
medical
clothing and ranch supplies
food, clothing, guiding supplies
Some groceries, medical help
clothing, some food
things that aren't available here
gas filling
clothing
clothing gas
clothes and food

not much
Home Improvement, Furniture
shoes and clothing specialized medical
Clothing, some groceries fabric
furniture, lumber, hardware
special medical needs
Vehicles, groceries and household cleaning products clothes
food, clothing, furniture
electronics
Bulk Goods, cloths
Clothes shopping, car wash
Food, dental, medical, lumber, and household repair items, and wood pellets
clothing, sporting goods, personal care items
items we cannot purchase in Roundup
food and high cost products, lumber, clothing
Doctors
Clothes, toiletries, home improvement items, furniture, school supplies, come toad
Clothes, shoes
Clothing
Food, fuel
Clothes, shoes, some grocery (not much), dentist, doctor
Gasoline, clothing
Groceries, gas, clothing, baby items, vehicles
Clothing, general household products
Clothes and medical
Laundry soap, paper goods (TP), salt for water softener
Groceries, medicine
Groceries, bldg. supplies, fuel, propane, etc.
Specialists, clothing, household furniture & appliances
Clothing
Clothes
Automobiles
Most grocery and appliance, clothing and etc.
Groceries, clothing, gift items
Clothing
All
Wal-Mart, specialty doctors, dentist
Water
Medical specialists, movies & entertainment
Food, gas, autos, big ticket items, stores refrigerator, etc.
Clothing, foods not offered here, art supplies
Appliances, food, restaurants
Clothing, household items, food
Groceries

Groceries, clothing, household items
Clothes, hardware, groceries
Paper products for home use
Most
Clothing
medical, fuel
general merchandise, clothes, appliances
good produce, some clothing
Groceries.
Groceries and building supplies.
Gas, clothes.
Clothes, bulk items.
Monthly groceries.
Food.
Specialty foods, most clothing, cultural or artistic events (admissions).
Groceries, clothing, appliances.
Medical care, clothing, household items.
Building material, bulk groceries, clothing.
All household, vehicles.
Health care, restaurants.
Medical mostly.
Appliances, clothing, some groceries, building materials.
Groceries, clothing, household needs.
Food and clothes.
All planned purchases except groceries and small purchases.

2 yr College or Community College
Small daily consumer store (Pamida, K-Mart)
Medical services
Sporting goods
f.) Entertainment Establishments - Recreational.
42. Other
I love the Farmers Produce Market.
No Opinion
Compete with Billings Prices
24 hr convince store
customer svc training
color copier
more business would help current business base. It keeps more people shopping in town but city council
Good idea but business are doing what they can with what they have
Sales rep, inventor, or published regional experts
We need a variety of goods & services
Work together
employee parking
Competitive/fair pricing
Lower prices.
The relatively few retail establishments in Roundup seem to be doing their best in all these areas.
More competition, gas station.
46. Other
Arts.
Also selected: Forest Product Processing and Heavy Industry.
Selected all, but did not rank.
good clothing store would be handy - for women- panty hose, & underwear dept.
child care related
seniors services
administrative
Everywhere
Oil
Entertainment
Entertainment like movies, skating rink etc., more plumbers, electricians, etc., auto repair
Mental health / school counseling
Discount store, K-mart, etc
Young Adults
a.) Agricultural Product Processing - small scale farming for local regional markets; h.) Tourism - based on "eco-tourism" and artistic wilderness; i.) Other - weatherizing, rehabilitation, retrofitting, renewal energy
i.) Training programs.
Jobs to keep busy-cleaning, etc.

Office work.
Technology.
50. Other
Building more buildings is not the answer. We already have too many empty buildings on Main Street.
promote art activities
Planning for services in the area
Low interest loans
Encourage people with cash to establish businesses
Incentives for redevelopment - empty facilities
Give land tax free for the first five years to a new business
isn't this why we elected you to figure this out
Help improving existing building to make them useable for area businesses
Improve city services
Support your local coal mine (KTUQ).
a.) Revenue bonds circled - What is the obsession with revenue bonds? How well did they work for the Hardin prison?; b.) Business development and management assistance - From whom?; c.) Lower taxes for new industries - Already done with the coal mine. How successful will that turn out to be?; e.) Tourism

Appendix N:

Public Participation

Aff. avit of Publicat. n

STATE OF MONTANA)
County of Musselshell) ss.

David A. Ponte

being first duly sworn, deposes and says: That he is the
Publisher

of the ROUNDUP RECORD-TRIBUNE and the WINNETT TIMES,
a weekly newspaper of general circulation, printed and published in
Roundup, County of Musselshell, State of Montana, and that the no-
tice hereunto annexed entitled

NOTICE OF PUBLIC HEARING FOR COMMENT ON
WATER STUDY AND APPLICATIONS TO TSEP,

CDBG, DNRC-RRGL, SRF, INTERCAP
AND COAL BOARD

has been correctly published in the regular and entire issue of every
number of said newspaper for 1
consecutive weeks, commencing with the issue dated

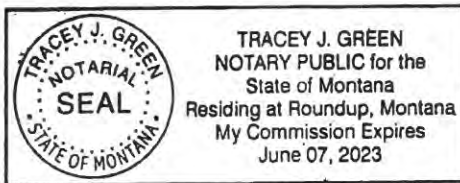
FEBRUARY 26, 2020, and ending with the issue dated
FEBRUARY 26, 2020

David A. Ponte

Subscribed and sworn to me this 3rd day of

February 2020

Tracey J. Green
NOTARY PUBLIC for the State of Montana
Residing at Roundup, Montana
My Commission Expires 6/7/23



NOTICE OF PUBLIC HEARING FOR COMMENT ON WATER STUDY AND APPLICATIONS TO TSEP, CDBG, DNRC-RRGL, SRF, INTERCAP, AND COAL BOARD

The City of Roundup will hold a public hearing on Tuesday, March 3rd, 2020 at 7:00 PM, at City Hall. The purpose of the hearing is to discuss the engineering study that was conducted for the water system. Recommended improvements will be discussed along with the associated project costs, including the overall costs per user and possible applications to the following funding agencies: Treasure State Endowment Program (TSEP), Community Development Block Grant (CDBG), Department of Natural Resources and Conservation (DNRC) Renewable Resource Grant and Loan (RRGL), State Revolving Fund (SRF), Rural Development (RD), INTERCAP, Montana Coal Board, and/or other funding agencies.

The public is strongly encouraged to attend and will be given an opportunity to ask questions and to express their opinions regarding the findings in the engineering report. Comment may be given orally at the hearing or submitted in writing prior to 5:00 PM on the day of the hearing. The City will hold a meeting after the hearing to discuss acceptance of the Preliminary Engineering Report

Anyone who would like more information or who wants to submit questions or comments should contact Lon Sibley, Public Works Director, at (406) 323-2804.
(Pub. Feb. 26, 2020)

Wages and Salaries @ 6:00pm

A G E N D A

March 3rd, 2020

CITY COUNCIL CHAMBERS, CITY HALL, 7:00 P.M.

CALL TO ORDER

Pledge of Allegiance

Roll Call

APPROVE CITY COUNCIL MINUTES

February 18, 2020

APPROVE AGENDA

PUBLIC COMMENT (3-minute limit per person)

VISITORS

Jeff Coles-15 minutes discuss zoning

LAW ENFORCEMENT COMMITTEE

NEW BUSINESS

Great West Engineering PER for phase 6 public hearing

MAYOR

CITY ATTORNEY

REPORT OF SITE PERMITS

CORRESPONDENCE

UNFINISHED BUSINESS

TIF Board Ordinance-tabled until late spring

COUNCIL DISCUSSION/FUTURE AGENDA ITEMS

Report out from Council Committee meetings

Wages & Salaries Committee discussion

CLERK TREASURER

ASSISTANT CLERK

DIRECTOR OF PUBLIC WORKS

PUBLIC COMMENT (3-minute limit per person)

COUNCIL ACTION ITEMS

Allow for public comment before vote is taken:

CLAIMS FOR THE PRECEDING MONTH

ADJOURNMENT

Council Members:

****Please contact the City Office before 1 p.m. on each Tuesday of the City Council meetings to let us know who will not be attending. Thanks***

****Council discussed Council meeting procedures and agenda items, Council, on December 16, 2003 passed a motion stating that if visitors wish to address Council, they must be on the agenda. Agenda items must be received by 12:00 p.m. each Friday before Council meetings. Thanks***

SIGN IN SHEET

Public Hearing for PER

March 3, 2020

Name (Please Print)	Address
Kurt Lang	325 4th St West
Bruce Holland	City
Angela Coles	1600 2nd St W #18
Jeff Coles	1600 2nd St W #18
Crystal Bennett - Great West	Billings, MT
Low Sibley	Roundup
Floyd R. Fisher	315 3rd St E
GARY Toombs	101 11th Ave W.
Ed. Shifflett Rick Griffith	424 2nd St W
Rick Carlson	905 5th St West
Dolly M. Lang	719 1st St W
Dave Liggett	215 2nd St W
Jane M. Danner	1103 2nd St W
JEREMY ERICKSON	602 1st St E
Cassie Mann	Roundup



City of Roundup

February 19 at 10:08 AM · 🌐

...

NOTICE OF PUBLIC HEARING FOR COMMENT ON WATER STUDY AND APPLICATIONS TO TSEP, CDBG, DNRC-RRGL, SRF, INTERCAP, AND COAL BOARD

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The public is strongly encouraged to attend and will be given an opportunity to ask questions and to express their opinions regarding the findings in the engineering report. Comment may be given orally at the hearing or submitted in writing prior to 5:00 PM on the day of the hearing. The City will hold a meeting after the hearing to discuss acceptance of the Preliminary Engineering Report.

Anyone who would like more information or who wants to submit questions or comments should contact Lon Sibley, Public Works Director, at (406) 323-2804.

MINUTES OF THE REGULAR MEETING OF THE CITY COUNCIL OF THE CITY OF ROUNDUP HELD ON March 3, 2020 AT 7:00 p.m. CITY COUNCIL CHAMBERS.

The meeting was called to order by Mayor Jones. Clerk/Treasurer Lanter conducted roll call with council members, Jones, Liggett, Vivirito, Erickson, Carlson, Griffith Toombs, and Fisher present. Also, present were Assistant Clerk Mann, Director Sibley, Compliance Officer Hoiland and Attorney Lundvall via phone.

Moved by Liggett seconded by Griffith to approve the minutes of the February 18, 2020 meeting. All in favor. Motion carried.

Moved by Toombs, seconded by Fisher to approve the agenda. All in favor. Motion carried.

Public Comment: No comments.

Visitors: Jeff Coles to discuss zoning-lives on 2nd St W, owns property on 1st St W. and is the owner of the 24hr gym in Roundup. Would like to build a home and business combined on the vacant lot. Wants it zoned as residential not commercial. Councilmember Toombs asked about parking. Mr. Coles said he would have an 8 or 9 spot parking lot. Compliance Officer Hoiland said the neighbors don't have a problem with it and the Council makes the decision but he recommends the Council approve it. Mayor Jones will send it to Zoning Committee to discuss. Zoning Committee will meet March 17th @ 6:30pm.

Law Enforcement: Undersheriff Bednar gave an oral report and a copy of incidents and citations to Clerk/Treasurer Lanter.

Open Public Hearing at 7:17pm, PER (Preliminary Engineering Report) for Phase 6: Report given by Crystal Bennett of Great West Engineering- It is a requirement to go over this in order to receive Grants for phase 6 of the water project. Ms. Bennett presented a slide show along with a hard copy.

Public Comment: Kurt Lang questioned the water rates that were on the slide show. Ms. Bennett explained the rates are an average. Mayor Jones gave the base rate, amount per thousand gallons, sewer rate and surcharge on residential bills. Mr. Lang stated he changes his filter monthly and heard that others change it weekly.

Close Public Hearing at 7:36pm.

Action Item for next meeting- consider new water source coming in, will there be a rate increase?

Mayor Jones: Jennifer from the County Extension Office will be hosting a virtual meeting April 15th @ 6:00pm. Key speaker will be Ben Winchester from the University of Minnesota.

Mayor Jones will reschedule AARP age friendly Communities presentation for sometime in May.

Tree City of the Year will be awarded May 1st at the City stage. Lunch will be served at the Senior Center; the Council and staff are invited.

Cleanup day will be April 27th. Mayor Jones will contact Montana Department of Transportation about street sweeping.

Next LEPC (Local Emergency Planning Committee) meeting will be March 10th at 12:00pm @ the ambulance barn.

City Attorney Lundvall: Nothing new to report. Should have the TIF (Tax Increment Financing) Board Ordinance done by Memorial Day.

Correspondence: Received a copy of a letter from the Health Department that was sent to 813 3rd St W. resident living in home without water service.

Report out from Council Committee meetings:

- **Wages & Salaries Committee discussion:** Griffith reports-Health Insurance is paid at 100% for City Employees. That's how we keep employees around. We will investigate Health Savings plan. Will meet with City Employees March 9th @ 1:00pm.

Water Authority will meet next week.

Director Sibley: Water truck was delivered.

Hoping to start Phase 5 of the water project the middle of April.

Public Comment: No comments.

Claims were read as follows:

City Payroll	\$45,783.88	Motor Power Equip	\$10,7667.00
Per Diem	\$325.00	Mid-Rivers	\$385.53
AT & T	\$58.21	Normont Equipment	\$199.08
American Welding & Gas	\$31.96	Northwest Pipe	\$584.46
Big Sky Linen	\$452.07	Northwestern Energy	\$13,634.77
Butler, Lee	\$97.83	O'Reilly Auto Parts	\$1209.59
City Petty Cash	\$86.57	Picchionis IGA	\$7.95
Dons Welding	\$61.00	Roundup Hardware	\$510.97
DPC Industries	\$372.83	Roundup Record	\$729.30
Electric Service Shop	\$143.87	Russell, Glen	\$371.03
Energy Labs	\$771.00	Schnitzer	\$226.86
Great West Engineering	\$16,570.55	State Industrial	\$1,133.06
Lawson Products	\$657.40	Tractor & Equipment	\$39.84
Lance Lundvall	\$550.00	USDA Blue Book	\$273.23
McCleary Dist.	\$4,057.43	Utilities Underground	\$3.64
Montana Dept. Of Enviro.	\$3,000.00	Yellowstone City News	\$701.25
Van Dykes	\$8.79		

Moved by Toombs, seconded by Griffith to approve Claims for the preceding month and draw warrants on the treasury for the same. All in favor. Motion carried.

*Moved by Toombs seconded by Liggett to adjourn the meeting. Motion carried.
The meeting adjourned at 8:03 p.m.*

APPROVED BY _____
Sandra Jones- Mayor

Tanya Lanter- Clerk Treasurer

Cassandra Mann-Assistant Clerk

City of Roundup, Montana

Water System PER Public Hearing

March 3, 2020



Water System Study

☐ Preliminary Engineering Report (PER) Examines Comprehensive Needs for:

- Growth/Capacity
- Water Supply
- Water Quality/Treatment
- Water Storage
- Distribution System
- Water Meters



☐ Required to Apply for Grant and Loan Funding



Water Supply



- ☐ Two Wells:
 - Capacity of 1,000 gpm each
 - Depth of 90 feet

- ☐ Infiltration Gallery:
 - Bypassed
 - Used as backup source

- ☐ Quantity sufficient to meet current and projected demands



Water Quality

☐ No health violations, but water is high in:

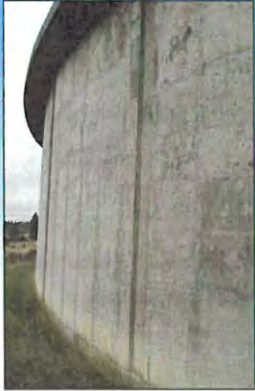
- Total Dissolved Solids = 580%
- Iron = 480%
- Manganese = 680%
- Sulfate = 620%

☐ Potential Health and Safety Risks:

- Long term exposure to iron & hemochromatosis risks
- Lead from cast iron mains



Water Storage



- ❑ Meets domestic and fire flow storage needs
 - 2,000,000 gallons available
 - 1,990,000 gallons required
- ❑ Tank well maintained
 - Cleaned and inspected every 7 years
 - Next cleaning scheduled for 2025 in CIP
 - No structural concerns

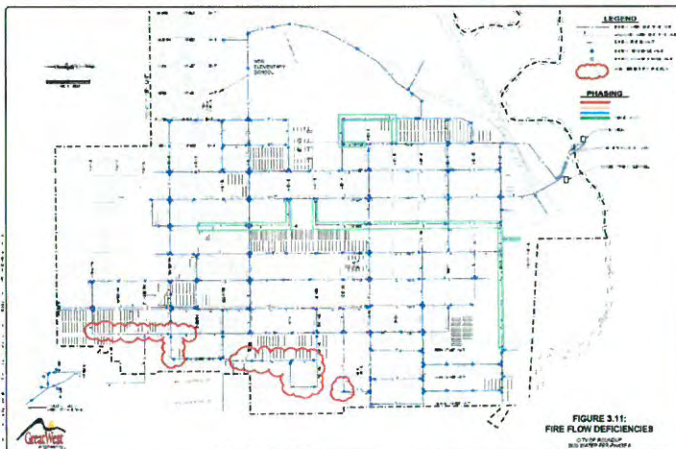


Distribution System

- ❑ Sizes: 4-inches to 12-inches
- ❑ Materials: cast iron, asbestos cement, PVC
- ❑ Condition:
 - Cast iron in poor condition
 - 4-inch provide inadequate fire flow
 - Rust has limited capacity down to a 2" main
 - Leak repair rate of cast iron mains is 4 times higher than normal

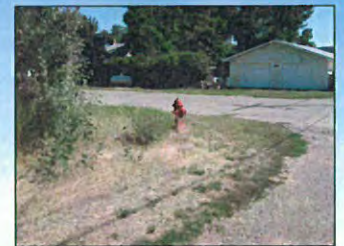


Fire Flow



Distribution System

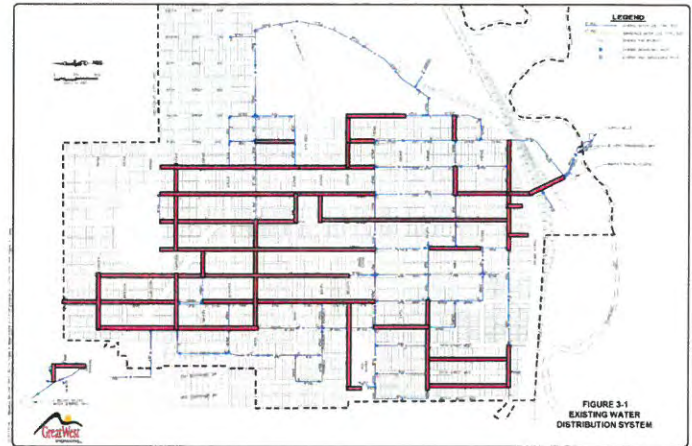
- ❑ Valves:
 - Many in-operable
 - Insufficiently spaced
 - Isolating mains is difficult
- ❑ Hydrants:
 - Inadequately spaced
 - Many need replacement
- ❑ Water Loss:
 - Roundup Average = 21%
 - Industry Standard = 10%



Leaks



Cast Iron Mains - 2010



Main Replacement Progress

2010

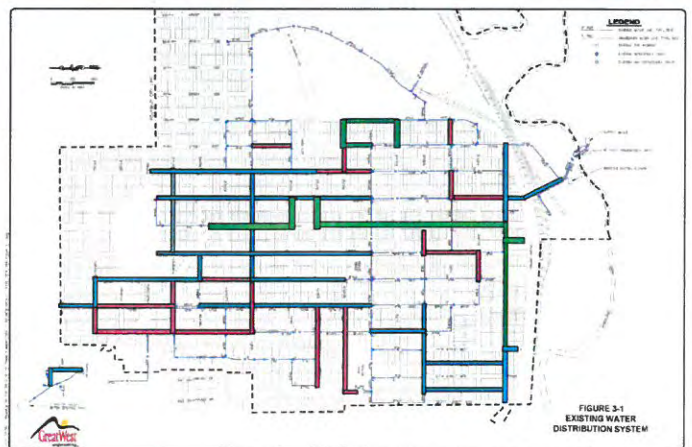
- Estimated 45,680 feet of cast iron mains (8.65 miles)

2020 (after Phase 5)

- Estimated 11,440 feet of cast iron mains remaining (2.17 miles)
- 75% completed after Phase 5



Main Replacement Progress



Summary of Needs/Alternative Development

- Summary of Needs
 - Distribution system improvements
 - Continue cast iron replacement
- Alternative Development
 - 3 alternatives identified



Alternatives Considered In Detail

- D-2: Replace all cast iron mains with 8" PVC mains
- D-3: Alternative D-2 plus replace three blocks of 4" PVC
- D-4: Alternative D-3 plus the remaining 4" AC mains that are limiting fire flows



Decision Matrix & Weighing Factors

Weighting Factors

- Life Cycle Costs = 10
- Operation and Maintenance = 7
- Permitting Issues = 5
- Social Impacts = 7
- Environmental Impacts = 5
- Sustainability = 4
- Land Acquisition = 5
- Public Health and Safety = 10



Decision Matrix

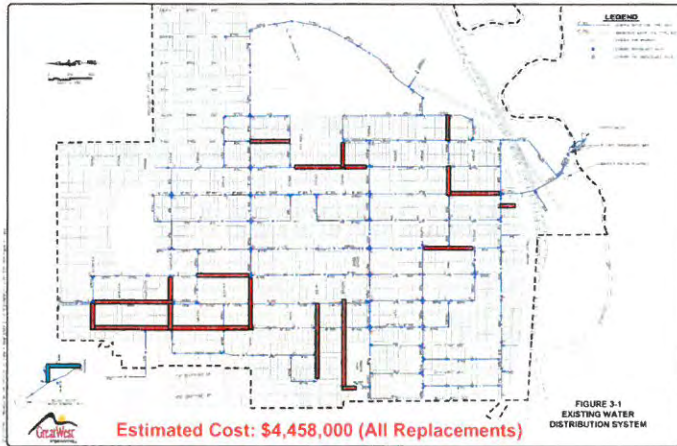
Alternative	Life Cycle Costs		Operation and Maintenance		Permitting Issues		Social Impacts		Environmental Impacts		Sustainability		Land Acquisition		Public Health & Safety		Total
	Weight	Weighted Score	Weight	Weighted Score	Weight	Weighted Score	Weight	Weighted Score	Weight	Weighted Score	Weight	Weighted Score	Weight	Weighted Score	Weight	Weighted Score	
D-2	8.8	88	7	49	7	35	9	63	10	80	9	36	5	25	7	70	389
D-3	5.7	57	6	36	7	35	8	56	10	50	9	36	5	25	9	90	405
D-4	4.2	42	8	56	7	35	7	49	10	50	10	40	5	25	9	90	394

Preferred Alternative

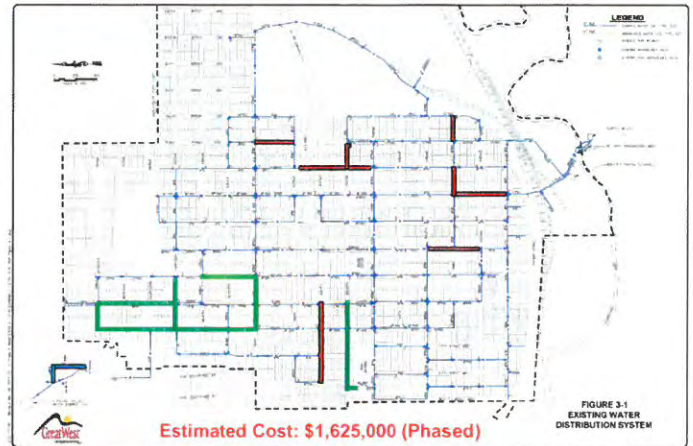
- Alternative D-3: Replace all cast iron mains, plus three blocks of 4" PVC main.



Remaining Water Main Replacements (Red)



Phased Water Main Replacements (Green Only)



Potential Grant Funding & Target Rates

Information On Target Rate Calculation

- ❑ Target rates based on median household income (MHI) as determined from the 2017 Income Survey
 - Water = \$33.30
 - Sewer = \$21.40
- ❑ Existing Rates (average resident)
 - Water = \$62.40
 - Sewer = \$29.66
- ❑ Rates will be 168% of Target Rate



Grant/Loan Eligibility

- ❑ Treasure State Endowment Program (TSEP) - \$500,000 to \$750,000 (Phases 1, 2, 3 and 5)

- 50-50 match (cannot exceed 50% of project costs)
 - User rate must meet or exceed target rate

Roundup = 168% of water rate = \$750,000 grant

Will be highly competitive this year



- ❑ Department of Natural Resources and Conservation Renewable Resource Grant and Loan Program (DNRC-RRGL) - \$125,000 (Phases 1, 2 and 5)

- Conserve, manage, develop, or protect renewable resources

With fixing of water main leaks, this project presents a strong case for water conservation



Grant/Loan Eligibility

□ CDBG– Community Development Block Grants

- ✓
 - Grants up to \$450,000
 - 25% match required
 - > 50% Low to Moderate Income (LMI) (Income Survey)
 - Very competitive

Roundup LMI = 60.0%

Used on Phases 3 and 4



Grant/Loan Eligibility

□ Coal Board

- ✓
 - No limit-but funding is scarce
 - Water Projects are eligible
 - Coal Board has funded a lot of recent projects in Roundup

Used on Phases 1, 3, 4 and 5 with Special Circumstances



Grant/Loan Eligibility

□ Rural Development – No limit but is part of grant/loan combination

- ✓
 - Priority given to communities with population < 5,500
 - Amount based upon MHI:
 - MHI < \$47,757 up to 45% of project costs grant eligible
 - MHI < \$38,205 up to 75% of project costs grant eligible
 - Current Loan Rate = 1.625% over 40 years
 - (\$1.40 per EDU per \$1M)

Roundup population qualifies (1,788 < 5,500)



Grant/Loan Eligibility

□ Montana SRF Loan– Offers Loan Forgiveness

- ✓
 - Loan Forgiveness Up to \$500,000
 - Current Loan Rates = 2.50% over 20 or 30 years

Used on Phases 2, 3 and 5

Could be used as a back-up source of funding

(20 years = \$5.73 per \$1M borrowed)

(30 years = \$3.69 per \$1M borrowed)



Funding Strategy Comparison

Funding Source	All Remaining Replacements*	Phased Replacements
TSEP Grant	\$ 750,000	\$ 750,000
DNRC Grant	\$ 125,000	\$ 125,000
CDBG Grant	\$ 450,000	\$ 450,000
City Matching Funds	\$ 300,000	\$ 300,000
RD Grant	\$ 783,250	\$ -
RD Loan (40 Years)	\$ 2,050,000	\$ -
Total	\$ 4,458,250	\$ 1,625,000

* Anticipated \$5-\$6 rate increase for RD Loan

** If any grant applications are unsuccessful, project can be downsized or a new SRF or RD loan obtained



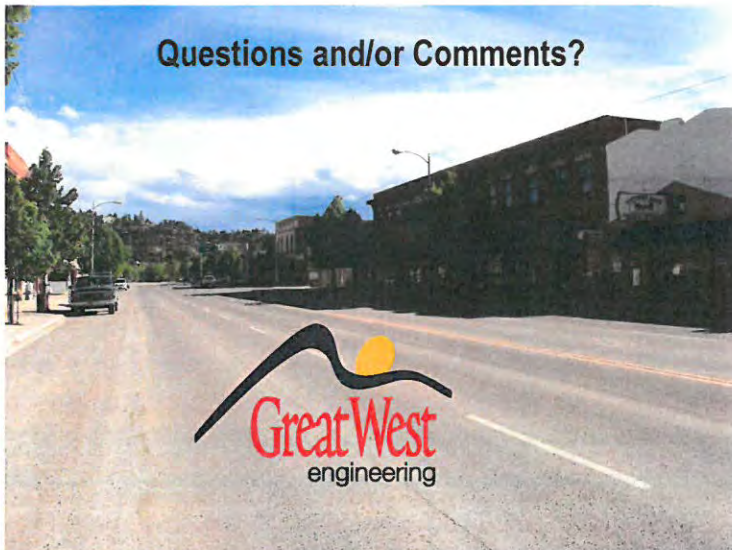
Project Schedule

□ Schedule is dependent on funding strategy:

- TSEP Funds available in July, 2021
- DNRC/RRGL Funds available in July, 2021
- CDBG Funds available by early 2022
- RD Available at Anytime
- SRF Available at Anytime
- Design = 4 Months
- DEQ Review = 2 Months
- Bidding = 1 Month
- Construction = Up to 4 Months, Completed in Fall, 2022



Questions and/or Comments?



Appendix O:

Income Survey Information

From: Anseth, Becky
To: [Jackie Kuhl](#)
Cc: [Rothenbuecher, A.C.](#)
Subject: RE: Income Survey for Roundup
Date: Monday, November 20, 2017 4:21:09 PM

Hi Jackie

TSEP will consider the MHI value as determined through the 2017 income survey to be acceptable for use in a TSEP program application, if the City chooses to submit an application for the upcoming cycle. Please include survey information and program correspondence in application information.

Please let us know if you have additional questions.

Becky Anseth

Program Manager
Community Development Division
406-841-2865
banseth@mt.gov

From: Jackie Kuhl [<mailto:jkuhl@greatwesteng.com>]
Sent: Wednesday, September 13, 2017 12:58 PM
To: Anseth, Becky <BAnseth@mt.gov>
Subject: RE: Income Survey for Roundup

Becky,

I wanted to follow up with you regarding the income survey for the City of Roundup. Have you been able to determine what we need to do to have the survey accepted by TSEP? I have attached my raw data which was provided to CDBG, Richard Knatterud, Kathy Plettenberg, and Gus Byrom. I have also attached the cover letter and income survey letter which were sent to 740 residences and the summary letter from July 5, 2017.

Please let me know if you need any further information.

Thanks,

Jackie Kuhl, PE | Project Engineer
Great West Engineering, Inc.
PHONE: 406-652-5000

From: Jackie Kuhl
Sent: Wednesday, July 26, 2017 12:41 PM
To: Anseth, Becky (BAnseth@mt.gov) <BAnseth@mt.gov>
Subject: Income Survey for Roundup

Becky,

We completed an income survey using the forms that were provided by CDBG (CDBG-RD Approved Form) in May – June. The City sent out 740 surveys due back by June 10th, but we accepted the surveys until July 5th. We received 315 back, of which 11 were incomplete with either the income not filled in or the household size not filled in and 5 were received after July 5th when the letter was sent to the City with the results.

I don't have an email from CDBG accepting the survey as Kathy Plettenburg stated over the phone that they would except the survey results of the LMI percentage based on the forms used and the excel spreadsheet of results, but that MHI is set by TSEP. Using the household incomes supplied, the survey shows the median income of the 299 counted is \$28,000 instead of the \$34,917 shown on the ACS. If we add in the 5 received later, the LMI doesn't change but the MHI goes to \$28,569. What do we need to have TSEP accept this survey for the MHI. It will make a huge difference if we apply next year as it shows the City is paying 160% of target rate vs 104%.

Thanks,

Jackie Kuhl, PE | Project Engineer

Great West Engineering, Inc.

6780 Trade Center Ave
Billings, MT 59101

OFFICE: 406-652-5000
DIRECT: 406-281-8589
FAX: 406-248-1363
www.greatwesteng.com

Roundup Income Survey

Raw Data

Incomes	# in Family	Needed and Returned	Median Income
1 \$ 140,241	2	305 Returned Complete	\$28,538
2 \$ 6,400	1	260 Needed	
3 \$ 80,000	2	740 Surveyed	
4 \$ 23,524	1	12 returned incomplete	
5 \$ 2,648	1		
6 \$ 27,720	2		
7 \$ 53,000	3		
8 \$ 92,138	5		
9 \$ 33,328	2		
10 \$ 120,000	2		
11 \$ 25,549	2		
12 \$ 33,000	4		
13 \$ 57,964	2		
14 \$ 15,243	1		
15 \$ 24,376	1		
16 \$ 80,000	2		
17 \$ 32,356	1		
18 \$ 38,424	2		
19 \$ 12,450	1		
20 \$ 120,000	2		
21 \$ 23,197	2		
22 \$ 33,618	2		
23 \$ 92,553	2		
24 \$ 10,020	1		
25 \$ 10,896	1		
26 \$ 20,723	1		
27 \$ 45,000	2		
28 \$ 93,600	2		
29 \$ 57,000	2		
30 \$ 60,000	1		
31 \$ 20,722	2		
32 \$ 42,000	2		
33 \$ 34,159	1		
34 \$ 70,000	4		
35 \$ 22,000	1		
36 \$ 25,000	10		
37 \$ 66,000	2		
38 \$ 90,000	2		
39 \$ 21,684	1		
40 \$ 110,000	4		
41 \$ 103,000	3		
42 \$ 43,157	1		
43 \$ 47,356	3		
44 \$ 138,205	2		
45 \$ 38,400	2		
46 \$ 60,000	9		
47 \$ 12,876	1		

Roundup Income Survey
Raw Data

48	\$	17,000	3
49	\$	84,993	2
50	\$	60,000	2
51	\$	45,000	2
52	\$	16,815	1
53	\$	44,389	3
54	\$	124,819	2
55	\$	10,591	1
56	\$	16,212	3
57	\$	34,708	2
58	\$	55,000	6
59	\$	17,940	2
60	\$	45,000	2
61	\$	54,000	1
62	\$	25,000	4
63	\$	76,270	2
64	\$	65,000	1
65	\$	20,974	1
66	\$	35,228	1
67	\$	65,000	2
68	\$	44,000	4
69	\$	25,000	4
70	\$	19,000	1
71	\$	9,168	1
72	\$	69,541	4
73	\$	52,000	2
74	\$	35,264	2
75	\$	10,894	1
76	\$	15,060	1
77	\$	28,960	2
78	\$	8,806	1
79	\$	23,000	1
80	\$	9,144	2
81	\$	23,557	1
82	\$	50,050	2
83	\$	31,351	8
84	\$	33,990	4
85	\$	67,796	2
86	\$	29,778	2
87	\$	5,940	2
88	\$	5,471	2
89	\$	37,220	1
90	\$	62,000	2
91	\$	50,687	2
92	\$	46,000	2
93	\$	105,000	5
94	\$	42,000	2
95	\$	36,240	2

Roundup Income Survey
Raw Data

96	\$	75,000	2
97	\$	43,099	1
98	\$	91,311	2
99	\$	21,600	1
100	\$	15,317	1
101	\$	29,055	1
102	\$	28,000	2
103	\$	16,800	1
104	\$	35,000	2
105	\$	14,700	1
106	\$	25,083	2
107	\$	42,000	2
108	\$	52,000	2
109	\$	73,000	1
110	\$	6,212	1
111	\$	26,420	2
112	\$	48,953	1
113	\$	65,000	2
114	\$	12,151	1
115	\$	11,400	1
116	\$	102,000	2
117	\$	80,000	1
118	\$	57,646	2
119	\$	45,000	2
120	\$	67,227	6
121	\$	66,588	11
122	\$	67,464	2
123	\$	27,127	4
124	\$	39,652	2
125	\$	12,107	2
126	\$	8,906	1
127	\$	26,519	1
128	\$	16,450	1
129	\$	3,561	1
130	\$	21,729	1
131	\$	17,000	1
132	\$	190,000	2
133	\$	120,000	2
134	\$	65,000	1
135	\$	72,000	4
136	\$	40,000	2
137	\$	15,750	4
138	\$	18,500	1
139	\$	11,136	1
140	\$	9,060	1
141	\$	14,022	1
142	\$	9,060	1
143	\$	9,453	1

Roundup Income Survey

Raw Data

144	\$	7,667	1
145	\$	27,614	2
146	\$	164,000	2
147	\$	26,000	1
148	\$	112,000	2
149	\$	41,015	2
150	\$	11,760	2
151	\$	225,000	2
152	\$	23,055	1
153	\$	81,500	5
154	\$	8,700	1
155	\$	8,820	1
156	\$	9,036	1
157	\$	150,000	4
158	\$	21,965	2
159	\$	15,000	2
160	\$	120,000	4
161	\$	14,940	2
162	\$	24,648	2
163	\$	8,594	1
164	\$	11,988	1
165	\$	14,916	1
166	\$	17,112	2
167	\$	9,024	1
168	\$	-	1
169	\$	9,036	1
170	\$	15,904	2
171	\$	18,860	1
172	\$	9,036	1
173	\$	18,972	1
174	\$	8,476	1
175	\$	137,000	4
176	\$	17,014	1
177	\$	8,820	1
178	\$	8,500	1
179	\$	16,075	1
180	\$	8,796	1
181	\$	9,036	1
182	\$	10,723	1
183	\$	11,184	1
184	\$	30,000	2
185	\$	25,500	1
186	\$	26,000	3
187	\$	5,616	1
188	\$	10,968	1
189	\$	9,036	1
190	\$	9,060	1
191	\$	9,036	1

Roundup Income Survey

Raw Data

192	\$	10,545	1
193	\$	12,036	1
194	\$	29,878	1
195	\$	600,000	15
196	\$	26,631	2
197	\$	9,144	1
198	\$	19,325	1
199	\$	8,796	1
200	\$	14,323	1
201	\$	19,068	1
202	\$	12,972	1
203	\$	25,175	2
204	\$	2,218	2
205	\$	14,028	1
206	\$	69,099	2
207	\$	11,000	1
208	\$	20,275	1
209	\$	76,192	3
210	\$	28,538	2
211	\$	16,080	1
212	\$	125,000	5
213	\$	12,000	2
214	\$	14,256	1
215	\$	220,000	4
216	\$	35,000	1
217	\$	78,000	2
218	\$	10,236	1
219	\$	34,585	2
220	\$	66,000	2
221	\$	18,125	4
222	\$	45,000	1
223	\$	100,000	3
224	\$	45,219	2
225	\$	14,508	1
226	\$	39,050	1
227	\$	64,881	2
228	\$	50,000	5
229	\$	240,000	2
230	\$	8,976	1
231	\$	21,660	1
232	\$	80,114	2
233	\$	18,214	1
234	\$	235,500	2
235	\$	46,000	1
236	\$	35,501	3
237	\$	140,000	2
238	\$	100,000	4
239	\$	32,500	2

Roundup Income Survey

Raw Data

240	\$	23,960	2	
241	\$	120,000	2	
242	\$	120,000	2	
243	\$	58,620	2	
244	\$	16,013	3	
245	\$	26,914	1	
246	\$	60,332	4	
247	\$	49,375	4	
248	\$	11,880	2	
249	\$	17,378	1	
250	\$	168,000	2	
251	\$	27,203	1	
252	\$	22,300	1	
253	\$	52,359	2	
254	\$	52,000	3	
255	\$	16,000	5	
256	\$	22,272	3	
257	\$	21,000	3	
258	\$	1,500	2	
259	\$	5,400	2	minimum surveys needed
260	\$	10,512	1	
261	\$	15,000	2	
262	\$	10,404	1	
263	\$	10,992	1	
264	\$	80,000	2	
265	\$	25,000	1	
266	\$	80,000	2	
267	\$	13,400	1	
268	\$	40,000	1	
269	\$	15,768	1	
270	\$	60,000	3	
271	\$	45,000	2	
272	\$	85,720	2	
273	\$	89,220	2	
274	\$	89,007	3	
275	\$	120,000	3	
276	\$	57,112	2	
277	\$	15,751	1	
278	\$	84,000	2	
279	\$	69,200	4	
280	\$	39,960	2	
281	\$	13,963	1	
282	\$	70,313	2	
283	\$	50,000	1	
284	\$	20,000	2	
285	\$	50,000	2	
286	\$	15,636	1	
287	\$	63,000	5	

Roundup Income Survey

Raw Data

288	\$	11,136	1
289	\$	35,096	1
290	\$	34,000	4
291	\$	36,600	2
292	\$	24,000	1
293	\$	19,356	2
294	\$	17,572	1
295	\$	35,000	2
296	\$	291,203	1
297	\$	35,000	1
298	\$	13,700	2
299	\$	90,110	3

Received After July 5th cutoff

300	\$	30,000	7
301	\$	100,000	1
302	\$	110,000	5
303	\$	25,332	1
304	\$	24,000	4
305	\$	85,000	4

HUD Income Limits
Musselshell County 2017

Household Size	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Musselshell County FY 2017															
Low Income	21350	24400	27450	30500	32950	35400	37850	40300	42700	45150	47600	50000	52450	54900	57350
Moderate Income	34200	39050	43950	48800	52750	56650	60550	64450	68320	72200	76150	80050	83950	87850	91750
Extremely Low	12850	16240	20420	24600	28780	32960	37140	40300	34440	36400	38400	40350	42300	44300	46250

2017 Roundup Income Survey

Incomes	# in Family	Low	Moderate	Other		
\$140,241	2			1		
\$6,400	1	1				
\$80,000	2			1		
\$23,524	1		1			
\$2,648	1	1				
\$27,720	2		1			
\$53,000	3			1		
\$92,138	5			1		
\$33,328	2		1			
\$120,000	2			1		
\$25,549	2		1			
\$33,000	4		1			
\$57,964	2			1		
\$15,243	1	1				
\$24,376	1		1			
\$80,000	2			1		
\$32,356	1		1			
\$38,424	2		1			
\$12,450	1	1				
\$120,000	2			1		
\$23,197	2	1				
\$33,618	2		1			
\$92,553	2			1		
\$10,020	1	1				
\$10,896	1	1				
\$20,723	1	1				
\$45,000	2			1		
\$93,600	2			1		
\$57,000	2			1		
\$60,000	1			1		
\$20,722	2	1				
\$42,000	2			1		
\$34,159	1		1			
\$70,000	4			1		
\$22,000	1		1			
\$25,000	10	1				
\$66,000	2			1		
\$90,000	2			1		
\$21,684	1		1			
\$110,000	4			1		
\$103,000	3			1		
\$43,157	1			1		
\$47,356	3			1		
\$138,205	2			1		
\$38,400	2		1			
\$60,000	9		1			

2017 Roundup Income Survey

\$12,876	1	1				
\$17,000	3	1				
\$84,993	2			1		
\$60,000	2			1		
\$45,000	2			1		
\$16,815	1	1				
\$44,389	3		1			
\$124,819	2			1		
\$10,591	1	1				
\$16,212	3	1				
\$34,708	2		1			
\$55,000	6		1			
\$17,940	2	1				
\$45,000	2			1		
\$54,000	1			1		
\$25,000	4	1				
\$76,270	2			1		
\$65,000	1			1		
\$20,974	1	1				
\$35,228	1			1		
\$65,000	2			1		
\$44,000	4		1			
\$25,000	4	1				
\$19,000	1	1				
\$9,168	1	1				
\$69,541	4			1		
\$52,000	2			1		
\$35,264	2		1			
\$10,894	1	1				
\$15,060	1	1				
\$28,960	2		1			
\$8,806	1	1				
\$23,000	1		1			
\$9,144	2	1				
\$23,557	1		1			
\$50,050	2			1		
\$31,351	8	1				
\$33,990	4		1			
\$67,796	2			1		
\$29,778	2		1			
\$5,940	2	1				
\$5,471	2	1				
\$37,220	1			1		
\$62,000	2			1		
\$50,687	2			1		
\$46,000	2			1		
\$105,000	5			1		

2017 Roundup Income Survey

\$42,000	2			1		
\$36,240	2		1			
\$75,000	2			1		
\$43,099	1			1		
\$91,311	2			1		
\$21,600	1		1			
\$15,317	1	1				
\$29,055	1		1			
\$28,000	2		1			
\$16,800	1	1				
\$35,000	2		1			
\$14,700	1	1				
\$25,083	2		1			
\$42,000	2			1		
\$52,000	2			1		
\$73,000	1			1		
\$6,212	1	1				
\$26,420	2		1			
\$48,953	1			1		
\$65,000	2			1		
\$12,151	1	1				
\$11,400	1	1				
\$102,000	2			1		
\$80,000	1			1		
\$57,646	2			1		
\$45,000	2			1		
\$67,227	6			1		
\$66,588	11		1			
\$67,464	2			1		
\$27,127	4	1				
\$39,652	2			1		
\$12,107	2	1				
\$8,906	1	1				
\$26,519	1		1			
\$16,450	1	1				
\$3,561	1	1				
\$21,729	1		1			
\$17,000	1	1				
\$190,000	2			1		
\$120,000	2			1		
\$65,000	1			1		
\$72,000	4			1		
\$40,000	2			1		
\$15,750	4	1				
\$18,500	1	1				
\$11,136	1	1				
\$9,060	1	1				

2017 Roundup Income Survey

\$14,022	1	1				
\$9,060	1	1				
\$9,453	1	1				
\$7,667	1	1				
\$27,614	2		1			
\$164,000	2			1		
\$26,000	1		1			
\$112,000	2			1		
\$41,015	2			1		
\$11,760	2	1				
\$225,000	2			1		
\$23,055	1		1			
\$81,500	5			1		
\$8,700	1	1				
\$8,820	1	1				
\$9,036	1	1				
\$150,000	4			1		
\$21,965	2	1				
\$15,000	2	1				
\$120,000	4			1		
\$14,940	2	1				
\$24,648	2		1			
\$8,594	1	1				
\$11,988	1	1				
\$14,916	1	1				
\$17,112	2	1				
\$9,024	1	1				
\$0	1	1				
\$9,036	1	1				
\$15,904	2	1				
\$18,860	1	1				
\$9,036	1	1				
\$18,972	1	1				
\$8,476	1	1				
\$137,000	4			1		
\$17,014	1	1				
\$8,820	1	1				
\$8,500	1	1				
\$16,075	1	1				
\$8,796	1	1				
\$9,036	1	1				
\$10,723	1	1				
\$11,184	1	1				
\$30,000	2		1			
\$25,500	1		1			
\$26,000	3	1				
\$5,616	1	1				

2017 Roundup Income Survey

\$10,968	1	1				
\$9,036	1	1				
\$9,060	1	1				
\$9,036	1	1				
\$10,545	1	1				
\$12,036	1	1				
\$29,878	1		1			
\$600,000	15			1		
\$26,631	2		1			
\$9,144	1	1				
\$19,325	1	1				
\$8,796	1	1				
\$14,323	1	1				
\$19,068	1	1				
\$12,972	1	1				
\$25,175	2		1			
\$2,218	2	1				
\$14,028	1	1				
\$69,099	2			1		
\$11,000	1	1				
\$20,275	1	1				
\$76,192	3			1		
\$28,538	2		1			
\$16,080	1	1				
\$125,000	5			1		
\$12,000	2	1				
\$14,256	1	1				
\$220,000	4			1		
\$35,000	1			1		
\$78,000	2			1		
\$10,236	1	1				
\$34,585	2		1			
\$66,000	2			1		
\$18,125	4	1				
\$45,000	1			1		
\$100,000	3			1		
\$45,219	2			1		
\$14,508	1	1				
\$39,050	1			1		
\$64,881	2			1		
\$50,000	5		1			
\$240,000	2			1		
\$8,976	1	1				
\$21,660	1		1			
\$80,114	2			1		
\$18,214	1	1				
\$235,500	2			1		

2017 Roundup Income Survey

\$46,000	1			1		
\$35,501	3		1			
\$140,000	2			1		
\$100,000	4			1		
\$32,500	2		1			
\$23,960	2	1				
\$120,000	2			1		
\$120,000	2			1		
\$58,620	2			1		
\$16,013	3	1				
\$26,914	1		1			
\$60,332	4			1		
\$49,375	4			1		
\$11,880	2	1				
\$17,378	1	1				
\$168,000	2			1		
\$27,203	1		1			
\$22,300	1		1			
\$52,359	2			1		
\$52,000	3			1		
\$16,000	5	1				
\$22,272	3	1				
\$21,000	3	1				
\$1,500	2	1				
\$5,400	2	1				
\$10,512	1	1				
\$15,000	2	1				
\$10,404	1	1				
\$10,992	1	1				
\$80,000	2			1		
\$25,000	1		1			
\$80,000	2			1		
\$13,400	1	1				
\$40,000	1			1		
\$15,768	1	1				
\$60,000	3			1		
\$45,000	2			1		
\$85,720	2			1		
\$89,220	2			1		
\$89,007	3			1		
\$120,000	3			1		
\$57,112	2			1		
\$15,751	1	1				
\$84,000	2			1		
\$69,200	4			1		
\$39,960	2			1		
\$13,963	1	1				

2017 Roundup Income Survey

\$70,313	2			1		
\$50,000	1			1		
\$20,000	2	1				
\$50,000	2			1		
\$15,636	1	1				
\$63,000	5			1		
\$11,136	1	1				
\$35,096	1			1		
\$34,000	4		1			
\$36,600	2		1			
\$24,000	1		1			
\$19,356	2	1				
\$17,572	1	1				
\$35,000	2			1		
\$291,203	1			1		
\$35,000	1			1		
\$13,700	2	1				
\$90,110	3			1		
\$30,000	7	1				
\$100,000	1			1		
\$110,000	5			1		
\$25,332	1		1			
\$24,000	4	1				
\$85,000	4			1		
LMI Calculation						
Income Level		Low	Moderate	Other		
Households		126	57	122		305
LMI Households		183				
LMI Percentage		60.0%				
	Received after July 5th					

Incomes	# in Family	Very Low	Low	Moderate	Other
\$140,241	2				1
\$6,400	1	1			
\$80,000	2				1
\$23,524	1			1	
\$2,648	1	1			
\$27,720	2			1	
\$53,000	3				1
\$92,138	5				1
\$33,328	2			1	
\$120,000	2				1
\$25,549	2			1	
\$33,000	4			1	
\$57,964	2				1
\$15,243	1		1		
\$24,376	1			1	
\$80,000	2				1
\$32,356	1			1	
\$38,424	2			1	
\$12,450	1	1			
\$120,000	2				1
\$23,197	2		1		
\$33,618	2			1	
\$92,553	2				1
\$10,020	1	1			
\$10,896	1	1			
\$20,723	1		1		
\$45,000	2				1
\$93,600	2				1
\$57,000	2				1
\$60,000	1				1
\$20,722	2		1		
\$42,000	2				1
\$34,159	1			1	
\$70,000	4				1
\$22,000	1			1	
\$25,000	10	1			
\$66,000	2				1
\$90,000	2				1
\$21,684	1			1	
\$110,000	4				1
\$103,000	3				1
\$43,157	1				1
\$47,356	3				1
\$138,205	2				1
\$38,400	2			1	
\$60,000	9			1	

\$12,876	1		1		
\$17,000	3	1			
\$84,993	2				1
\$60,000	2				1
\$45,000	2				1
\$16,815	1		1		
\$44,389	3			1	
\$124,819	2				1
\$10,591	1	1			
\$16,212	3	1			
\$34,708	2			1	
\$55,000	6			1	
\$17,940	2		1		
\$45,000	2				1
\$54,000	1				1
\$25,000	4		1		
\$76,270	2				1
\$65,000	1				1
\$20,974	1		1		
\$35,228	1				1
\$65,000	2				1
\$44,000	4			1	
\$25,000	4		1		
\$19,000	1		1		
\$9,168	1	1			
\$69,541	4				1
\$52,000	2				1
\$35,264	2			1	
\$10,894	1	1			
\$15,060	1		1		
\$28,960	2			1	
\$8,806	1	1			
\$23,000	1			1	
\$9,144	2	1			
\$23,557	1			1	
\$50,050	2				1
\$31,351	8	1			
\$33,990	4			1	
\$67,796	2				1
\$29,778	2			1	
\$5,940	2	1			
\$5,471	2	1			
\$37,220	1				1
\$62,000	2				1
\$50,687	2				1
\$46,000	2				1
\$105,000	5				1

\$42,000	2				1
\$36,240	2			1	
\$75,000	2				1
\$43,099	1				1
\$91,311	2				1
\$21,600	1			1	
\$15,317	1		1		
\$29,055	1			1	
\$28,000	2			1	
\$16,800	1		1		
\$35,000	2			1	
\$14,700	1		1		
\$25,083	2			1	
\$42,000	2				1
\$52,000	2				1
\$73,000	1				1
\$6,212	1	1			
\$26,420	2			1	
\$48,953	1				1
\$65,000	2				1
\$12,151	1	1			
\$11,400	1	1			
\$102,000	2				1
\$80,000	1				1
\$57,646	2				1
\$45,000	2				1
\$67,227	6				1
\$66,588	11			1	
\$67,464	2				1
\$27,127	4		1		
\$39,652	2				1
\$12,107	2	1			
\$8,906	1	1			
\$26,519	1			1	
\$16,450	1		1		
\$3,561	1	1			
\$21,729	1			1	
\$17,000	1		1		
\$190,000	2				1
\$120,000	2				1
\$65,000	1				1
\$72,000	4				1
\$40,000	2				1
\$15,750	4	1			
\$18,500	1		1		
\$11,136	1	1			
\$9,060	1	1			

\$14,022	1		1		
\$9,060	1	1			
\$9,453	1	1			
\$7,667	1	1			
\$27,614	2			1	
\$164,000	2				1
\$26,000	1			1	
\$112,000	2				1
\$41,015	2				1
\$11,760	2	1			
\$225,000	2				1
\$23,055	1			1	
\$81,500	5				1
\$8,700	1	1			
\$8,820	1	1			
\$9,036	1	1			
\$150,000	4				1
\$21,965	2		1		
\$15,000	2	1			
\$120,000	4				1
\$14,940	2	1			
\$24,648	2			1	
\$8,594	1	1			
\$11,988	1	1			
\$14,916	1		1		
\$17,112	2		1		
\$9,024	1	1			
\$0	1	1			
\$9,036	1	1			
\$15,904	2	1			
\$18,860	1		1		
\$9,036	1	1			
\$18,972	1		1		
\$8,476	1	1			
\$137,000	4				1
\$17,014	1		1		
\$8,820	1	1			
\$8,500	1	1			
\$16,075	1		1		
\$8,796	1	1			
\$9,036	1	1			
\$10,723	1	1			
\$11,184	1	1			
\$30,000	2			1	
\$25,500	1			1	
\$26,000	3		1		
\$5,616	1	1			

\$10,968	1	1			
\$9,036	1	1			
\$9,060	1	1			
\$9,036	1	1			
\$10,545	1	1			
\$12,036	1	1			
\$29,878	1			1	
\$600,000	15				1
\$26,631	2			1	
\$9,144	1	1			
\$19,325	1		1		
\$8,796	1	1			
\$14,323	1		1		
\$19,068	1		1		
\$12,972	1		1		
\$25,175	2			1	
\$2,218	2	1			
\$14,028	1		1		
\$69,099	2				1
\$11,000	1	1			
\$20,275	1		1		
\$76,192	3				1
\$28,538	2			1	
\$16,080	1		1		
\$125,000	5				1
\$12,000	2	1			
\$14,256	1		1		
\$220,000	4				1
\$35,000	1				1
\$78,000	2				1
\$10,236	1	1			
\$34,585	2			1	
\$66,000	2				1
\$18,125	4	1			
\$45,000	1				1
\$100,000	3				1
\$45,219	2				1
\$14,508	1		1		
\$39,050	1				1
\$64,881	2				1
\$50,000	5			1	
\$240,000	2				1
\$8,976	1	1			
\$21,660	1			1	
\$80,114	2				1
\$18,214	1		1		
\$235,500	2				1

\$46,000	1				1
\$35,501	3			1	
\$140,000	2				1
\$100,000	4				1
\$32,500	2			1	
\$23,960	2		1		
\$120,000	2				1
\$120,000	2				1
\$58,620	2				1
\$16,013	3	1			
\$26,914	1			1	
\$60,332	4				1
\$49,375	4				1
\$11,880	2	1			
\$17,378	1		1		
\$168,000	2				1
\$27,203	1			1	
\$22,300	1			1	
\$52,359	2				1
\$52,000	3				1
\$16,000	5	1			
\$22,272	3		1		
\$21,000	3		1		
\$1,500	2	1			
\$5,400	2	1			
\$10,512	1	1			
\$15,000	2	1			
\$10,404	1	1			
\$10,992	1	1			
\$80,000	2				1
\$25,000	1			1	
\$80,000	2				1
\$13,400	1		1		
\$40,000	1				1
\$15,768	1		1		
\$60,000	3				1
\$45,000	2				1
\$85,720	2				1
\$89,220	2				1
\$89,007	3				1
\$120,000	3				1
\$57,112	2				1
\$15,751	1		1		
\$84,000	2				1
\$69,200	4				1
\$39,960	2				1
\$13,963	1		1		

\$70,313	2				1
\$50,000	1				1
\$20,000	2		1		
\$50,000	2				1
\$15,636	1		1		
\$63,000	5				1
\$11,136	1	1			
\$35,096	1				1
\$34,000	4			1	
\$36,600	2			1	
\$24,000	1			1	
\$19,356	2		1		
\$17,572	1		1		
\$35,000	2				1
\$291,203	1				1
\$35,000	1				1
\$13,700	2	1			
\$90,110	3				1
\$30,000	7	1			
\$100,000	1				1
\$110,000	5				1
\$25,332	1			1	
\$24,000	4	1			
\$85,000	4				1
Poverty Calculation					
Income Level	Very Low	Low	Moderate	Other	
Households	76	50	57	122	
Poverty Households	76				
Poverty Percentage	24.9%				

305

Received after July 5th

BILLINGS

6780 Trade Center Ave.
Billings, MT 59101
406.652.5000 ▪ Fax 406.248.1363
www.greatwesteng.com



July 5, 2017

Ms. Sandra Jones
Mayor, City of Roundup
34 3rd Avenue West
Roundup, MT 59072

RE: 2017 Income Survey Results

Dear Mayor Jones:

As of today's date, we have received 310 income survey forms for the latest income survey. Of these, 11 were not completed properly, leaving 299 completed forms used. The final survey results are:

- 124 were below the low and moderate income level listed.
- 56 were below the moderate income level listed.
- 119 were above both incomes listed.

This calculates to a total of 60.2% of all respondents being below the low and moderate income level. The survey also shows a median household income (MHI) of \$28,000.

Please let us know if you have any further questions.

Sincerely,
Great West Engineering, Inc.

A handwritten signature in blue ink, appearing to read "Greg Lukasik", is written over the printed name.

Greg Lukasik, P.E.
Project Manager

CC: Kathy Plettenberg, Montana Dept. of Commerce CDBG Program

HELENA

PO Box 4817
2501 Belt View Drive
Helena, MT 59604
406.449.8627
Fax 406.449.8631

BOISE

3363 N. Lakeharbor Ln.
Boise, ID 83703
208.576.6646

MISSOULA

112 W. Front Street
Missoula, MT 59802
406.493.0312

JAMES SCHLADWEILER, President of Council
TANYA LANTER, Clerk/Treasurer
VIOLET OLSEN, Assistant Clerk
LON E. SIBLEY, Director of Public Works
DONNA MARSH, City Judge

SANDRA JONES, Mayor

City of Roundup

P.O. Box 660
Roundup, Montana 59072
Phone (406) 323-2804 • Fax (406) 323-2757
(406) 253-4091 (TTY) / (866) 253-4090 (voice)

ALDERMEN
THOMAS VANDEBERG, 1st Ward
JAMES SCHLADWEILER, 1st Ward
PAULETTE RAMSEY, 2nd Ward
RON SOLBERG, 2nd Ward
DAVID MARTIN, 3rd Ward
DAVE PICCHIONI, 3rd Ward
JOHN LAPIERRE, 4th Ward
LINDA YOUNT, 4th Ward

May 22, 2017

Dear Roundup Resident and Neighbor,

The City of Roundup is currently in the process of completing major improvements to the City's water system. Although three phases of main has been replaced, there is still over 22,000 feet of water main rehabilitation remaining. These main replacements will improve the water quality and provide a more reliable water system.

The City may be eligible for up to \$450,000 in grant funds from the Community Development Block Grant Program (CDBG) of the Montana Department of Commerce. The CDBG program is intended to aid communities of low to moderate income, so a City-wide income survey must be completed to verify whether Roundup is eligible for this grant. We would appreciate your help by simply completing the attached income survey.

The Montana Department of Commerce requires all surveys be randomly numbered and the name and address filled out as shown. However, the information submitted is confidential since the name and address will be detached from the income portion and is only used to verify who submitted a survey. The actual surveys go to our consultant. Tabulations will be made by the consultant, and City personnel will not be able to identify respondents or have access to the original surveys. All data submitted will not be public information.

The City has a good chance of becoming eligible for this large grant with a good response rate on the survey. This will in turn help to keep the City's costs and water rates to a minimum. Consequently, each household's information is very important!

To allow adequate time to calculate the results, please mail the survey by June 10, 2017, although please note late surveys will be accepted for a few weeks after that date

Please send the completed survey in the enclosed envelope to Great West Engineering, Inc. at 6780 Trade Center Avenue, Billings, MT 59101, and the detached portion to the City offices. If you have any questions, please contact the City at (406) 323-2804 or Greg Lukasik at Great West Engineering at (406) 652-5000.

Thank you very much for your cooperation.

Sincerely,


Sandra Jones, Mayor
City of Roundup

Return top portion to
Great West Engineering, Inc.
6780 Trade Center Avenue
Billings, MT 59101

HOUSEHOLD INCOME SURVEY FORMAT FOR AREA-WIDE CDBG PROJECTS

The total number of all persons in the household is _____

Gross Household Income includes the combined income of all persons 18 years old and over in the household, whether related or not, taking into consideration the following definition:

Income includes:

1. The gross amount, before any payroll deductions, of wages and salaries, overtime pay, commissions, fees, tips and bonuses;
2. The net income from operation of a business or profession or from rental or real or personal property (this includes gross receipts minus operating expenses received from the operation of a farm or ranch);
3. Interest and dividends;
4. The full amount of periodic payments received from social security, annuities, insurance policies, retirement funds, pensions, disability or death benefits and other similar types of periodic receipts;
5. Payments in lieu of earnings, such as unemployment and disability compensation, worker's compensation, and severance pay;
6. Public assistance;
7. Periodic and determinable allowances, such as alimony and child support payments, and regular contributions or gifts received from persons not residing in the dwelling; and
8. All regular pay, special pay and allowances of a member of the armed forces (whether or not living in the dwelling) who is head of the family or spouse.

My (our) total gross household income for 2016 was \$_____

REMOVE THIS PORTION OF THE FORM AND SUBMIT SEPARATELY



(Please print clearly)

Survey # _____

NAME _____

ADDRESS _____

I certify that the income information I have provided is true and accurate to the best of my knowledge and belief. I agree to provide income verification if requested by state and local officials. I understand that anyone who knowingly provides false or incomplete income information may be subject to penalties for fraud under federal law.

SIGNATURE _____ DATE _____

Return bottom portion to
Roundup City Office
P.O. Box 660
Roundup, MT 59072