APPROVED
By: D. Smith
IDAHO DEQ
Boise Regional Office
Date: 11/1/19

CITY OF MOUNTAIN HOME
WATER FACILITIES PLANNING STUDY

DRINKING WATER GRANT NUMBER DWG-204-2019-8

PROFESSIONAL ENGINEER
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10/31/2019
STATE OF IDAHO
JAMES L. BLEDSOE

OCTOBER 2019

PROJECT NO. 214010-020

PREPARED BY:

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STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1445 North Orchard • Boise, ID 83706 • (208) 373-0550

Brad Little, Governor
John H. Tippets, Director

November 5, 2019

The Honorable Rich Sykes
Mayor, City of Mountain Home
160 South 3rd East
Mountain Home, Idaho 83647

RE: City of Mountain Home – Facility Plan – DWG-204-2019-8 (Elmore County)
Technical Approval of the City of Mountain Home Drinking Water Facility Plan

Dear Mayor Sykes:

The Department of Environmental Quality (DEQ) has completed its review of the technical portion of the City of Mountain Home (City) Drinking Water Facility Plan DWG-204-2019-8 (Facility Plan) and has no further comments. This letter shall be considered approval of the technical portion of the Facility Plan. Please submit preliminary engineering reports (PER) to DEQ for review and approval prior to preparing and submitting detailed plans and specifications for any of the proposed projects in the Facility Plan. Plans and specifications cannot be reviewed until a corresponding PER is first approved; furthermore, no construction can begin until the detailed plans and specifications have been reviewed and approved by DEQ except for those projects subject to review by a Qualified Licensed Professional Engineer.

The City has chosen to opt out of the requirement to complete an Environmental Information Document (EID) as part of the Facility Plan. Thus, at this time, the City is not eligible for federal funding through DEQ's State Revolving Fund (SRF) Program. Please note that if SRF funding will be pursued, an EID must be prepared in order to qualify for those funds. Generally, SRF loan money can be used to pay for the preparation of an EID as part of a loan-funded project.

If you have any questions regarding the technical portion of the Facility Plan, please feel free to contact me at 208-373-0281 or via email at Dan.M.Smith@deq.idaho.gov.

Sincerely,

Dan Smith, P.E.
Staff Engineer

DS:tg

Enclosure: Approval Stamped Facility Plan Cover Page

ec: James Bledsoe, P.E., Keller Associates (w/ enclosure)
Charlie Parkins, DEQ State Office
2019AGD6719

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1.0 INTRODUCTION

1.1 PURPOSE AND NEED

This report presents the findings and recommendations relating to the Mountain Home municipal potable water system study. This study was commissioned by the City in an effort to determine the current state of the water system and to plan for future needs. The planning study is intended to update the previous planning efforts completed in 2011 to reflect current and projected conditions, as well as address current DEQ rules.

A review of the fundamental planning elements such as population, water supply and demand, development and household densities, and fire flow requirements is presented as well as an analysis of the system followed by a summary of recommendations and a capital improvement plan. Figures and supporting data for the information presented in this report have been included in the appendices for reference.

While the findings of this study reveal many positive system conditions resulting from past planning efforts and ongoing system maintenance, the system is currently facing concerns with fire protection, and supply deficiency is anticipated to be a concern in the near future. One of the primary purposes of this master plan was to identify these deficiencies and develop improvement alternatives and phasing to correct these deficiencies. Another purpose of the planning effort was to develop a roadmap to assist the City in future planning and development.

Based on the results of the analysis, Keller Associates has identified the following deficiencies:

1. Low Pressures. One area of the water system sees pressures below 40 psi during peak hour conditions when the largest well is off-line. Minor changes in the pressure zone boundaries are recommended to correct this.
2. High Pressures. Isolated portions of the water system regularly experience pressures above 100 psi. This corresponds to commercial/industrial areas that has historically had high pressures without any reported issues or concerns. Substantial additional portions of the system exceed 80 psi, where individual pressure regulators are recommended to control pressures at the service.
3. Fire Protection. There are several locations identified in the distribution system that have less available fire protection than required by the fire code.
4. Supply Deficit. While the existing supply is adequate for existing needs, it is anticipated that the existing supply within the City will not be sufficient to cover the City's future needs.

Keller Associates has worked as part of a technical review committee with key City staff to understand the challenges currently facing the system and to develop practical, cost-effective solutions. Keller Associates gratefully recognizes the Mayor and City Council, Public Works Director, the Mountain Home Water Department, the city administrative support staff, and all others involved for their support and assistance in the completion of this study.

1.2 REPORT ORGANIZATION

The report is organized into four chapters. Planning criteria are summarized in Chapter 2. Existing and future conditions are evaluated against these criteria in Chapter 3, and alternative improvements to address existing and anticipated future needs are discussed after each criteria if a deficiency is discovered. Final recommended alternatives with their associated costs and rate impacts are summarized in Chapter 4. Supporting materials can be found in the Appendix.

1.3 SYSTEM OWNER

The City of Mountain Home has owned and operated their water system for decades. City staff and elected officials work hard to ensure that the water system complies with drinking water regulations. Elected officials have historically enabled the water system to operate without subsidies from other City funds, providing experienced and trained operators with the technical qualifications needed to deliver a high level of service. This has resulted in a track record of successful projects, including many pipeline, tank, and water supply improvements in recent years. The City is committed to maintain a high level of service to the residents of Mountain Home, and is committed to complete priority improvements.

2.0 PLANNING CRITERIA

2.1 GENERAL

This chapter details the planning criteria used to establish standards by which the system is evaluated and serve as the basis for identifying needed improvements. These criteria include an evaluation of population, development densities, potable water demands, land use, and other factors affecting the water system.

2.2 HISTORICAL AND FUTURE POPULATIONS

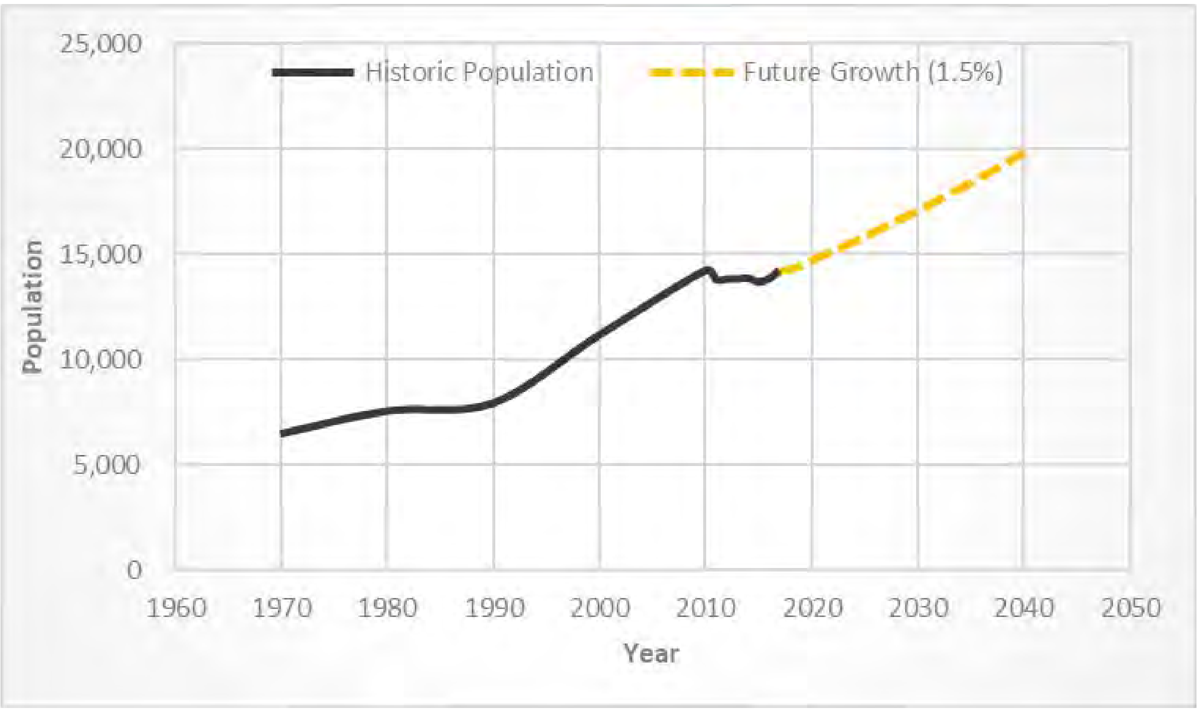
The population values presented in Figure 2.1 and Table 2.1 summarize historical populations as recorded by the US Census Bureau, and future populations calculated at the selected growth rate.

The population growth rate of 1.5% was considered for this study, and reflects expected growth rate reported by City staff. This results in a total population of approximately 17,070 people and 19,830 people in 2030 and 2040, respectively.

Table 2.1 – Historic and Future Populations

	Year	Population	Average Annual Growth Rate
Historic Growth Rates	1970	6,451	-
	1980	7,540	1.6%
	1990	7,913	0.5%
	2000	11,143	3.5%
	2010	14,206	2.5%
	2011	13,761	-3.1%
	2012	13,794	0.2%
	2013	13,798	0.0%
	2014	13,846	0.3%
	2015	13,662	-1.3%
	2016	13,822	1.2%
	2017	14,224	2.9%
	2018	14,260	0.3%
Future Growth Rates	2019	14,474	1.5%
	2020	14,691	1.5%
	2025	15,835	1.5%
	2030	17,069	1.5%
	2035	18,398	1.5%
	2040	19,831	1.5%

Figure 2.1 – Historic and Anticipated Growth



Throughout the study, Keller Associates has attempted to tie growth-related capital improvements to population. Areas where growth is anticipated prior to 2040 is recorded in Appendix A – Figure 2.1.

2.3 DEVELOPMENT DENSITIES

Design densities refer to anticipated development densities for residential land use within the study area, and the average household density. These densities serve as the basis for estimating potable demands in areas yet to be developed. Table 2.2 presents design densities per gross acre of undeveloped residential zones, as well as residential household densities for Mountain Home. The residential housing densities are derived from historical densities, and from input from the City's planning staff. Areas which have already been permitted for certain types of residential development have been used to account for a portion of future populations. Additional areas for residential growth, found in Figure 2.1 in Appendix A, have assumed R3 residential growth. The average household density assumed for this study is consistent with the household density reported for the City of Mountain Home in the year 2010 US Census.

Table 2.2 – Development Densities

Design Densities	
Residential 1 (homes / gross acre)	1.5
Residential 2 (homes / gross acre)	2.3
Residential 3 (homes / gross acre)	3.7
Average Household Density* (People/home)	2.27

*2010 Census

2.4 PRESENT AND FUTURE WATER DEMANDS

Historical well production data were used to determine the average annual, average winter, average summer, and average daily demands. Because daily well production readings are not always taken the same time each day, a two-day average value was used to determine the maximum day demand. Peak hour demands were estimated using a 24-hour demand pattern developed from actual summertime water usage patterns observed in the City's SCADA data. Supporting data and additional details regarding the development of these system demands can be found in Appendix C.

Table 2.3 reports the existing demands of the system, and compares the demand per capita day in 2018 to the previous planning study performed in 2011. The average annual water usage per capita has remained relatively constant since the 2011 facility planning study was completed, only increasing by about 3%. Peak hour, maximum day, average winter day water demands also remained within 4% of change, with peak hour demands estimated to be 1.7 times the peak day demand. Conversely, the average summer day demands increased by approximately 12%.

Table 2.3 – Existing System Demands

Demand Scenario	2018 Design (gpm)	2018 Demand per Capita (gpcd)	Compare to Previous Water FPS (gpcd)
Peak Hour	14,200	1,434	1,414
Maximum Day	8,150	823	788
Average Summer Day	6,340	640	570
Annual Average Day	3,000	303	294
Average Winter Day	830	84	85

*gpcd = gallons per day per capita

Figure 2.2 below depicts the comparison between peak day demand curves of the previous two facility plans, the previous declining balance updates, and the current data.

Figure 2.2 – Demand Curve Comparison

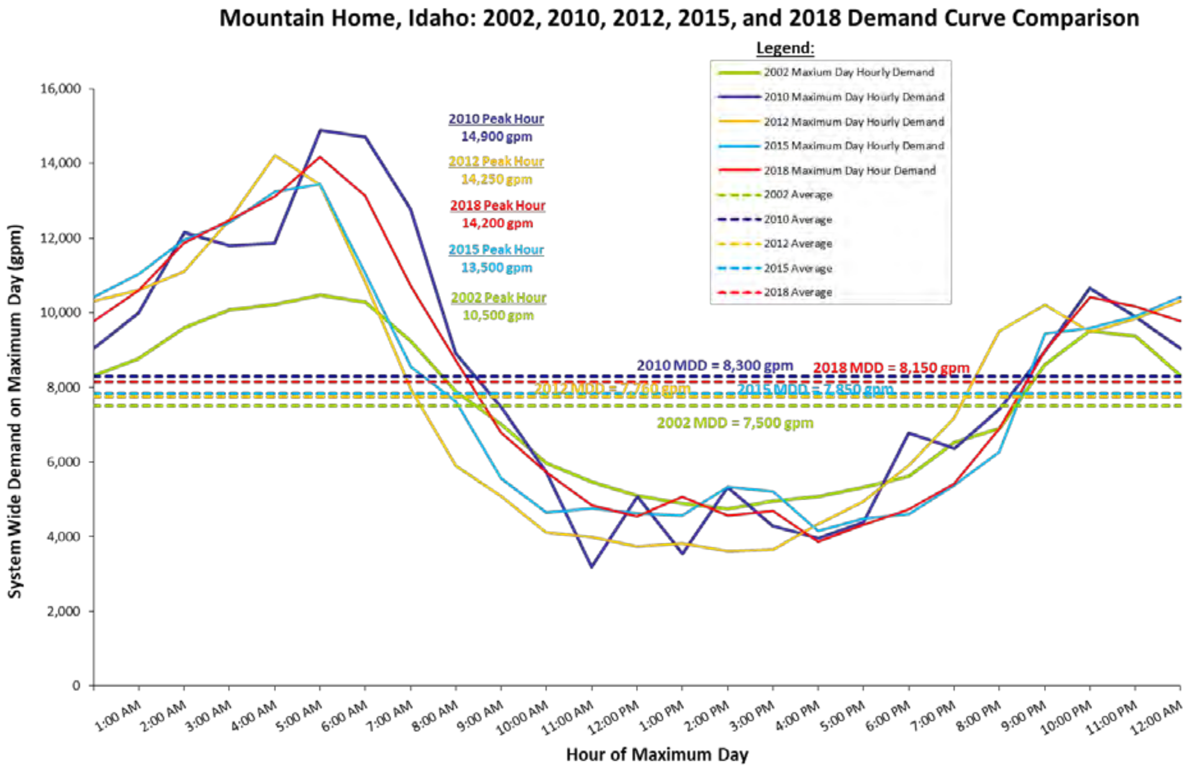


Figure 2.3 compares monthly water production and water consumption (from individual meter data). Because the metering period doesn't always align with the well production month and typical logs, we recommend estimating water loss based on an annual basis or a 12-month moving average. The difference between the two accounts for approximately 13% of the water produced annually, and represents both unaccounted-for water usage and water loss. This is an improvement over the last facilities planning study, where the water loss was approximately 19%. However, this number is higher than the 10% unaccounted-for water reported in the 2015 declining balance report.

The City is currently working on improving their water metering and accounting efforts with the hope of reducing the amount of unaccounted-for water usage. Keller Associates recommends that the City continue to conduct water balances and expand their metering efforts to better quantify actual existing water loss, with the goal of reducing the unaccounted for water and water loss to below 10% of the water produced.

Figure 2.3 – Water Production vs. Consumption

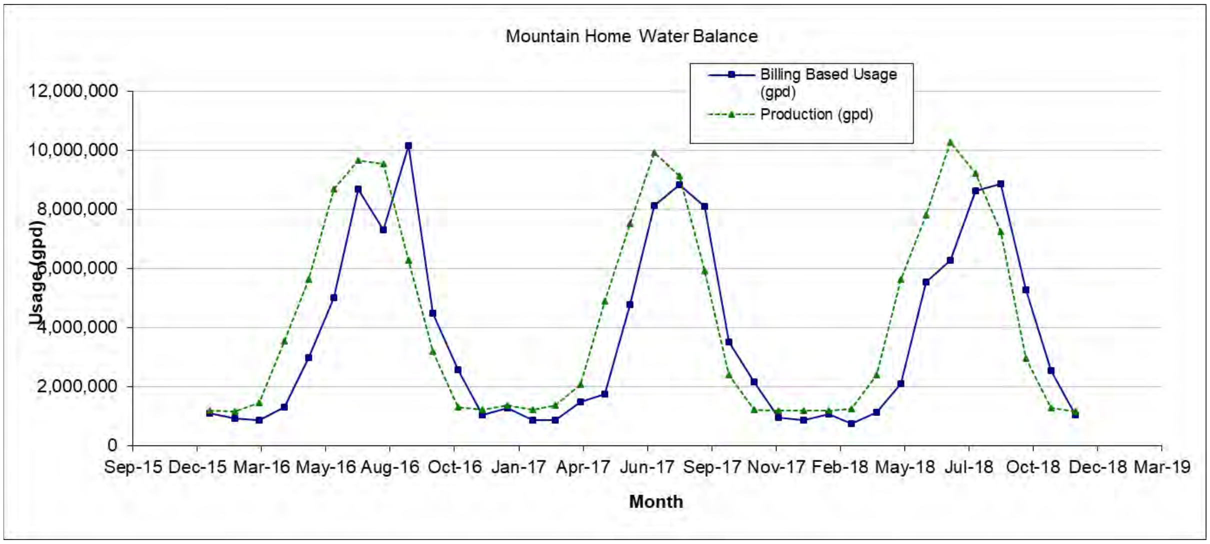
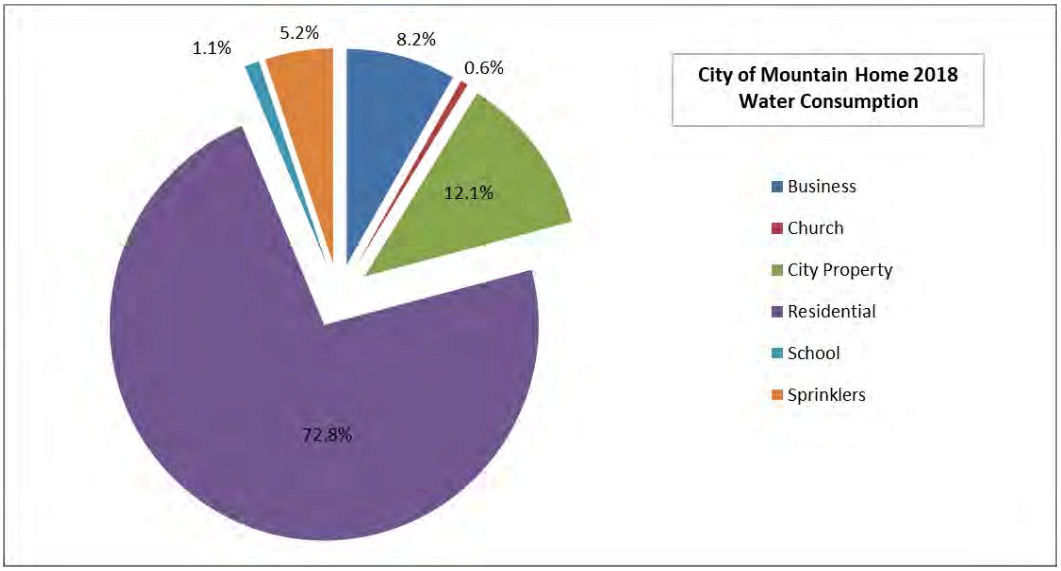


Table 2.4: 2016 – 2018 Unaccounted for Water

Year	Recorded Well Production (MG/yr)	Billing Based Consumption (MG/yr)	Annual Water Loss (%)
2016	53	46	12%
2017	48	43	11%
2018	52	44	15%

Total system demands consist of commercial/industrial and residential demand components. Figure 2.4 illustrates the breakdown of water usage in Mountain Home. Residential usage, the total of single family and multi-family residential, amounts to approximately 73% of the annual water usage. Overall, approximately 70% of the total volume of water consumed is used for irrigation.

Figure 2.4 – Average Day Water Usage By Customer Class



It is assumed that the residential and commercial demand components of the current per capita demand will continue to grow at the same rate in the future. From discussions with City staff, it is anticipated that there will be an increase in industrial users in the coming years. For the next 20 years, an assumed demand increase from industrial users of 1,000 gpm was included in analysis. Projections for future residential and commercial system demands are based on the existing per capita demands multiplied by future population values, and it is assumed that an additional 50 gpm of industrial demand is added each year, beginning in 2020, to accommodate an increase of 1,000 gpm in 20 years. This information is summarized in Table 2.5.

Table 2.5 – Future System Demands

Estimated Year	Total Population	Average Day Demand	Max Day Demand	Peak Hour Demand	Average Summer Day Demand	Average Winter Day Demand
2018	14,260	3,000	8,150	14,200	6,340	830
2019	14,474	3,050	8,270	14,410	6,440	840
2020	14,691	3,140	8,450	14,680	6,580	910
2025	15,835	3,580	9,300	16,020	7,290	1,170
2030	17,069	3,840	10,010	17,250	7,840	1,240
2035	18,398	4,120	10,760	18,570	8,430	1,320
2040	19,831	4,420	11,580	20,000	9,070	1,400

2.5 WATER STORAGE CRITERIA

A detailed storage analysis for Mountain Home is presented in Chapter 3 of this report. However, general recommendations and definitions for various storage components are presented here:

- Operational Storage. Operational storage is the volume of water drained from the reservoirs during normal operation before the water sources begin pumping to refill the reservoir. Keller Associates recommends using approximately 15% of the total storage volume for operational storage to provide appropriate pump run times and adequate tank mixing.
- Peaking or Equalization Storage. Peaking storage refers to the storage required to meet peak hour demands in excess of the supply pumping capacity.
- Fire Protection Storage. Fire protection storage provides the volume necessary to meet maximum fire demands for the specified duration.
- Emergency Storage. Idaho DEQ recommends a minimum volume or emergency supply equivalent to 8 hours of average day demand for extended power outages. This storage can be reduced if wells are equipped with standby power.
- Dead Storage. This is the volume in the reservoir which cannot be used due to physical constraints. Generally, this is the volume of storage below the elevation of the tank outlet pipe and above the tank overflow elevation.

2.6 DISTRIBUTION NETWORK CRITERIA

Planning for the distribution network involves establishing performance standards for pressures and flows throughout the system. The design flows through the system are the largest flows reasonably anticipated to occur. For the city of Mountain Home, these flows result from a fire event during the system's maximum day demand.

In evaluating fire flow for existing residential areas, we assumed a minimum fire flow requirement of 1,000 gpm above 20 psi for 2 hours. It is recommended any new development be provided a minimum fire flow of 1,500 gpm at 20 psi. Aside from residential areas, the Idaho Surveying and Rating Bureau (ISRB) has identified several areas in Mountain Home which currently require more than 1,000 gpm at

20 psi. For Mountain Home, there are approximately 19 structures with fire demands of 2500+ gpm, of which 2 have demands of 4000+ gpm. Keller Associates recommends that a maximum fire demand of 4000 gpm for 4 hours be provided. This is consistent with previous planning assumptions and industry standards. A copy of the original ISRB data along with a letter from the local fire authority can be found in Appendix C. For future growth in areas zoned commercial/industrial, a minimum of 2,500 gpm at 20 psi for 2 hours is recommended.

In addition to design standards for the delivery of flow rates, standards for system pressures are necessary for the normal daily operation of the water system. The aim of standards for pressure is to provide safe and reliable service to water users under a variety of system conditions. If pressures are too high, damage can occur within the distribution system and at points of use. If pressures are too low, a variety of issues arise including back flow contamination, and low or no water availability. The recommended distribution pressure standards for new connections are listed in Table 2.6. These pressures are consistent with current DEQ standards.

Table 2.6 – Distribution System Pressure Standards

System Scenario	Pressure (psi)
Peak Hour Demand Event - Minimum	40+
Maximum Day Demand Plus Fire - Minimum	20+
Mainline Pressures - Maximum (without special pipe design)	100
Pressures at service without Pressure Regulator - Maximum	80

3.0 EXISTING FACILITIES EVALUATION AND ALTERNATIVES

The Mountain Home water system is comprised of nine potable water wells, four storage reservoirs, two booster stations, and a network of distribution pipelines that conveys water to users spread throughout three pressures zones. This chapter provides an analysis of Mountain Home's existing system components of supply, storage, delivery, and distribution with respect to the design criteria presented in Chapter 2 of this report. The most recent Sanitary Survey performed on the Mountain Home's water system in April 2018 revealed four deficiencies, primarily concerning proper screening on well overflow/discharge lines, an open port on a well, and secondary containment for fuel. All of these deficiencies were addressed by the City prior to October 10th, 2018 and are not included as part of this existing system evaluation. A copy of the action summary of the Sanitary Survey has been included in Appendix F for reference.

3.1 STUDY AREA

The study area was developed in close coordination with City planning staff. Areas of probable residential and commercial development were identified. Figure 3.1 in Appendix A illustrates the study area and land use contemplated for this planning study. This planning effort focuses on the projected 2040 growth areas.

3.2 EXISTING ENVIRONMENTAL CONDITIONS

This portion of the report presents a general overview of existing environmental conditions within the study area. Should the City seek DEQ funding for priority improvements, a separate Environmental Information Document (EID) will need to be completed.

3.3.1. Physical Aspects: Topography, Geology and Soils

The City of Mountain Home is relatively flat, with elevations ranging from approximately 3,080 to 3,400 feet above sea level. The highest elevations are north and east of the City, with elevations dropping to the south and west.

The main soil units in and around the City of Mountain Home include Chilcott-Power complex, Power silt loam, Colthorp-Kunaton complex, and Chilcott-Kunaton-Chardoton complex. Issues to be considered in design and construction relative to these soils include a high risk of corrosion to steel, difficulty digging and potential for sloughing when digging trenches.

Many areas in Mountain Home are underlain with shallow basalt layers, requiring rock excavation for underground construction. The most important geologic information for the proposed improvements is the depth to rock.

3.3.2. Surface and Groundwater Hydrology

Rattlesnake Creek is the primary drainage through the Mountain Home area, extending from the Mountain Home reservoir northeast of the City to an area south of the City. There are no outfalls to waters of the United States. All water that flows in Rattlesnake Creek is either fully diverted for irrigation use or is diverted to open areas where it can percolate into the ground. Water in Rattlesnake Creek is largely controlled by the Mountain Home Irrigation District, which also maintains several canals that run through and around the City.

The City is located within the Mountain Home Groundwater Management area. Water supply comes primarily from fractured basalt layers and some sedimentary layers near the Rattlesnake drainage. Groundwater levels generally follow the ground contours; however, higher levels are observed north and east of the interstate. Well yields vary substantially in the area around the City.

3.3.3. Fauna, Flora, and Natural Communities

Those species documented in Elmore County that are listed as endangered, threatened, proposed, and candidate species by US Fish and Game (as of 10/24/2018) are listed below:

Threatened:	Canada Lynx, Bull Trout, Bliss Rapids Snail,
	Slickspot Peppergrass, Yellow-billed Cuckoo
Endangered:	Snake River Physa Snail
Candidate:	Greater Sage-Grouse, Whitebark Pine, North American Wolverine
Recovery:	Gray Wolf

None of these species are anticipated to be found within the Mountain Home urban area where most of the proposed improvements would be constructed, but could be present in areas around the City not previously disturbed.

3.3.4. Housing, Industrial, and Commercial Development

Refer to Section 3.2.12 – Land Use and Development.

3.3.5. Cultural Resources

There are 11 buildings in Mountain Home currently listed in the National Register of Historic Places. None of the proposed improvements would affect these properties. The majority of the construction of the proposed improvements will be in the roadways or the designated rights-of-way with little or no impact on buildings in the vicinity.

This region is under the ancestral jurisdiction of the Shoshone-Bannock Tribes, the Burns-Paiute Tribe and the Shoshone-Paiute Tribes.

3.3.6. Utility Use

Water usage is discussed in Chapter 2 of this report. The annual average daily water demand in 2018 was 3,000 gallons per minute (gpm), which equates to 303 gallons per capita per day (gpcd). The average water usage has remained relatively constant since 2005, due to water conservation efforts, more efficient fixtures in newer homes, and water rate increases. Average summer demands are approximately 7.64 times higher than average winter demands, driven primarily by irrigation water usage. Peak hour water demands were estimated to be approximately 1.74 times the peak day demand. Projections for future system demands are based on existing per capita demands.

Refer to Section 3.2.15 – Energy Production and Consumption for a discussion of electrical usage.

3.3.7. Floodplains / Wetlands

There is a mapped floodplain for the Rattlesnake drainage (see Appendix G). Any facilities located within this floodplain would need be located above the reported flood elevations and/or be flood proofed.

The nature of the climate and waterways in Mountain Home is such that there are wetlands in the study area, and approximately 80 percent of them are smaller than five acres. The wetlands in the Mountain Home study area are classified as freshwater emergent, freshwater forested/shrub, freshwater pond, and riverine. Much of the wetland vegetation that may be encountered is a result of seasonal irrigation delivery canals or small seasonal ponds. For any projects that involve disturbances to jurisdictional wetlands, formal consultation with the U.S Army Corps of Engineers, the Idaho Department of Water Resources, and the Idaho Department of Lands will be required to obtain nationwide 404 permits for stream crossings or wetland alteration.

3.3.8. Wild and Scenic Rivers

There are no designated or proposed wild and scenic rivers in Mountain Home, or within the vicinity of the proposed projects.

3.3.9. Public Health and Water Quality Considerations

There have not been water quality violations related to the potable water supply for the City of Mountain Home. The existing municipal wells are all equipped with chlorination to protect public health. Project improvements are intended to improve, or otherwise sustain, public health protection and water quality by providing safe drinking water, adequate storage, and improved system pressures.

3.3.10. Important Farmlands Protection

Approximately two-thirds of the non-urban land in the Mountain Home planning area is designated by NRCS as prime farmland if irrigated. (Of the primary soil units listed in 3.2.1, the Chilcott-Power complex and Power silt loam are considered prime farmland if irrigated; the Colthorp-Kunaton and Chilcott-Kunaton-Chardoton complexes are not.)

The City of Mountain Home has historically discouraged “leapfrog” development. Future development is expected to occur close to the existing city limits but will eventually involve development of irrigated farmlands located near the City.

Most priority improvements are anticipated to be located within areas previously disturbed by development. Most future pipeline improvements are anticipated to be located within existing or future right-of-ways. In some cases, future pipelines may be constructed within easements through unimproved or agricultural lands.

3.3.11. Proximity to a Sole Source Aquifer

The City of Mountain Home is not over a sole source aquifer. The sole source aquifer closest to Mountain Home is the Eastern Snake River Plain Aquifer. The westernmost edge of the Eastern Snake River Plain Aquifer is at King Hill, 34 miles east of Mountain Home.

3.3.12. Land Use and Development

Figure 3.1 in Appendix A shows the existing land use in the study area, as well as anticipated future growth for both residential and commercial developments. The land use inside the city limits and impact area is primarily residential, commercial and industrial areas previously developed. Areas outside of the city limits are mainly agricultural lands.

Most priority improvements are anticipated to be located within areas previously disturbed by development. Most future pipeline improvements are anticipated to be located within existing or future right-of-ways. In some cases, future pipelines may be constructed within easements through unimproved or agricultural lands. In the event of a conflict between the selected improvement locations and preservation of cultural resources, the final locations or routes may need to be revised.

3.3.13. Precipitation, Temperature and Prevailing Winds

The climate summary for Mountain Home (1981 through 2010) shows average minimum temperatures in Mountain Home ranging from 21.4°F to 56.4°F and average maximum temperatures ranging from 38.1°F to 93.4°F. Over this same period, the total annual precipitation averaged 10.55 inches with a snowfall average of 11 inches. The wettest month is December; the driest month is August.

Based on Western Regional Climate Center wind data for Mountain Home (May 2002 to 2013), the prevailing wind direction is northwest at an average wind speed of nearly 12 mph. Winds averaging over 13 mph are experienced 21% of the time, while winds less than 1.3 mph (calm) occur about 9% of the time.

3.3.14. Air Quality and Noise

No existing air quality or noise issues have been identified for Mountain Home.

There are no anticipated long-term adverse impacts to the air quality and noise levels from any proposed improvements. Proposed improvements may have a temporary local impact on noise and air quality (dust) during construction. Best management practices during construction can mitigate against airborne dust during construction.

3.3.15. Energy Production and Consumption

The existing water system utilizes electrical energy for pumping water from wells throughout the distribution system. The City's existing SCADA system is used to optimize energy consumption. Additional storage facilities and transmission improvements will reduce head loss in the system and increase well pumping rates.

3.3.16. Socioeconomic Profile / Population Statistics

Based on 2016 census data estimates, approximately 65% of Mountain Home's population 16 years old and over were employed, compared with a 63% Idaho average. The median household and family incomes in Mountain Home were $47,816 and $59,252, respectively. Approximately 14.2% of Mountain Home families were below the poverty level, compared with 10.7% of Idaho families and 11.0% of United States families on average.

With periodic increases in water rates, the City will be able to continue funding proposed improvements. Specific landowners will not benefit substantially more than other landowners due to the location of the proposed facilities. It is anticipated that these improvements will have little impact on the land values in the City of Mountain Home. There are no poor or disadvantaged groups that will be adversely impacted; conversely, such groups would benefit by the improved water quality and delivery capabilities of the water distribution system.

Historical and projected populations are found in Chapter 2 of this report. Based on historical population growth rates, assumes an annual population growth rate of 1.5% and results in 2030 and 2040 populations of 17,069 and 19,831 people, respectively.

3.3 Potable Supply

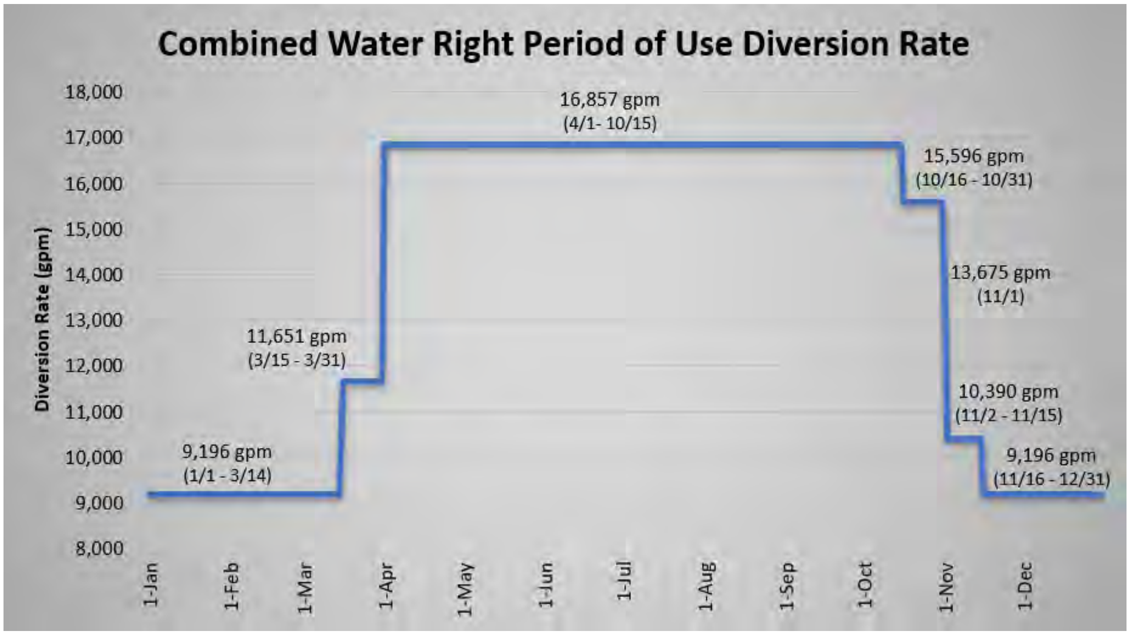
The City currently supplies the water system from groundwater wells. An evaluation of the conditions of these facilities, completed in April 2018, is documented in the Inspection Finding Form and email found in Appendix F, as well as the latest Sanitary Survey Action Summary. The City maintains files for each of their wells to track operation and maintenance activities, pump run times, and well production. Continuous SCADA data is also monitored for alarms, security, flows, pressures and drawdown.

The City currently has potable water rights for 16,857 gpm, of which 7,661 gpm are restricted to summertime irrigation. With these rights, the City can supply all its existing wells as they turn on during high demand situations. In addition to the groundwater rights, the City also owns irrigation shares in the Mountain Home Irrigation District. Irrigation shares are the primary source of water for the City's golf course. Information for the City's water rights are summarized in Table 3.1 and Figure 3.1 below, as well as in Appendix C.

Table 3.1 – Summary of Water Rights

Type	Basin	Sequence	Suffix	Priority Date	Div. Rate (cfs)	Actual Div. Rate (gpm)	Period of Use	Water Use
WR	61	2072		3/13/1931	2.00	898	1/1 - 12/31	Municipal
WR	61	2167		4/6/1964	1.97	884	4/1 - 11/1	Municipal
WR	61	2170		5/27/1964	9.64	4,326	1/1 - 12/31	Municipal
WR	61	2188		2/17/1966	2.66	1,194	3/15 - 11/15	Municipal
WR	61	2210		9/30/1966	5.35	2,401	4/1 - 11/1	Municipal
WR	61	7151		4/9/1973	1.14	512	4/1 - 10/31	Municipal
WR	61	7172	F	11/19/1973	2.81	1,261	3/15 - 10/15	Municipal
WR	61	7184		4/22/1974	4.35	1,952	1/1 - 12/31	Municipal
WR	61	7339		8/18/1977	4.50	2,020	1/1 - 12/31	Municipal
WR	61	7439		6/10/1981	3.14	1,409	4/1 - 10/31	Municipal
Total					37.56	16,857		

Figure 3.1 – Summary of Use Diversion Rate



The Groundwater Source Redundancy Rule, found in the Idaho Rules for Public Drinking Water Systems (IDAPA 58.01.08.501.17), requires under normal operating conditions, with any well out of service, the remaining wells shall be capable of providing either peak hour demand of the system or maximum day demand plus equalization storage. The pumping capacity with one well off-line is referred to as the system's firm capacity. The system's firm capacity is used when comparing the supply and demand.

A review of the well pumping capacities at each of the well sites indicates that the City has the capacity to pump all their water right during summer months from their potable wells (total pumping capacity of 12,000 gpm) as well as the farm well (estimated capacity of 1500 gpm). The City can construct two additional 1,500 gpm wells without exceeding their existing water rights during summer months. Table 3.2 summarizes the pumping capacity of each of the City's wells and the system's total firm capacity.

Table 3.2 – Observed Capacity of Wells in Mountain Home

	Observed Pumping Capacity, gpm		
Existing Water Supply	2013	2015	2018
Well 1	800	750	700
Well 6	2,100	2,000	2,000
Well 9	1,550	900	900
Well 11	2,100	2,150	2,100
Well 12	1,200	1,200	1,200
Well 13	2,100	1,950	1,950
Well 14	1,200	1,200	1,200
Well 15 (VFD)	1,200	1,100	1,100
Well 16			850
Total Production Capacity	12,250	11,250	12,000
Less Largest Well	(2,100)	(2,150)	(2,100)
Firm Pumping Capacity	10,150	9,100	9,900

Based on data provided by the City, the firm capacity is 9,900 gpm and the total production capacity is 12,000 gpm. This total production capacity is estimated to serve an additional 4,070 equivalent dwelling units (EDUs). The firm capacity is estimated to serve an additional 1,850 EDUs. As the population continues to grow, a new well would be needed for every 1,580 EDUs. In addition, Mountain Home is anticipating the introduction of industrial entities into the City. This may lead to an anticipated 1,000 gpm of additional demand. Meeting the projected domestic and industrial demands would require two additional wells in the next 20 years. In planning for future wells, the City should begin several years before the wells are needed to ensure that water rights, permitting, and test wells can be completed prior to actual well drilling and construction of well pumping facilities. Keller Associates recommends that new well supply provisions be underway before the City's maximum day demand exceeds 90% of their firm capacity. Additionally, it should be noted that adequate peaking storage and transmission piping are required to realize the full benefit of each well.

An evaluation of alternative well locations was completed by Brockway Engineering and documented in "Hydrogeologic Assessment of Potential Well Sites for the City of Mountain Home" dated February 20, 2019, a copy of which can be found in Appendix I.

3.5.1. Alternatives for Addressing Supply Shortfall

In general, alternatives for addressing the City's projected supply shortfall include doing nothing, reducing demands, or increasing supply. This section reviews options under each of these categories:

<u>No Action</u>

If the City were to do nothing, and population and industrial development in the city continued to grow as assumed, the maximum day demand is expected to exceed the 90% firm supply by 2025 and surpass the 100% firm capacity by 2030. Under the scenario that the largest well is offline during the peak demand periods, the storage tanks would eventually run dry and system pressures could potentially drop to substandard levels and pose a public health risk. To avoid this risk, the city would need to put a moratorium on new growth or otherwise reduce system demands.

<u>Mandatory Curtailment</u>

To mitigate the potential impacts of a projected supply shortfall, the City could develop a mandatory curtailment plan that would effectively force a reduction in system demands during potentially high usage periods. The curtailment plan might specifically target irrigation usage. One drawback to this option may be damage to existing landscaping and the expense and manpower to enforce the curtailment plan. Mandatory curtailment is not a permanent solution to the issue because the gap between supply and demand will continue to grow over time, unless the City institutes a moratorium on all new development.

<u>General Water Conservation</u>

The City of Mountain Home is taking steps to conserve water. The City does not currently have a formal water conservation plan, but periodically engages in public education efforts to encourage better water usage. Public education efforts are believed to be partially responsible for the high night-time irrigation pattern evident in Mountain Home. Since the last facility plan update in 2011, an inclining rate structure has been adopted, that charges residents a progressively increasing amount the more water is used. The average household gallons per day usage has remained relatively constant since the previous master plan and declining balance updates performed in 2013 and 2015.

Potential elements to be included in a water conservation effort include:

- Use newspaper, websites, or radio advertisements to promote water conservation topics.
- Involve grade school students in promoting awareness.
- Educate the general public regarding the net effect of small actions with specific examples of water conservation and water wastefulness. For example, quantify how much water is wasted through small household leaks over the course of year, or running water to let it get cold as opposed to refrigerating drinking water.
- Host lawn care and landscaping classes identifying optimum water usage and highlighting consumption rate limits for typical lawns, gardens, and shrubs.
- Establish a means for strictly regulated irrigation (citations for infractions).
- Provide both positive and negative incentives for water conservation to all customers.
- Require water-saving fixtures on all new residential construction. Consider a retrofit water-saving fixture program.
- Continue leak detection and elimination efforts.

Surface Water Supply

The closest reliable surface water supply is the Snake River. The 2003 Water Facilities Planning Study completed a cursory investigation for a surface water supply from the Snake River. In 2008, the City participated in a regional surface water supply investigation for the Elmore – Ada County area. As evident from these evaluations, the surface water alternative is substantially more costly than continuing with groundwater sources. In 2016, SPF Water Engineering produced for the Idaho Water Resource Board a report titled Mountain Home Air Force Base, Snake River Surface Water Supply. This report evaluated a new surface water supply for the Mountain Home Air Force Base. SPF later produced a technical memorandum dated May 9, 2016 that provided an initial cost allocation to the City of Mountain Home should the City participate in the project. Given the large capital investment and increased operations and maintenance costs, the City elected to take no further action.

In addition to a possible future Snake River supply source, it should be noted that the City of Mountain Home is looking at other surface water supply sources. These include:

- Ongoing use of the Mountain Home Irrigation District water shares for irrigation of the golf course. Keller Associates recommends that the City continue to acquire additional shares as they become available.
- Potential acquisition of senior water rights that predate the Mountain Home Irrigation District. These rights would be more reliable the District shares, but still not be as reliable as groundwater sources. Additionally, using these water rights for potable consumption would be considerably more expensive than using groundwater. A more cost effective alternative may be to use these rights for industrial process water and/or a localized separate pressure irrigation system.
- Ongoing efforts to divert excess surface water spring runoff into large groundwater infiltration basins north and east of the City.

Because of continued declines in the ground water in and around Mountain Home, the area around Mountain Home has been designated as a Groundwater Management area. Eventually, groundwater management practices may result in curtailment or water rights acquisitions or other measures to bring the system into balance. Recognizing these concerns, the city purchased its most recent water rights and has implemented water rights fees for new developments. These factors affecting the future sustainability of the existing groundwater supply indicate that the surface water may become a more likely option at some point in the future.

While surface water is unlikely to be part of the City's 20-year water supply portfolio, given the declines in the aquifer, the City should consider surface water supply as part of the City's long-term supply portfolio. In the future, should the Mountain Home Airforce Base (MHAFB) elect to proceed with a surface water supply, Keller Associates recommends the City consider negotiating with the MHAFB to pay for the incremental additional cost to upsize the transmission pipeline in exchange for a right to convey the incremental additional water capacity in the pipeline.

Additional Capacity from Existing Wells

The City has previously explored increasing the capacity of existing wells. In 2006, Well 6 was rehabilitated and a new pump was installed capable of delivering approximately 500 gpm more than the previous pump. The Well 14 hole was reamed out in 2005 so that the capacity of this well could be increased to 1100 gpm. Within the last decade Well 12 was rehabilitated to increase its well yield and Well 9 was restored to operation.

There is a potential that additional capacity could be obtained from Wells 11 and 13. Historical records show that one of these wells was pump tested at 3500 gpm with little additional drawdown. The challenges with increasing the capacity of one of these wells are threefold. First, the pressures in this region of the system are already much higher when both wells are operational. Increasing the supply in this region will require substantial additional off-site transmission improvements. Second, increasing only one well to 3500 gpm would not increase the firm capacity of the system. According to DEQ regulations, the largest well – now 3500 gpm, instead of 2100 gpm -- would have to be assumed to be off-line in evaluating the system's firm capacity. Third, the City has a number of 500 hp wells which allows the City to keep spare motors and other parts for quicker repairs. A 3500 gpm well would require a substantially larger motor and generator.

Given the nature of groundwater within Mountain Home, it is likely that the only wells that could have increased capacity without significant drawdown or reduction to the main aquifer would be Wells 11 and 13, both of which are already pumping at their anticipated capacity. Because of this, it is not recommended to pursue pulling additional capacity from existing wells.

New Wells

The City may consider either constructing new wells or acquiring existing private wells. One advantage to acquiring an existing well is that it removes some of the guesswork with respect to capacity and quality that are often part of constructing a new well. Keller Associates recommends that any new well construction be equipped with the capability to add disinfection in the future even if it is not currently used.

As part of an effort to assess suitable locations for a new well, Brockway Engineering was retained to perform a hydrogeologic assessment of potential well sites for the City, see Appendix I for the completed report. The study examined the hydrogeologic conditions at several sites of interest for a new City well, and summarized the likely maximum yields, drawdowns, and water levels at each of the sites. Based on this analysis and City input, the location chosen at the existing City Public Works Shop is recommended as the site for the new well. This decision was based on the hydrogeologic conditions, the accessibility and existing security of the site, and the fact that the City already owns the land. Because of the uncertainty of water quantity, test holes and test pumping are recommended for future well facilities.

3.4 Existing Potable Water Quality and Treatment

Water quality sampling occurs regularly at each well and at various locations within the distribution system. Existing water quality data for 2015 through 2017 is summarized in the City's Consumer Confidence Report (CCR), which can be found in Appendix E. The only treatment currently provided by Mountain Home is chlorination at each of the well sites. Chlorination is provided using tablet feed systems, which are regularly inspected and maintained by City staff. Chlorination is not required to meet drinking water quality standards but is recommended to maintain a chlorine residual in the system. The City plans on continuing with chlorination in future wells. If water quality standards require disinfection in the future, the City may need to provide additional contact time prior to delivery to the first customer.

3.5 Existing Storage Evaluation

With the completion of Tank 1B, the City has 4.99 MG of effective storage volume in four storage reservoirs. The storage component volumes presented here are effective storage volumes, and thus exclude unusable or 'dead' storage. Reservoir 1A is 105 feet in diameter and was originally constructed in 1964, with major upgrades (roof replacement) in 2001. Reservoir 2 is 55 feet in diameter and was constructed in 1975. The upper steel reservoir (Reservoir 3) was completed in 1993 and is 60 feet in diameter. The new tank, Tank 1B was completed in 2019 and has the same dimensions as Reservoir 1A. An conditions assessment with recommended improvements for each of the reservoirs was completed in 2018 (refer to Appendix H).

Table 3.3 – Existing and Anticipated Storage Volume

Site	Material	Pressure Zone	Volume
Reservoir 1A	Concrete	Main	1.88
Reservoir 1B	Concrete	Main	2.0
Reservoir 2	Steel	Main	0.51
Reservoir 3	Steel	Upper	0.60

In determining peaking storage needs, Keller Associates reviewed continuous SCADA data from June 23rd through June 26th of 2019, which appeared as maximum days in daily reporting. The 24-hour demand pattern below was developed from this evaluation. The peaking storage need was calculated assuming that the peak day water demand is equal to the well production supply, which resulted in a peaking storage equal to approximately 16% of the maximum day demand.

Figure 3.2 – Demand Pattern – Unit Curve

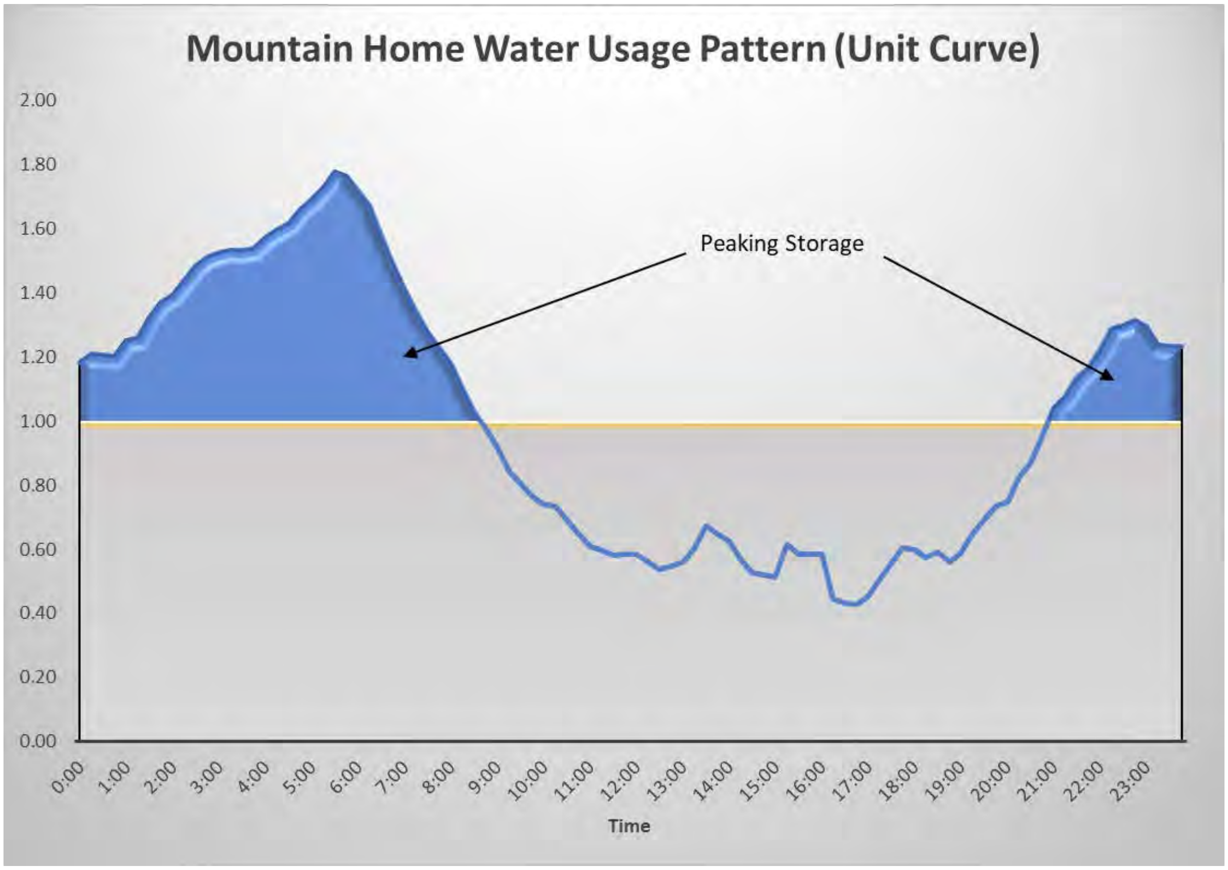


Table 3.4 summarizes the required storage volumes for both 2020 and 2040. The required storage volumes are based on the storage component requirements presented in Section 2.5 of this report.

Table 3.4 – Existing and Future Storage Components

Storage Component	Year 2018	Year 2040	Year 2040 - With Additional Standby Power
Population	14,260	19,831	19,831
Operating Storage[1] (gal)	498,600	498,600	498,600
Peaking Storage[2] (gal)	2,184,000	3,040,000	3,040,000
Fire Storage[3] (gal)	960,000	960,000	960,000
Additional Emergency Storage[4] (gal)	0	539,000	0
Total Storage Required (gal)	*3,642,600*	*5,037,600*	*4,444,444*
Total Storage Available (gal)	*4,986,000*	*4,986,000*	*4,986,000*
Storage Surplus (gal)	1,343,000	(51,000)	542,000

Notes:
1. Operating storage recommendation is 10% of total required tank volume.
2. Peaking storage calculated using the 24-hour demand pattern developed from summertime Mountain Home SCADA data.
3. Existing and future fire flow volume is based on 4,000 gpm for 4 hours.
4. DEQ requires that the system provide 8 hours of average day demands. This amount can be offset by water supply equipped with standby power.
5. Table summarizes effective storage needs only. Additional dead storage volume must be accounted for in pre-design and final design efforts.

The additional emergency storage requirement by DEQ, that the storage be required to provide 8 hours of average day demands, can be offset by water supplies with standby power. Currently, Wells 6, 14, and 16 are the only wells equipped with standby power, which offset this requirement. However, in the future, as demands increase, the current storage system will not be sufficient to cover the City's requirements through 2040.

3.6.1. Alternatives for Addressing Storage Shortfall

In general, some alternatives for addressing the City's existing storage shortfall include doing nothing, adding standby power, constructing new storage, reducing peak hour demands, and increasing supply.

<u>No Action</u>

If the City were to do nothing, the peaking storage need will continue to grow over time, and the tank will run dry during peak usage periods and pressures will drop below DEQ allowable levels by 2040. Additionally, inadequate storage would be available to fight fires and provide DEQ-required emergency storage. The City would also be required to notify those individuals/establishments for which the City is not able to provide adequate fire storage.

<u>Increasing Supply with Standby Power</u>

Adding new wells to the system, equipped with stand-by power could reduce the emergency storage requirement. By including standby power in the form of generators to the future wells, the DEQ requirement for additional emergency storage can be met. If the City decides to construct an additional 1,500 or 2,000 gpm well, and standby power is included, then the City can provide an additional 720,000 to 960,000 gallons of additional emergency storage, which is enough to compensate for the required 539,000 additional gallons required by 2040. This option is the least expensive, as it will coincide with recommended future improvement projects to address the supply shortfall. It also provides the added benefit of allowing the City to provide additional supply in the unlikely event of an extended power outage beyond that required by DEQ.

<u>Construct Additional Storage Tank</u>

The City's future 2040 storage deficit of 50,000 gallons is not substantial enough to warrant the construction of an additional tank within the next 20 years. With the recent addition of Tank 1B to the City's infrastructure and the cost to the City of that tank, it is not recommended that an additional storage tank be constructed in the next 20 years to address the City's storage deficit. However, as the City nears the 20-year planning period, constructing a new larger storage facility to service the future (ie. 2060) demands should be reconsidered.

<u>Reduce Peak Hour Demands</u>

A mandatory curtailment plan could be implemented as a means of reducing peak hour demands, and therefore reduce the peaking storage component of the needed storage. In the past, there have been circumstances that have required that the City not water their parks or water during the day. More drastic curtailment measures would be required to maintain emergency and fire storage levels in the tanks. One concern with encouraging more irrigation during the daytime (which would reduce the night-time peaking storage required) is that the total water demands could increase as a result of additional evaporation that occurs.

3.6 Booster Pumps and Pressure Zones

There are three pressure zones in the City of Mountain Home. The main pressure zone services the majority of the system. A high pressure zone serves the industrial / commercial area located on the east side of the city near Interstate 84 and Highway 20. The medium pressure zone was established to allow growth in the northern portion of Mountain Home. Table 3.6 summarizes the water supply sources and storage available to each pressure zone. A more detailed evaluation for each pressure zone follows.

Table 3.5 – Booster Pumps and Pressure Zones

Pressure Zone	Source Water	Primary Delivery	Backup Delivery	Available Storage
High	All Wells (indirectly via Pilot Booster)	Pilot Booster Station	Well 14 (emergency inter-tie into zone)	Tank 3 (directly); Tank 1A, 1B, 2 (indirectly via Pilot Booster)
Medium	All Wells (indirectly via Boosters)	Medium Pressure Booster; Pilot Pump 3	PRV located near Tank 2	Tank 3 (indirectly via PRV); Tanks 1A, 1B, and 2 (indirectly via Boosters)
Lower (Main)	All Wells (directly)	All Wells plus Peaking Storage from Tanks 1A, 1B, and 2	PRV from High Zone	Tanks 1A, 1B, 2 (directly); Tanks 3 (indirectly via PRV)

3.7.1. High Pressure Zone

Water is delivered to the Upper Pressure Zone by the Pilot Booster facility (formerly referred to as the Edgemeade Booster Station). The upper reservoir (Reservoir 3) provides fire storage to the pressure zone. The City installed an intertie between the Well 14 transmission pipeline and the upper pressure zone, as an emergency supply provision to the upper pressure zone. This intertie was used when the Pilot Booster Station upgrades were completed and requires manual operation of valves.

Keller Associates completed an analysis of fire protection for this zone and found that the City could provide 3000+ gpm for a period of 4 hours using 71% of the tank capacity (29% reserved for operational and peaking storage) plus the combined capacity of the two booster pumps. Well 14 was not assumed to pump into this zone to comply with DEQ's requirement for mechanical redundancy. Based on the fire demand requirements from the Idaho Insurance and Rating Bureau, the highest existing fire demand in this zone is only 2500 gpm. If the two booster pumps are out of service, the upper zone can supply 2 hours of 3,000+ gpm fire flow.

As part of this Facility Plan update, Keller Associates performed an update to the Declining Balance. We estimate that the Upper Pressure Zone can add approximately 240 EDUs before the booster pumping capacity needs to be increased. The Declining Balance Update is further discussed in Section 4.7 of this report.

3.7.2. Medium Pressure Zone

The Medium Pressure Zone is isolated from the system by normally closed isolation valves, a check valve, a pressure reducing valve, and booster pump stations. The medium pressure zone is served primarily from a booster station located near Legacy Park. This pump station is able to deliver approximately 1450 gpm. Since the last planning update, the Pilot Booster Station was equipped with another pump capable of supplementing this pressure zone with approximately 500 gpm. There are two backup supply sources to the medium pressure zone. A check valve located near the booster station will allow flow from the lower zone (approximately 40 psi), and a pressure reducing valve located near the Reservoir 2 (Pilot tank) site will supplement peak demands. The upper pressure zone provides fire storage and backup supply to the medium pressure zone via the pressure reducing valve.

Similar to the Upper Pressure Zone, Keller Associates performed a capacity analysis on the Medium Pressure Zone. The medium pressure zone was determined to have the ability to handle an additional 318 EDUs before the zone reaches capacity.

For planning purposes, Keller Associates has assumed that Well 9 will eventually be piped to the Medium Pressure Zone. Connecting Well 9 to the Medium Pressure Zone requires that Well 9 operate using a variable frequency drive (VFD). Installing a pressure reducing valve between the Medium Pressure Zone and the Main Pressure Zone is also recommended when Well 9 is directed to the Medium Pressure Zone. The addition of Well 9 to the Medium Pressure zone would allow for the addition of 547 EDUs, for a total capacity of 865 EDUs within the Medium Pressure zone. If Well 9 is not connected into the Medium Pressure Zone, then the City should consider a future supply source in the zone or consider adding additional booster capacity.

3.7.3. Main (or Lower) Pressure Zone

The Main Pressure Zone serves most of the system users. The piping in this pressure zone makes up roughly 90% of the total system piping. The Main Pressure Zone is supplied by the system wells that pump directly into the system or through the storage tanks. The storage needs of this system are provided by Tanks 1A, 1B, and 2. The High Pressure Zone serves as an emergency backup to the main pressure zone through a pressure reducing valve. As part of future improvements near Well 9, Keller Associates also recommends that a PRV (recommended setting at about 40 psi) be installed to allow for emergency backup supply to the main pressure zone via the medium pressure zone.

3.7 Distribution System Evaluation

An existing computer model of the City's distribution system was updated in conjunction with this study. Bentley's WaterCAD v10.01.01 was used to aid in the evaluation of the distribution and transmission system in its present and future states. The hydraulic model of the water system was updated from the existing mapping, input and corrections from City crews, and field investigations.

Keller Associates collaborated with City staff in calibration efforts which included collecting data on a series of coordinated pressures and flows at strategic points throughout the City's system (see Appendix B). Using the field data, the computer model was calibrated to simulate field conditions. This process resulted in more realistic model results used in the planning and evaluation process. Additional calibration information can be found in Appendix B.

This calibrated computer model of the water system can continue to serve as a valuable and cost-effective system planning and management tool for the City. It is recommended that the City update the model every one to three years to reflect changes in the physical attributes and usage patterns of the water system.

3.7.1. System Evaluation and Results

With the calibrated model, the existing distribution system was evaluated for compliance with the pressure and flow standards presented in Section 2.6 of this report. The following sections summarize the analysis results:

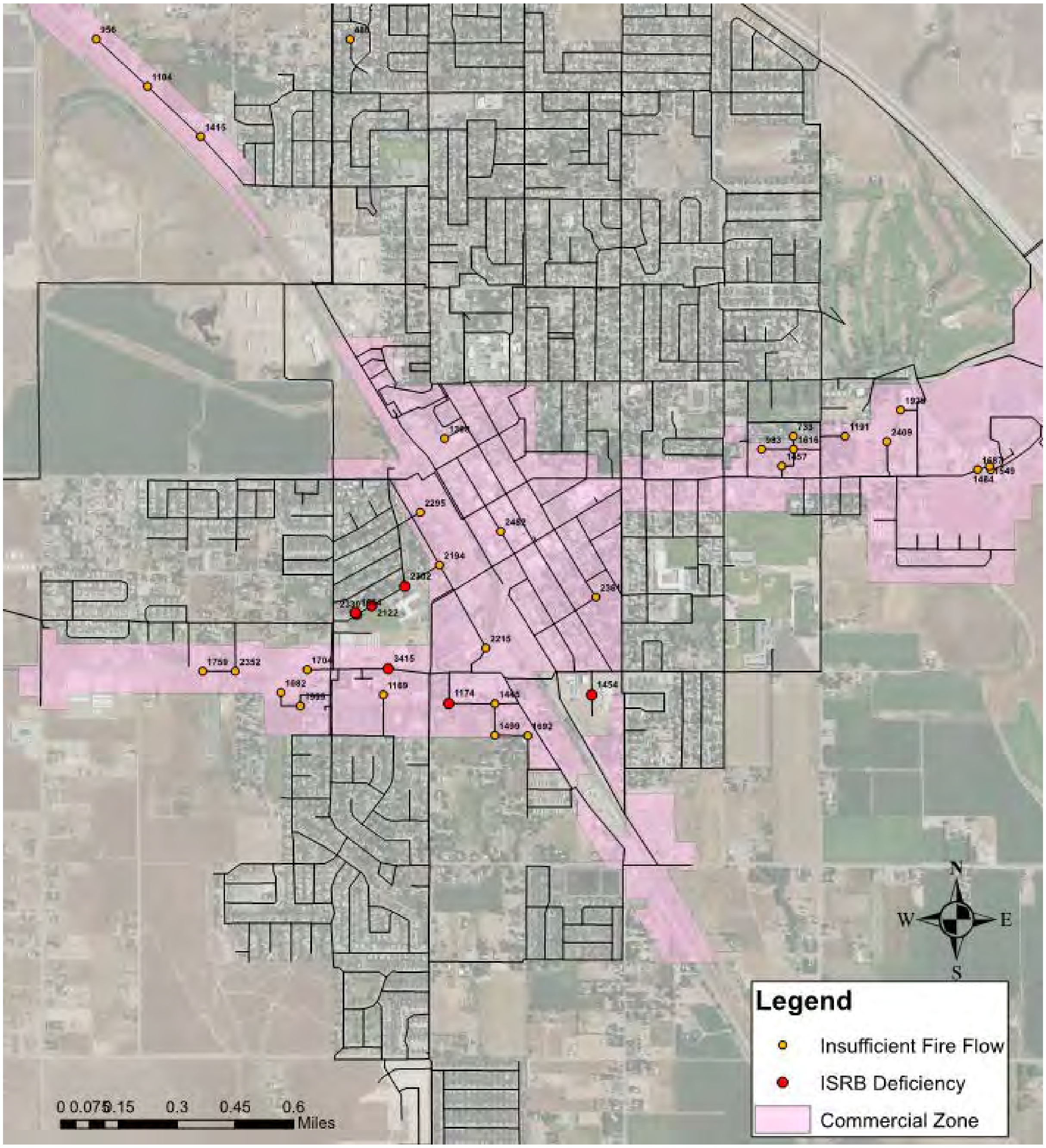
<u>Maximum Day Demand plus Fire Demands</u>

The model was populated with fire flow demands for areas with specific requirements identified by the ISRB and Mountain Home's local fire authority. These specific requirements can be found in Appendix C. A minimum fire flow of 1,000 gpm at 25 psi was selected as the default for the model evaluation if no specific fire flow requirement was identified by the ISRB or the local fire authority. The reason 25 psi was used instead of the 20 psi presented earlier in Section 2.6 was to allow for an additional planning 5 psi buffer; this accounts for potential discrepancies between the model and the real world. Service lines, transmission lines, or dead-end lines without hydrants or within 300 feet of another node capable of providing fire flow were eliminated from the fire flow evaluation. In addition, if nodes fell within a commercial zoned area, a minimum fire flow requirement of 2,500 was assigned.

Under maximum day demands with the largest well, Well 11, offline, the tanks at the lower end of the operating level, and the fire flow requirements stated, the system was tested with the criterion of pressures not dropping below 25 psi. The water model evaluates each node individually under maximum day demands with the specific fire flow requirement for that node, while considering pressures at other nodes in the system. The analysis is steady state and assumes adequate fire storage is provided to support the design durations. Figure

3.3 highlights the modeled nodes in the water system that do not meet maximum day demand plus fire requirements. Appendix A contains figures depicting the model results report for this and all other model evaluations discussed in this section. The pink shaded areas refer to the commercial areas where the higher fire flows are required.

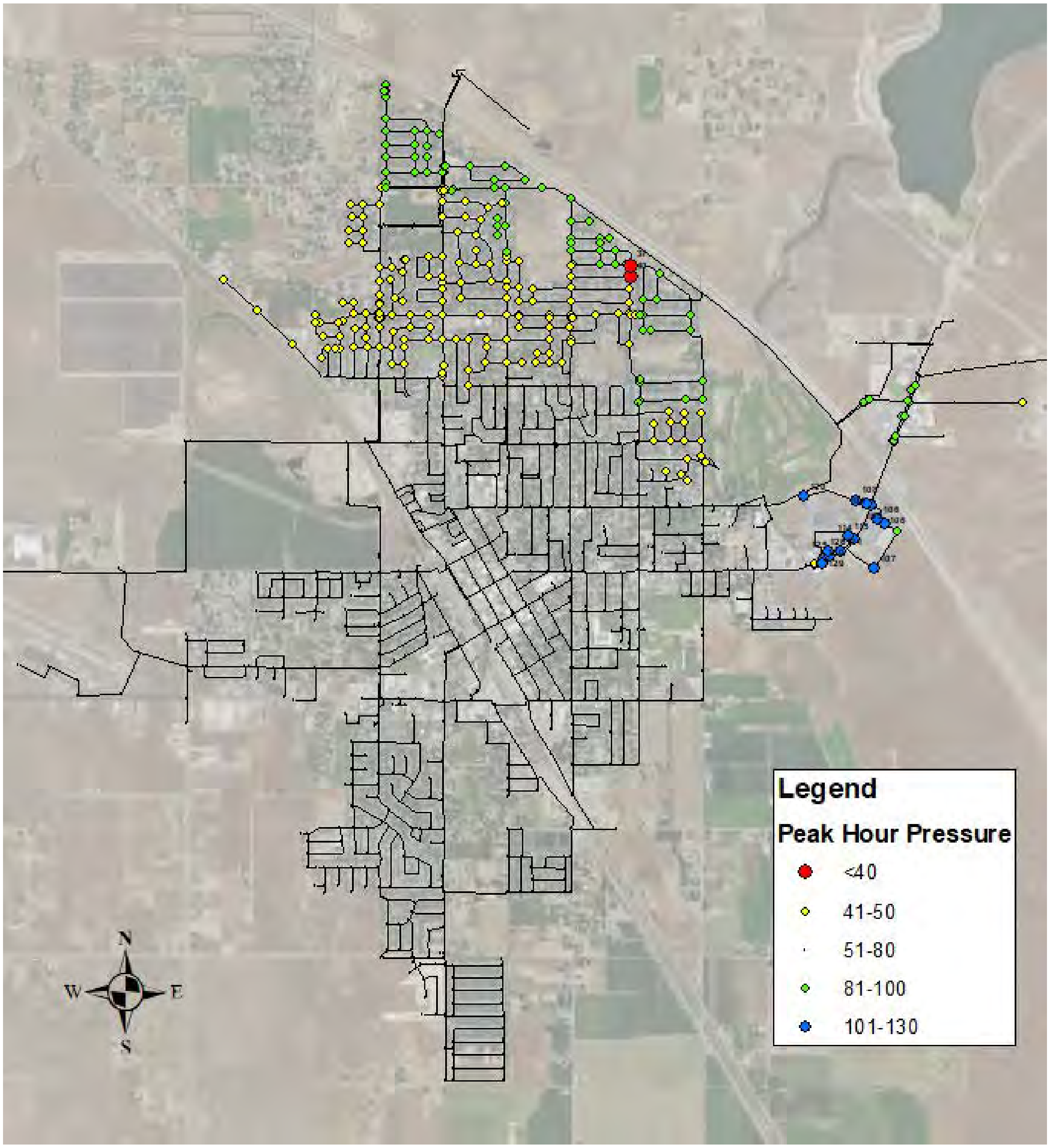
Figure 3.3 – 2018 Available Fire Flow Deficiencies



Peak Hour Demand

The system was also modeled under peak hour demands to check for pressures in the system dropping below 40 psi. An extended period simulation analysis was completed to determine tank levels at the time of maximum demand (and minimum pressures). Lowest system pressures were observed around 5 am and corresponded to tank levels of approximately 21-24 feet. During this time, one area on the border of the Main Pressure Zone and Medium Pressure Zone experienced pressures slightly below 40 psi. **Failure to correct these low pressures and the conditions that create them could result in DEQ enforced restrictions on development in the main (or lower) pressure zone.** Chart 3.4 highlights the system locations with peak hour pressures of 40 psi or lower under existing conditions.

Figure 3.4 – Existing System Locations with Pressures Less than 40 psi



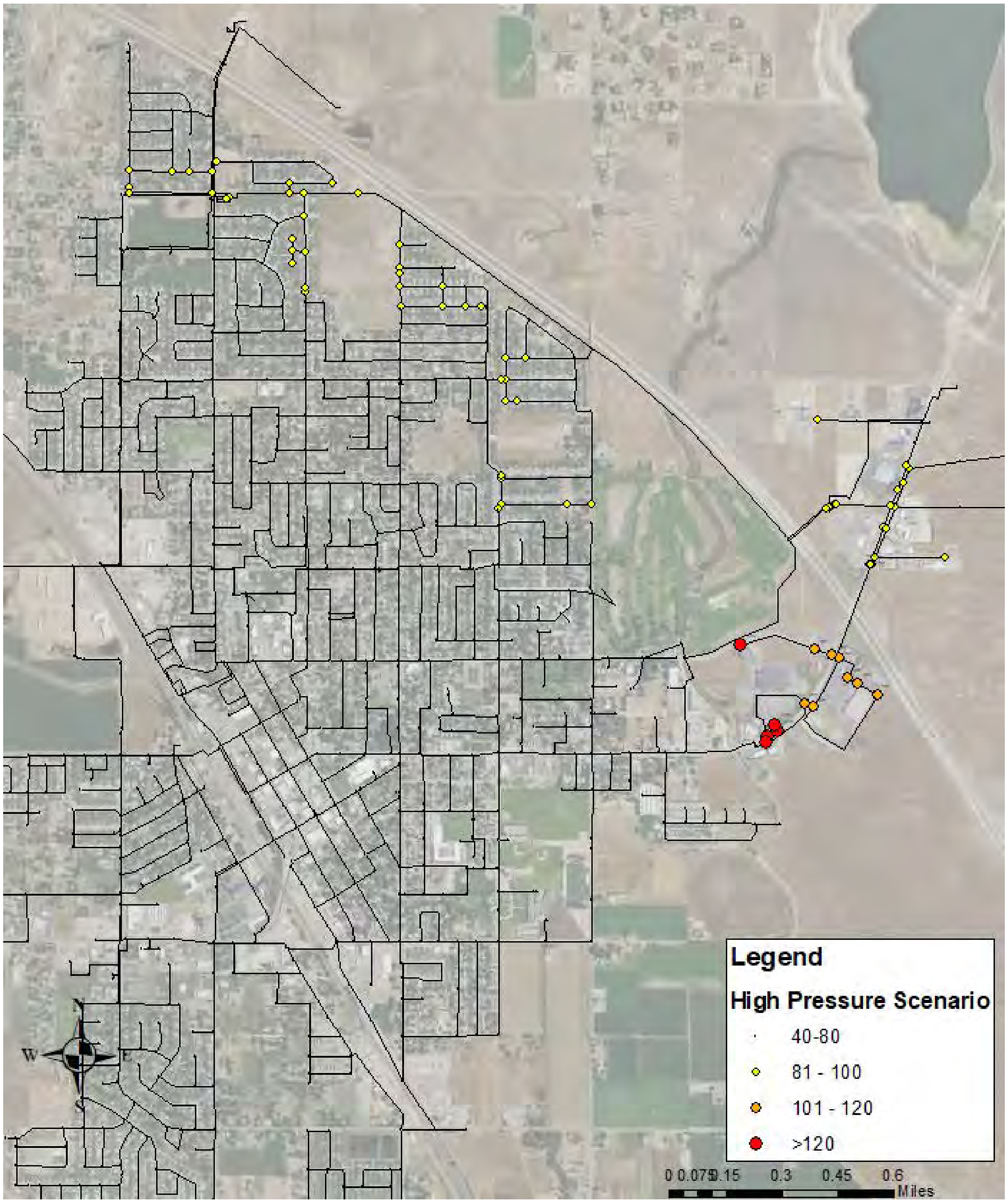
Maximum System Pressures

Chart 3.5 highlights areas with pressures exceeding 80 psi even after the well is turned off. Improvements completed since the last planning study have greatly improved system pressures, particularly the large pressure swings that occurred on the west part of the City. Those areas that experience pressures above 80 psi have done so since they were first installed (decades in some cases) with minimal concerns reported by City staff. Higher pressures in many of these areas are necessary to provide looping and to simplify system operations.

There is an area within the high pressure zone which experiences over 100 psi. This area is small, historical, and provides a looping benefit to this part of town. In addition, it services a commercial area, with no residential connections. There are currently no reported issues associated within this portion of the system. Additionally, reducing pressures in this area could have adverse effects on commercial fire suppression systems.

For any new development where pressures are anticipated to exceed 80 psi, Keller Associates recommends that the City require individual pressure regulators be installed in the homes/business. This will be the case for infill within the Medium Pressure Zone, where higher pressures are needed to maintain pipe looping and more efficient operation of the system. It should be noted that where the use of individual pressure regulating devices is considered, DEQ should be consulted to approve its use (IDAPA 58.01.08 Section 552.01.b.vi).

Figure 3.5 – Existing System Locations with Pressures Exceeding 80 psi



Operation & Maintenance

The City of Mountain Home Fire Department exercises all hydrants at least annually. Broken valves and hydrants are replaced as needed. The City also exercises all valves annually. Line flushing is often completed as a response to water quality complaints. However, there is no formal flushing program. City staff have also expressed a desire to have more funds available for pipeline replacements and pipeline improvements. Recommended pipeline replacement and improvement budgets have been included in Appendix D.

The City has relayed that it has been difficult maintaining the transite pipes within the system. Transite pipes are made from asbestos concrete and generally are some of the older pipelines and prone to failure. City staff has requested that the two areas that contain transite pipe, the subdivision north of the City's water shop and the subdivision on N 4th W near West Elementary school, be targeted for Priority 1 pipeline replacement.

3.7.2. Distribution System Improvements Alternatives

No Action Alternative

Failure to correct existing distribution system deficiencies will result in development restrictions for the City of Mountain Home. As population grows and system demand rises, pressures will continue to be at risk of dropping below 40 psi during peak hour demands. Mandatory curtailment could be required to ensure pressures are above 40 psi if one of the larger City wells is off-line during peak demand periods. Additionally, fire protection will be substandard for several locations.

Additionally, this alternative will leave the transite pipe in place, and the issues with said pipelines reported by City staff will remain unresolved.

Existing Pipeline Improvements

To improve transmission to portions of town which experience pressure or fire flow deficiencies, upsizing existing pipelines or constructing parallel pipelines can be implemented to address said deficiencies. Pipelines that would benefit from upsizing or parallel pipe installation were modeled and the benefits were discussed with City staff. The pros and cons of installation of parallel transmission lines vs pipeline replacement is discussed in Table 3.7.

Table 3.6: Pros and Cons of Parallel Pipeline Installation vs Pipeline Replacement

	Pros	Cons
Parallel Lines	- Reduces temporary services during construction - Lower construction cost	- 2 pipelines to maintain - Larger O&M cost over time
Replacement	- Only 1 pipeline to maintain - Lower O&M cost over time	- Higher construction cost

New Pipeline Construction

In locations where pipeline upsizing or parallel pipelines may not provide a huge benefit, installation of new pipelines may provide that benefit. These new pipelines may provide looping benefits and/or draw water from a nearby portion of town that do not experience deficiencies. Pipelines that would benefit from new construction were modeled and vetted with City staff. In addition, as the City expands, new pipelines will need to be constructed for service to those areas. Areas of anticipated growth a can be found in Appendix A. While, in general, the development community is responsible for extending waterlines, their developments often do not require more than 8-inch diameter pipelines, where in many cases larger pipelines are desired to provide improved transmission or serve adjacent future developments. In these cases, the City has expressed interest in compensating the contractor for the cost of upsizing the pipe. The costs of upsizing are reflected in the CIP list in Section 4.3 of this report.

3.8 CROSS-CONNECTION CONTROL PROGRAM

The City reviews and maintains copies of backflow inspection reports. The City requires backflow prevention devices on all new irrigation, commercial, and industrial connections. The City also ensures that their own facilities are equipped with backflow devices and that these devices are regularly inspected.

The City has a cross-connection control program and ordinance. The ordinance was developed and reviewed in connection with previous DEQ water loans.

3.9 SANITARY SURVEY

The most recent sanitary survey was completed in April of 2018. A copy of the action plan to correct deficiencies found during the sanitary survey can be found in Appendix F. According to City staff, all outstanding action items have been addressed.

3.10 SEPARATE IRRIGATION FACILITIES

Separate irrigation facilities were explored as part of 2003 facility planning study. Because of the unreliable nature of the supply from Mountain Home Irrigation District, the City cannot depend on this water to always be available. However, the City currently has approximately 57 shares which are used to irrigate the City's golf course. Supplemental irrigation is required from the city's potable water system during shoulder seasons and during drought periods. Additionally, it should be noted that there are over 100 acres of land (including the golf course) within the city limits that have Mountain Home Irrigation District shares.

Keller Associates recommends that the City continue to acquire additional surface water rights as they may become available or as irrigated lands develop. These rights could potentially be used to offset groundwater demands and irrigate large parks within the City. In the case of some developments where surface water is available and surface water rights pre-date the Mountain Home Irrigation District, the City should consider the potential for a localized separate irrigation system.

Eventually, reuse of a highly treated wastewater effluent could be used within a separate irrigation utility. However, based on wastewater planning efforts previously completed, this alternative is not likely to occur in the near future; and when and if occurs, it will initially target large green spaces.

3.11 OPERATOR LICENSING AND TRAINING

The City currently operates a class II system. The City complies with state licensing and training requirements. License and training data for each employee can be found in Appendix J. The City pays for training requirements of its employees. The most recent system classification form can also be found in Appendix J. Proposed improvements are not anticipated to increase the overall complexity of the city's potable water system.

3.12 REGIONALIZATION AND SERVICE AROUND COMMUNITY

Regionalization for surface water supply was discussed previously. There are no municipalities nearby that would make sense to connect to for other than a regional surface water supply. However, there are a number of smaller developments within the study are that could eventually annex to the City and connect to their water system. Presently, the City maintains a backup supply connection to the Melen Subdivision.

3.13 SEWER COLLECTION AND TREATMENT

The City currently owns and operates a sanitary wastewater collection and treatment system. The treatment plant is located at the south end of the City boundary and consists of a series of lagoon treatment ponds. Treated effluent is land applied to City-owned farmland. The collection system consists entirely of gravity sewer mains. If, in the future, the treatment plant upgrades to a mechanical system, then it may be possible to reuse water on large green spaces throughout the City and reduce the City's potable water demand. However, there are no current plans to upgrade the existing plant within the twenty-year planning period of this study.

3.14 ENERGY AUDIT

Keller Associates performed a professional energy audit for the City in August of 2016. The audit included an evaluation of the existing systems. Most of the wells were in good condition, equipped with NEMA premium efficiency motors, and were tied into the City's SCADA system. The report did note several deficiencies and recommendation for improving energy efficiency in the system. The complete audit can be found in Appendix M.

Well 12 was reported to give erroneous SCADA data, was equipped with an obsolete control panel, and had an inefficient pump and motor. This ties into the recommended alternative to address Well 12's condition in section 4. Well 13 was also recommended to be replaced with a premium efficiency motor. Other recommendations including LED lighting to reduce energy costs at all wells and booster stations, and to operate the lowest energy intensive wells (wells 9, 12, 14, and 16) most often to cover the system's needs and be cost efficient. Well 15 is equipped with a VFD, but the wells that pump into systems with tanks are set to constant speed and operate near the maximum efficiency point of the pump curve in order to fill the tanks. The wells that pump into systems serviced by tanks are not expected to receive benefit from switching to a VFD. The pumps that serve the City's closed systems, like the Medium Pressure Zone, are already equipped with VFDs.

4.0 RECOMMENDATIONS AND CAPITAL IMPROVEMENT PLAN

4.1 GENERAL

This section provides a summary of the recommendations selected from the alternatives presented in Chapter 3. A capital improvement plan, which reflects opinions of probable costs for the recommendations and an order of priority, is also presented.

4.2 RECOMMENDATIONS FROM SELECTED ALTERNATIVES

Because of the City's commitment to provide a reliable water supply and fire flow to the potable system users, the no-action alternatives are not considered as viable options. Table 4.1 summarizes all of the alternatives considered and the recommended actions.

Table 4.1 – Alternatives Considered

System Deficiency (Section)	Alternatives Considered	Status*
Supply Shortfall (3.3.1)	General Water Conservation	R
	More From Existing Wells	NR
	New Wells	R
	No Action	NR
	Mandatory Curtailment	NR
	Surface Water Treatment	NR
Storage Shortfall (3.5.1)	No Action	NR
	Reduce Peak Hour Demands	NR
	Increase Supply	R
	Additional Storage	NR
	Additional Standby Power	R
Distribution Improvements (3.7.2)	Fire Protection Improvements	R
	High Pressure Improvements	R
	Low Pressure Improvements	R
	No Action	NR

*Key: NR = not recommended; R = recommended

Based on an evaluation of the alternatives for addressing the current system shortfalls, the recommended alternatives are:

Supply Shortfall

Continue with efforts for the siting and development of Well 17, which is recommended to take place at the City's Public Works shop. As growth-based development occurs, continue efforts to site and develop future wells. The City has sufficient existing water rights to construct up to two additional 1,500 gpm wells. The City should continue to take advantage of opportunities to secure additional senior groundwater and surface water rights. Recognize that a surface water source may be an important part of the City's long-term water supply portfolio and reconsider participating with a regional transmission pipeline if it passes near the city. Continue to encourage water conservation with user rates and other conservation measures. Finally, continue to look for ways of using existing Mountain Home Irrigation surface water for irrigation of large parcels as a means of preserving the groundwater supply.

Storage Shortfall

Keller Associates recommends that all future wells be outfitted with onsite backup power generators. Doing so will decrease the DEQ emergency storage requirement for the City, thus dropping the overall storage required.

Due to the recent construction of Tank 1B, it is not anticipated that the City will require an additional storage tank prior to 2040 if future wells are equipped with standby power.

Towards the end of the 20-year planning period the City should begin considering adding additional storage capacity. Keller Associates recommends that the location and size of future storage facilities be reevaluated in future planning efforts. The optimum storage size and location will be a function of many parameters (i.e. growth rates, location of development, well locations, remaining life and condition of existing facilities, and available transmission). A second storage facility at the Tank 2 site or replacement of the Tank 2 should be one of the options considered in future planning efforts.

Pumping Delivery Shortfall

Complete pipeline improvements that will allow Well 9 to pump directly to the medium pressure zone. If additional fire protection is needed in the upper pressure zone in the future, upsize the Pilot Booster pumps at that time.

Fire Flow Shortfall

The distribution pipeline improvements necessary to correct the fire flow shortfall were identified in Chapter 3 and will be included as part of the capital improvement plan. The immediate need of ISRB deficient structures will be met by implementing Priority 1 improvements. Priority 2 improvements will resolve commercial and residential area fire flow deficiencies. Phasing for these improvements along with other future improvements are illustrated in Figure 4.1 of Appendix A. The City should be aware that notification of those residences not meeting minimum fire flow requirements may be required until such time that adequate fire flows can be provided. The type and frequency of notification will need to be coordinated with DEQ.

High System Pressures

Outfit future wells with VFDs to maintain desired hydraulic grade in the system. Additionally, require pressure regulators on new services where system pressures have the potential to exceed 80 psi, with approval from DEQ.

Low System Pressures

Complete the Priority 1 improvements, including the installation of isolation valves that alter the medium pressure zone to encompass the existing low-pressure areas. Complete additional transmission pipeline improvements as required for new developments.

Future System Improvements

As the City continues to grow, it is important to ensure the water system grows in a planned manner with appropriate transmission and distribution sizes. It is recommended that the minimum line size allowed in the system be 8 inches in diameter. Figure 4.1 in Appendix A illustrates the proposed layout for larger transmission lines. Many of the transmission pipeline improvements within the City could be coordinated with roadway projects. Because the need for these future lines is likely to be driven by development and will also likely occur beyond the current 20-year planning window, only the upsize costs (portion likely to be paid for by the City) have been included as part of the Capital Improvement Plan. Computer model evaluations should be completed with each new major development to ensure that adequate infrastructure is in place for the development.

4.3 CAPITAL IMPROVEMENT PLAN

The capital improvement plan (CIP) summarizes the recommended system improvements that are anticipated to require capital beyond routine maintenance practices. The CIP outlines a prioritization schedule and provides an opinion of probable cost for those improvements. A more detailed description of these improvements and a breakdown of the cost assumptions can be found in Appendix D of this report.

The prioritization schedule in the CIP was established by consulting with City staff. Priority for these projects was assigned based on a review of the design criteria for the water system, an evaluation of the water system needs, and with input from the City.

The CIP projects shown in Table 4.2 are grouped by priority, with Priority 1 being the highest priority. Priority 1 improvements are considered to be improvements most critical to the system. Keller Associates also recommends that Priority 2 improvements be completed in the near future. Subsequent priorities can be phased in as funding is available because they are primarily targeted to reduce the system's vulnerability in emergency scenarios, to reduce demands, to improve system circulation, and accommodate growth.

Where possible, future improvements intended to expand capacity (i.e. new wells, storage, and water rights) have been tied to populations so they can be complete when they are needed. Ideally, many of the future pipeline improvements can be coordinated with future street improvements to minimize overall costs.

The cost estimates presented herein are planning level cost estimates and are based on Keller Associates perception of current conditions. Costs reflect our opinion of probable costs at this time and are subject to change as the project design matures.

Table 4.2 – Capital Improvement Plan

Project ID#	Project Description	Est. Cost (2019 Dollars)	
	Water System Capital Improvement Plan - Priority Improvements		
	Priority 1 Improvements (Year 1 - 5)		
1.1	Well 17 and Transmission Pipeline	$	3,219,000
1.2	Replace Transite Pipeline on S 12th E, S 13th E, E 6th S	$	923,000
1.3	Upgrade Pipeline on West 2nd N, near West Elementary	$	449,000
1.4	Commercial Fire Upgrades, near DeMeyer	$	252,000
1.5	Replace Transite Pipeline on Chesnut St and W 3rd N	$	584,000
1.6	Medium Pressure Zone Service Area Expansion	$	33,000
1.7	Replace Well 12	$	1,594,000
	Total Priority 1 Improvments	**$**	**7,054,000**
	Priority 2 Improvements (Years 5 - 15)		
2.1	W 5th N, Water Main Upgrade	$	215,000
2.2	Transmission Pipeline Upgrades on Elmcrest and West 5th North	$	830,000
2.3	Old State Highway 30 Pipeline	$	380,000
2.4	NE Pearl St and W 17th N Pipelines	$	776,000
2.5	Queen's Court Pipeline	$	85,000
2.6	Upgrade Transmission Pipeline on N 3rd E and E 15th N	$	1,542,000
2.7	Connect Well 9 to Medium Pressure Zone	$	610,000
2.8	E 4th N and E 5th N Pipelines	$	237,000
2.9	N 2nd E Pipeline	$	82,000
2.10	Airbase Road Pipeline	$	939,000
2.11	Upgrade Pipelines along W 7th S	$	264,000
	Total Priority 2 Improvments	**$**	**5,960,000**
	Priority 3 Improvements (Year 15+ or growth dependent)		
3.1	N Haskett St Pipeline Upgrades	$	562,000
3.2	Well 18 - SW Mountain Home	$	2,426,000
3.3	West Airbase Road and Elmcrest St Upgrades	$	1,568,000
3.4	Connecting to Lateral North of S Haskett St LDS church	$	180,000
3.5	Well 19 - New Industrial Well	$	2,060,000
3.6	City-wide Pipesize Upsizing	$	1,669,000
	Total Priority 3 Improvments	**$**	**8,465,000**
	TOTAL	***$***	***21,479,000***

4.4 PUBLIC INPUT

Information on system deficiencies, improvement alternatives, and capital and user rate impacts were presented in a City council meeting on September 23, 2019. A copy of the presentation is included in Appendix K.

4.5 FUNDING AND POTENTIAL USER RATE IMPACTS

Funding for the recommended system improvements may come from any number or combination of sources. A spreadsheet model was developed to evaluate the user rates and estimate the impacts of changes to the user rate needed to cash finance Priority 1 improvement. Table 4.3 outlines the potential residential user rate impact to balance the City's budget and pay for needed priority improvements. Additional rate information and assumptions can be found in Appendix D. In forecasting the user rates, we suggest maintaining a minimum balance of at least $1M. This should address DEQ reserve obligations and provide a reasonable reserve for unanticipated expenditures.

For this model, the line item titled "User Rate % Annual Increases" was assumed as an increase in the percentage of revenue accumulated from all user types and includes both the base rate and usage-based rates. The scope of this study did not include a detailed look at alternative rate structures or a cost of service evaluation of expenses and user types. When the City decides to implement user rates, additional evaluation of rate structures and cost allocation between the various user types could be completed using the existing user rate model.

Table 4.3 –User Rate Considerations

	Anticipated FY 18-19	Baseline/Budget FY 19-20	Forecast FY 20-21	Forecast FY 21-22	Forecast FY 22-23	Forecast FY 23-24	Forecast FY 24-25
User Rate % Annual Increase		10.0%	10.0%	5.0%	5.0%	5.0%	5.0%
Typical User Rate	**$30.02**	**$33.02**	**$36.32**	**$38.14**	**$40.05**	**$42.05**	**$44.15**
Revenues							
Metered Sales[1]	$ 2,650,000	$ 2,915,000	$ 3,206,500	$ 3,366,825	$ 3,535,166	$ 3,711,925	$ 3,897,521
Other Charges [2]	$ 154,340	$ 186,683	$ 192,283	$ 198,052	$ 203,993	$ 210,113	$ 216,416
Service Availability Fee[3]	$ 25,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000
Total Revenues	**$ 2,829,340**	**$ 3,186,683**	**$ 3,483,783**	**$ 3,649,877**	**$ 3,824,159**	**$ 4,007,038**	**$ 4,198,937**
Total Operating Revenues	**$ 2,675,000**	**$ 3,000,000**	**$ 3,291,500**	**$ 3,451,825**	**$ 3,620,166**	**$ 3,796,925**	**$ 3,982,521**
Expenditures							
Operations[4]	$ 842,657	$ 856,315	$ 882,004	$ 908,465	$ 935,719	$ 963,790	$ 992,704
Salaries and Benefits[4]	$ 810,803	$ 895,126	$ 921,980	$ 949,639	$ 978,128	$ 1,007,472	$ 1,037,696
Capital Improvements[4,5]	$ 472,700	$ 676,800	$ 1,326,228	$ 1,463,936	$ 1,398,363	$ 1,120,331	$ 1,663,095
Replacements[4,6]	$ 181,603	$ 100,000	$ 103,000	$ 106,090	$ 109,273	$ 112,551	$ 115,927
Debt Repayment - Long Term[7]	$ 297,946	$ 475,262	$ 475,262	$ 475,262	$ 475,262	$ 475,262	$ 475,262
Total Expenditures	**$ 2,605,708**	**$ 3,003,503**	**$ 3,708,474**	**$ 3,903,392**	**$ 3,896,744**	**$ 3,679,407**	**$ 4,284,684**
Net Change in Fund Balance	**$ 223,631**	**$ 183,180**	**$ (224,691)**	**$ (253,515)**	**$ (72,585)**	**$ 327,631**	**$ (85,747)**
Initial Fund Balance	$ 1,886,951						
Ending Fund Balance	**$ 2,110,582**	**$ 2,293,762**	**$ 2,069,071**	**$ 1,815,556**	**$ 1,742,971**	**$ 2,070,602**	**$ 1,984,855**

Notes:

1. Assumes increase in revenue comes solely from existing accounts; conservatively excludes minor additional revenue from new growth
2. Includes late charges, water turn on fees, meter sales, interest earnings, and other operating revenues
3. Assumed an average value from servive avaiability fees for years 2015-2018
4. 3% % annual inflation of costs assumed.
5. Capital Improvements based off the 6-Year recommended CIP project schedule, adjusted for inflation
6. Used recommended replacement budgets, which are higher than current depreciation expenses. Target annual replacement budget is approximately $788,000. However, because approximatley 60% of the above CIP budget is replacement oriented, an annual buget of $100,000 was assumed for the first six years (adjusted for 3% inflation). This should be sufficient to address the Priority 1 condition improvements identified in the master plan. In the future, efforts should be taken to increase the annual replacement budget to the target of $788,000.
7. Includes payments for DEQ Loans #1, #2, #4, and #5. History of payments used for DEQ Loans #1, #2, and #4. DEQ Loan #5 annual payment calculated assuming a $2,700,000 principal over 20 years with a 2.75% interest

Rate increases of 10% for the next two fiscal years, followed by 5% rate increases thereafter are needed to properly fund operations and needed improvements. Alternatively, the City could elect to raise rates15% the first year, then 5% each year thereafter.

In forecasting operating needs, we assumed a 3% inflation in costs, which is consistent with historical trends. The additional O&M expenses resulting from Priority 1 improvements were anticipated to be negligible.

The City should reevaluate revenues and expenses annually and update the user rate model every two to five years. When the City retires the existing DEQ debt service in 2029, we suggest that these funds be dedicated to more fully funding the City's long-term replacement needs. An analysis of connection fees was not included in the scope and thus is not included in this update.

4.6 CONCLUSION

The critical and more urgent issues facing the City's water system include additional supply needs, AC pipeline replacement needs, and improving fire protection. The city begin now to implement the Priority 1 components outlined in the capital improvement plan. Keller Associates also recommends that Priority 2 improvements be completed in the near future. Lower priority improvements can be completed as funding becomes available or in coordination with other improvements or routine replacement.

Because the planning elements that serve as the basis for the recommendations contained in this report tend to evolve over time, it is recommended the City consider intermediate updates to the facilities planning study every three to five years to reflect these changes. The planning tools created in connection with this study, such as the water model and the utilities base mapping, should be updated every one to three years to reflect repairs, replacements, and other changes to the water system that will inevitably take place. Maintaining the plan and the planning tools will serve as the most effective means for the city to proactively manage this crucial component of their existing infrastructure.

4.7 DECLINING BALANCE SUMMARY

4.7.1. Remaining Capacity

Calculations of remaining capacity for the system can be found in Appendix C. The remaining firm capacity of the water system was estimated to be approximately 1,850 additional equivalent dwelling units (EDUs) before needing additional well supply in service. This corresponds to a City population of 18,460. With the addition of a new 1,500-gpm well, the water system would have an estimated remaining capacity of approximately 1,586 EDUs (population 22,060).

For continued growth in the system, additional wells will be needed every 1,580 EDUs. If the City supplies newly constructed wells with backup power, it is not anticipated that the City will need additional storage within the 20-year planning period. Additional details on the timing of these recommendations are included in Appendix D. Because it sometimes takes years to permit, fund, design, and construct necessary improvements, Keller Associates recommends that the City begin implementation of improvements well in advance of when they are required.

4.7.2. Booster Station Considerations

Keller Associates also reviewed data for the upper and medium pressure zones to assess available booster station capacities (see Appendix C).

In estimating the remaining capacity of the upper zone, the use of Well 14 (which can be manually directed to the upper zone) was not considered in approximating the firm pumping capacity. Additionally, in estimating remaining capacity of the medium pressure zone, the existing PRV that services the zone was assumed to provide the firm backup supply of the zone.

Based on this analysis, the medium pressure zone can add a total of approximately 318 EDUs before the booster pumping capacity at the booster station needs to be increased. The upper pressure zone can add a total of approximately 240 EDUs before the booster pumping capacity at the booster station needs to be increased. If Well 9 is used to supply water to the medium pressure zone, listed as a priority 2 improvement in the recommended CIP, it is anticipated that the zone can accommodate approximately 865 EDUs.

Table 4.4 – Declining Balance Summary

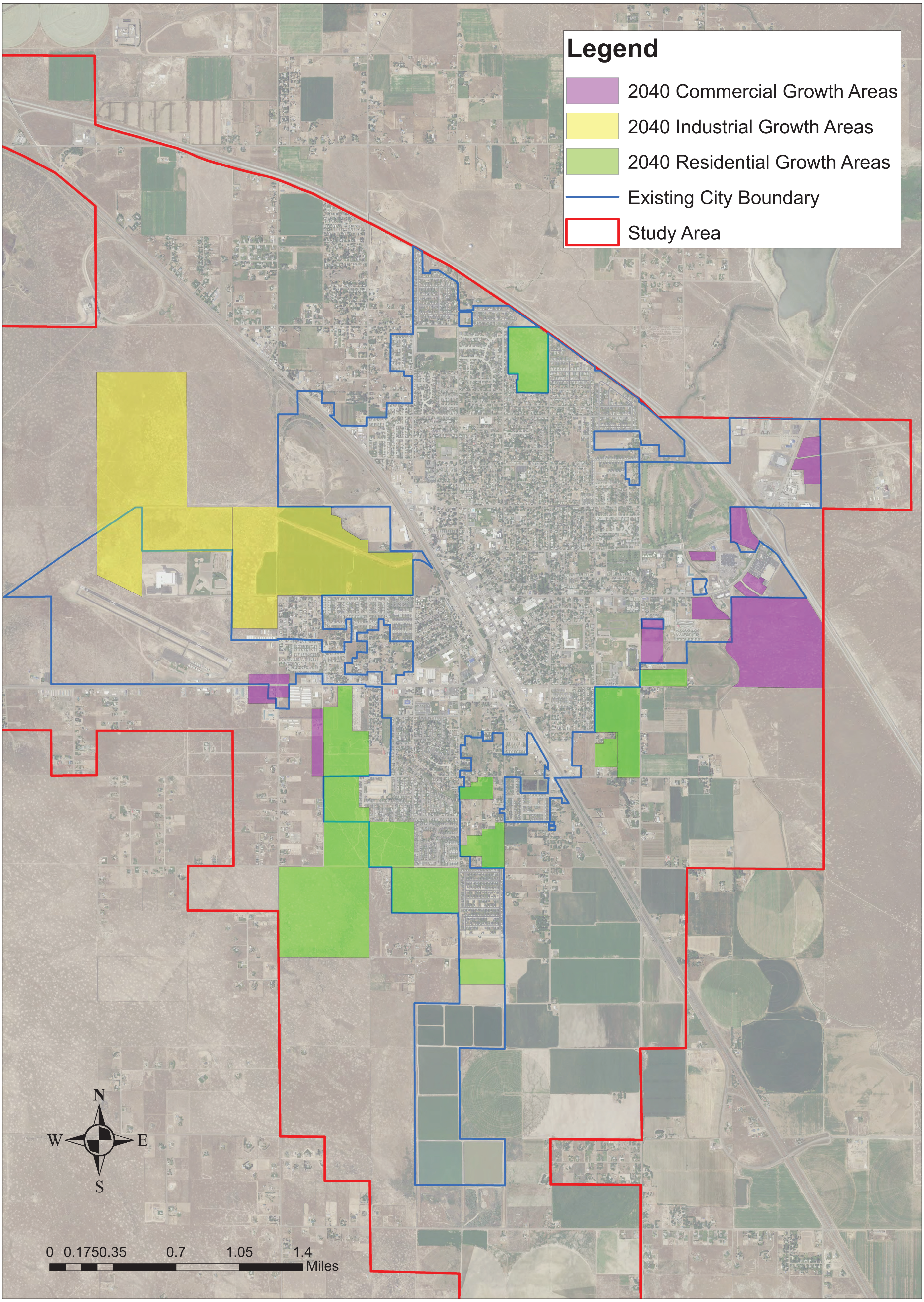
	Improvement	Available EDUs*	Approx. Service Population
System Wide	Existing Condition	1,850	18,460
	New Well 17 (1500 gpm)	3,436	22,060
	New Well 18 (1500 gpm)	5,022	25,661
	Additional Transmission	varies	varies
Pressure Zones	Medium Zone Additional Pumping Capacity	318	NA
	Upper Zone Additional Pumping Capacity	240	NA

Available EDUs is based on current number of users and is not adjusted to reflect vacancy rates, buildable lots, or undeveloped land within the city limits.

ATTACHMENT A

Figures

KELLER ASSOCIATES



KELLER ASSOCIATES

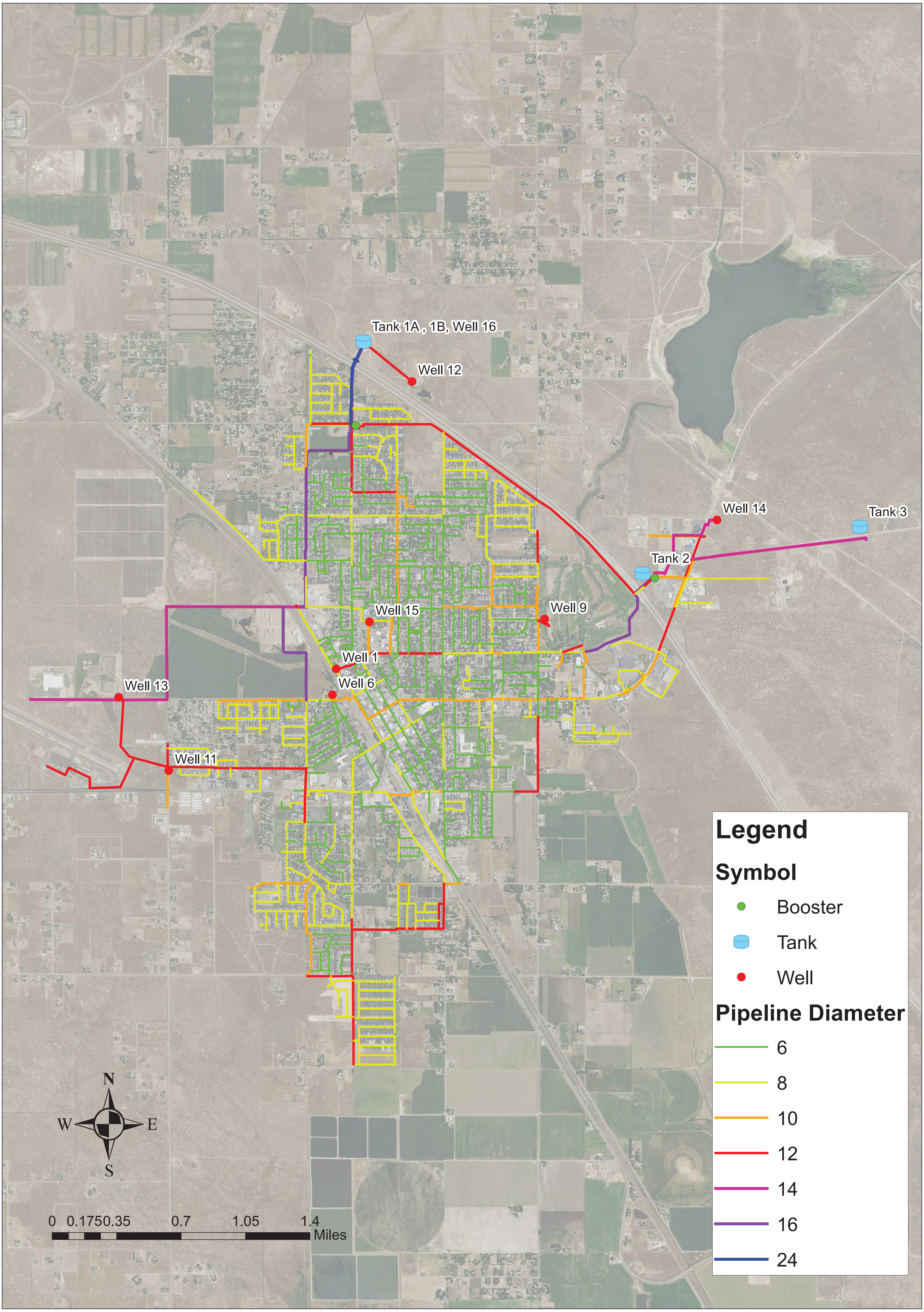
2040 Future Growth Areas

Water Facilities Planning Study

city of Mountain Home

Figure 2.1

City of Mountain Home, ID
September, 2019



KELLER ASSOCIATES

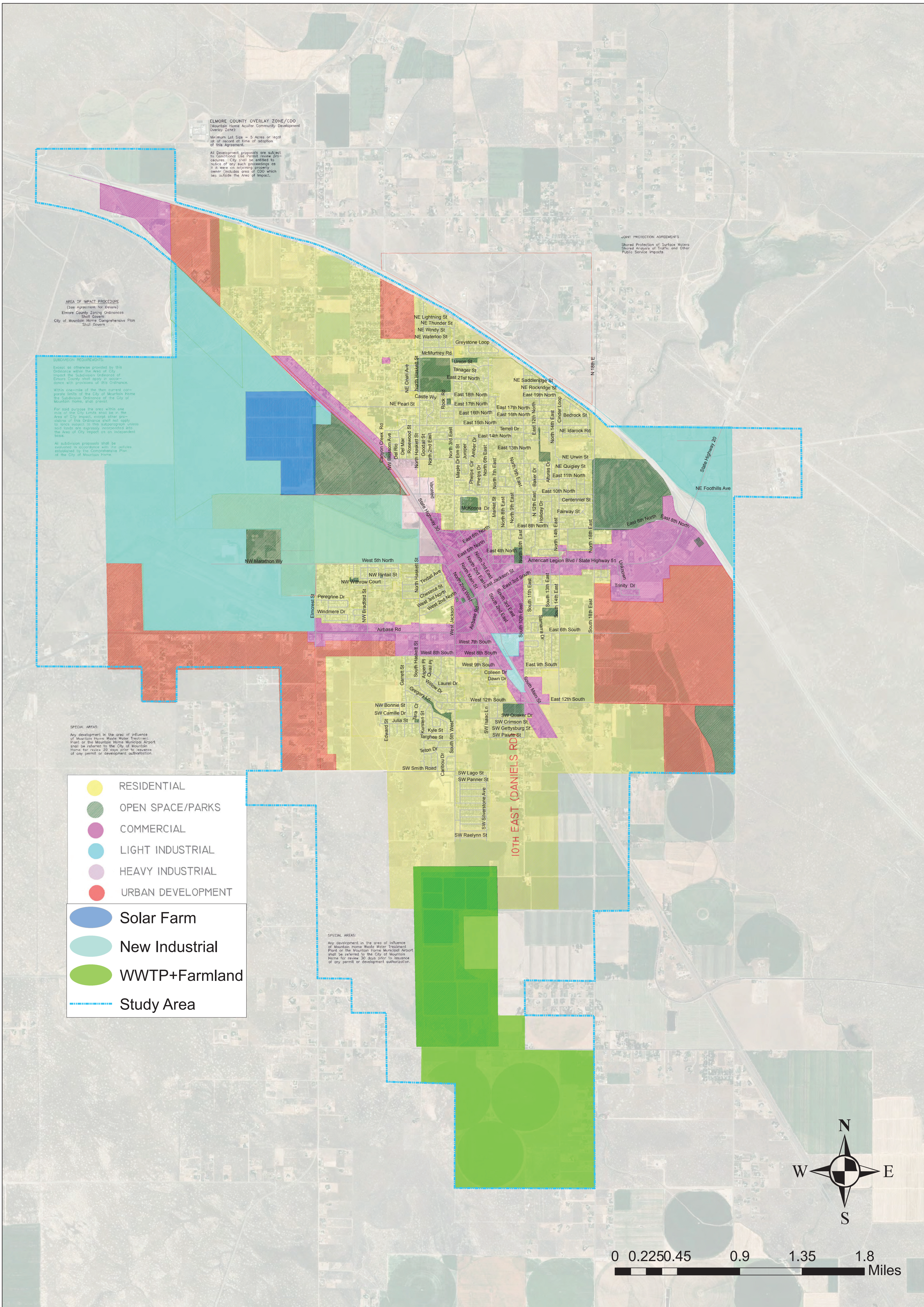
Existing System

Water Facilities Planning Study

city of Mountain Home

Figure 2.2

City of Mountain Home, ID
September, 2019



KELLER ASSOCIATES

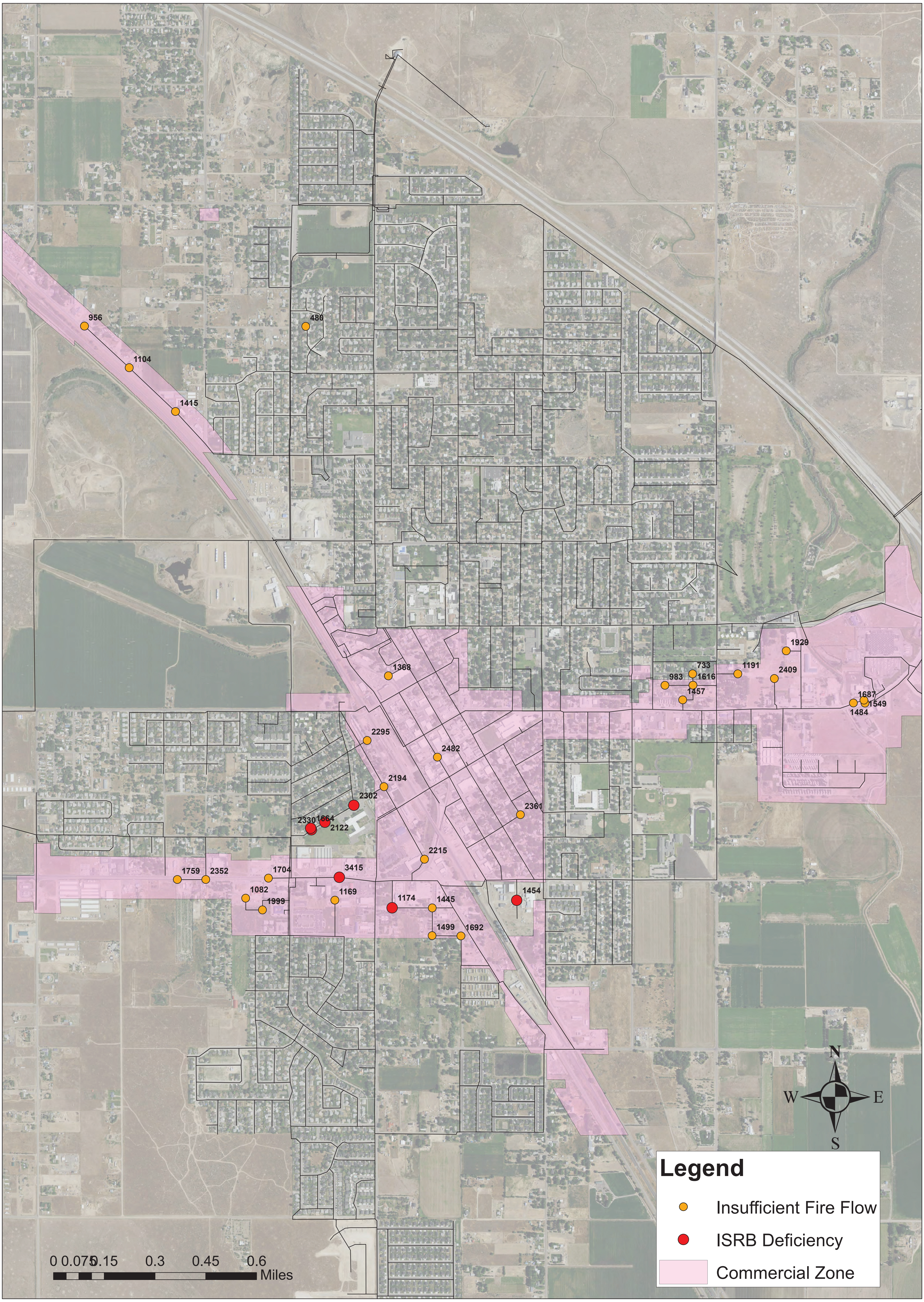
Land Use

Water Facilities Planning Study

city of Mountain Home

Figure 3.1

City of Mountain Home, ID
September, 2019



KELLER ASSOCIATES

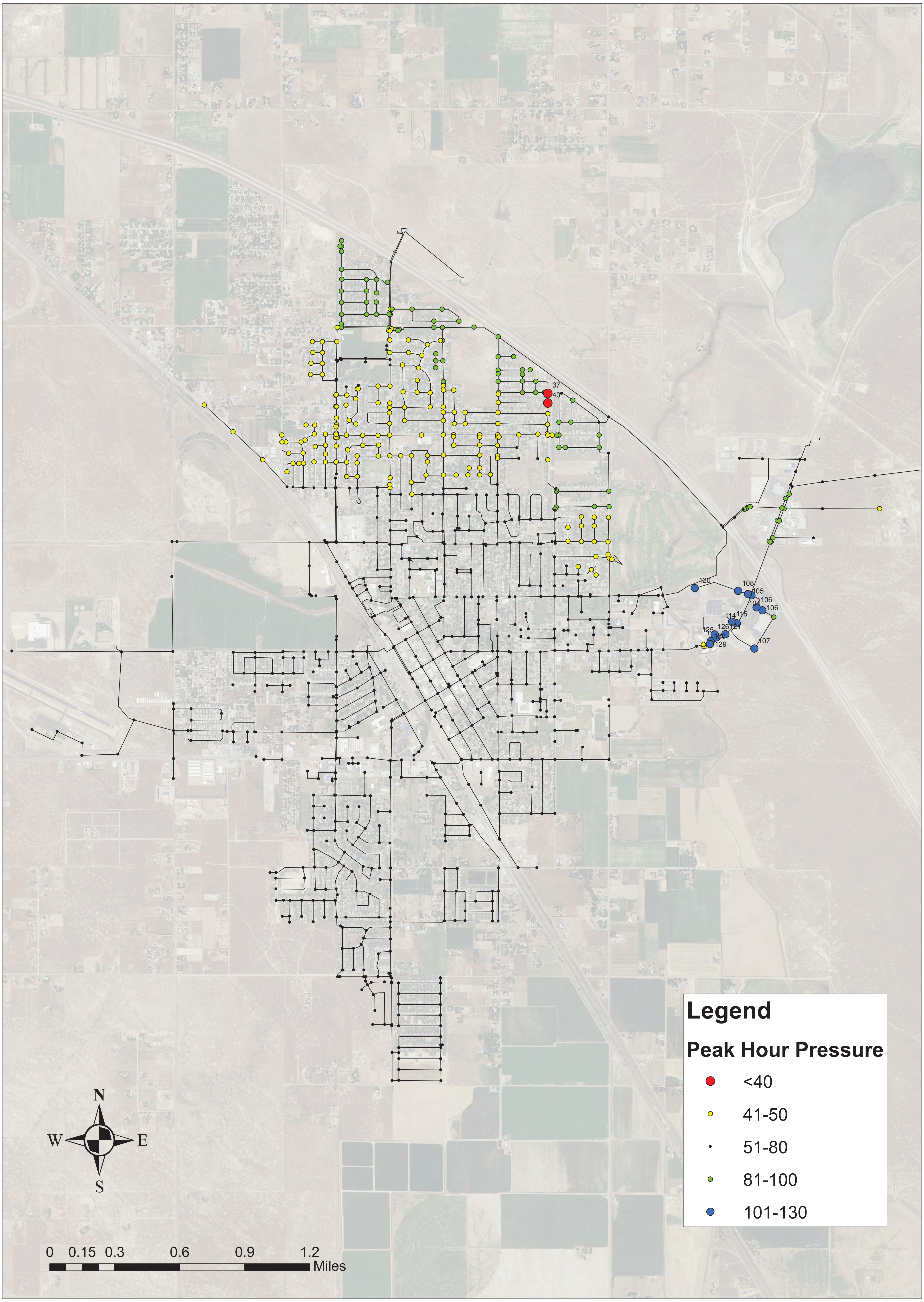
2018 Available Fire Flow Deficiencies

Water Facilities Planning Study

city of Mountain Home

Figure 3.2

City of Mountain Home, ID
September, 2019



KELLER ASSOCIATES

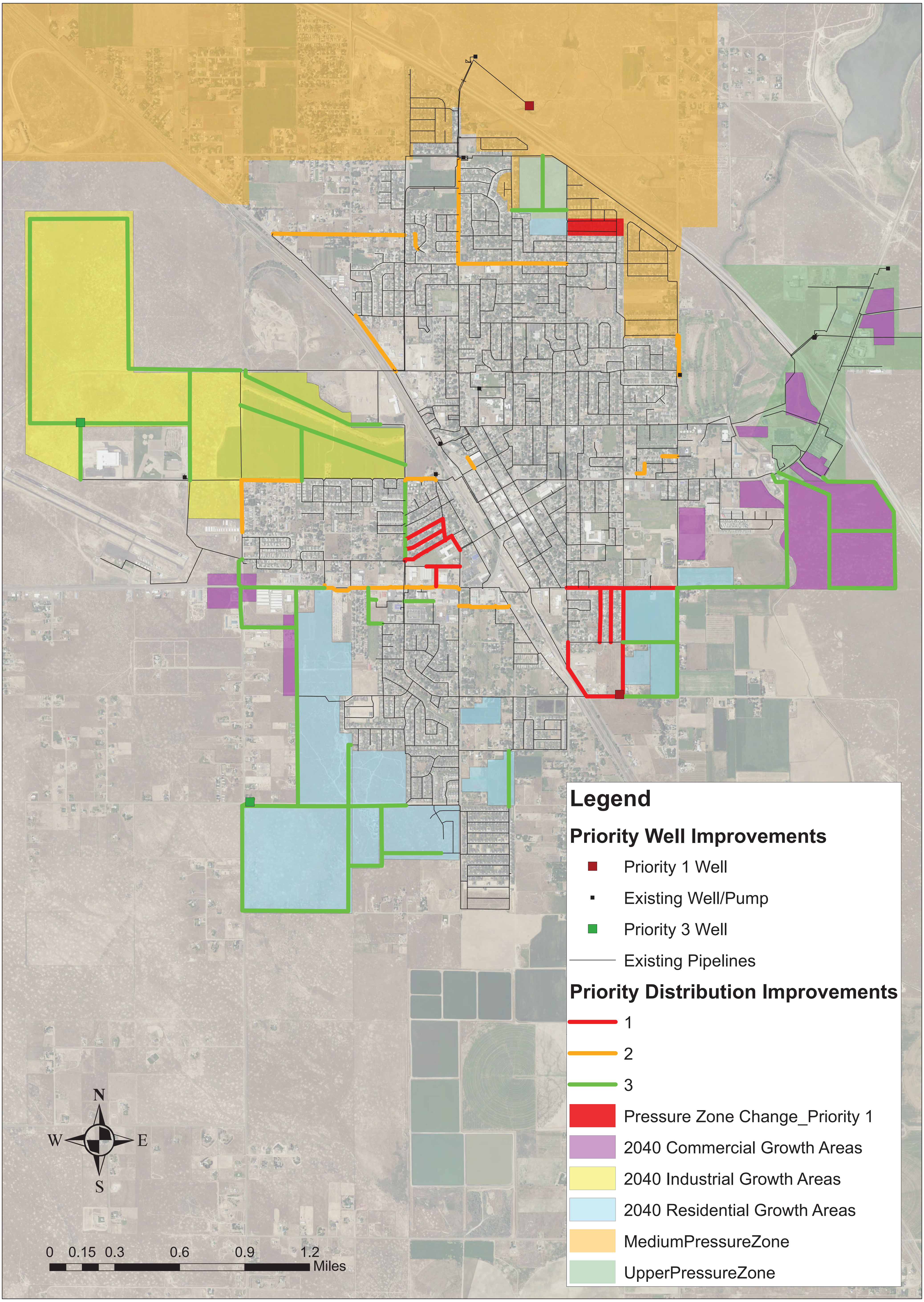
2018 Peak Hour Pressures

Water Facilities Planning Study

City of Mountain Home

Figure 3.3

City of Mountain Home, ID
September, 2019



KELLER ASSOCIATES

Future Project Priorities

Water Facilities Planning Study

city of Mountain Home

Figure 4.1

City of Mountain Home, ID
September, 2019

ATTACHMENT B

Calibration Information

APPENDIX B

Calibration Information

KELLER
ASSOCIATES

Mountain Home Facility Plan Update 2019
Hydrant Test Calibration

Pressure Gauge Calibration @ Test 1B Location

Pressure Gauge A	65 psi	3
Pressure Gauge B	67 psi	1
Flow Gauge	69 psi	-1

Tank Diameters

Tank 1	105 ft
Tank 2	55 ft
Tank 3	60 ft

2018 model MDD
8152.59
2018 ADD
3000
Ratio of Test 1 Flow (900 gpm)to 2018 MDD
0.1103944

Original City MDD (2015)
7747.31
Ratio of Total Flow to MDD
0.26548
Ratio of Test 1 System Demands to Total Flow
0.4228813

Note: Times are 1 hour ahead due to watch not being set back. So 11am is actually 10am, etc.

Well 11 did not run other than during test 5

Test No.	Flow Hydrant: Time of Residual Reading	Flow Hydrant: Port 1 Pitot Pressure (psi)	Flow Hydrant: Port 1 Pitot Flow (gpm)	Pressure Hydrant A: Time of Static Reading	Pressure Hydrant A: Static Pressure (psi)	Pressure Hydrant A: Time of Residual Pressure	Pressure Hydrant A: Residual Pressure (psi)	Pressure Hydrant A: Pressure Drop (Static minus Residual) (psi)	Pressure Hydrant B: Time of Static Reading	Pressure Hydrant B: Static Pressure (psi)	Pressure Hydrant B: Time of Residual Pressure	Pressure Hydrant B: Residual Pressure (psi)	Pressure Hydrant B: Pressure Drop (Static minus Residual) (psi)
1	11:24:59	50	1187	11:13:00	65	11:25:25	54	11	11:14:24	66	11:26:10	54	12
2	12:06:00	40	1062	11:56:45	64	12:04:11	62	2	11:57:30	67	12:02:55	59	8
3	12:34:00	30	919	12:29:57	59	12:34:00	58	1	12:30:30	61	12:34:30	59	2
4	1:06:00	50	1187	1:01:40	58	1:06:30	55	3	1:02:10	60	1:07:00	56	4
5	1:30:00	45	1126	1:25:30	56	1:30:35	52	4	1:26:00	57	1:31:05	55	2
6	3:55:12	60	1300	3:49:00	75	3:55:50	62	13	3:49:45	82	3:56:20	67	15
7	3:14:36	92	1600	3:10:45	112	3:16:30	100	12	3:29:32	113	3:17:00	101	12

Test No.	Tank Levels – Static Level (ft): Time of Static Reading	Tank 1	Tank 2	Tank 3	Tank Levels – Residual Level (ft): Time of Residual Reading	Tank 1	Tank 2	Tank 3
1	11:19:38	26.5	22.3	26.2	11:28:30	26.3	22.1	26.4
2	11:59:00	26.1	21.5	27.1	12:06:04	26	21.3	27.3
3	12:31:06	25.8	20.8	27.9	12:35:27	25.7	20.8	28
4	1:02:52	25.5	21.2	27.9	1:08:55	25.4	21.2	27.9
5	1:27:05	26.1	21.7	27.8	1:32:47	26.3	21.8	27.8
6	3:52:11	27.9	23	27	3:59:13	27.8	23	26.9
7	3:07:32	27.9	22.9	27.6	3:18:44	27.9	23	27.1

Test No.	Well 1: Time of Static Reading	Well 1: Static Flow (gpm)	Well 1: Static Pressure (psi)	Well 1: Time of Residual Reading	Well 1: Residual Flow (gpm)	Well 1: Residual Pressure (psi)	Well 11: Time of Static Reading	Well 11: Static Flow (gpm)	Well 11: Static Pressure (psi)	Well 11: Time of Residual Reading	Well 11: Residual Flow (gpm)	Well 11: Residual Pressure (psi)
1	11:16:26	672	57.8	11:27:46	672	56.5						
2	11:58:25	699	57.7	12:05:32	693	56.6						
3	12:30:40	691	58.1	12:35:00	695	56.7						
4	1:02:22	691	56.8	1:07:11	699	55.8	1:06:20	0	56.3			
5	1:25:47	683	64.6	1:31:23	687	63.2	1:26:24	2040	80.2	1:31:40	2073	78.2
6	3:50:00	700	58.6	3:56:30	703	58.2						
7	3:05:18	687	57.2	3:17:17	685	58.3						

Well 13 did not run other than during test 5

Neither pilot pump ran during testing, effectively the same

Pilot pump 3 did not run during testing

3rd street booster was turning off and on during testing
Only reported values where the demand may cause booster to kick on

Test No.	Well 13: Time of Static Reading	Well 13: Static Flow (gpm)	Well 13: Static Pressure (psi)	Well 13: Time of Residual Reading	Well 13: Residual Flow (gpm)	Well 13: Residual Pressure (psi)	Pilot Pump 1 / Pilot Pump 2: Time of Static Reading	Pilot Pump 1 / Pilot Pump 2: Static Flow (gpm)	Pilot Pump 1 / Pilot Pump 2: Static Pressure (psi)	Pilot Pump 1 / Pilot Pump 2: Time of Residual Reading	Pilot Pump 1 / Pilot Pump 2: Residual Flow (gpm)	Pilot Pump 1 / Pilot Pump 2: Residual Pressure (psi)
1												
2												
3												
4	1:06:00	0	49.3									
5	1:26:46	1887	74.6	1:32:10	1890	73						
6							3:50:40	0	84.8	3:58:44	0	84.8
7							3:06:24	0	84.9	3:17:40	0	84.9

Test No.	Pilot Pump 3: Time of Static Reading	Pilot Pump 3: Static Flow (gpm)	Pilot Pump 3: Static Pressure (psi)	Pilot Pump 3: Time of Residual Reading	Pilot Pump 3: Residual Flow (gpm)	Pilot Pump 3: Residual Pressure (psi)	3rd Street Booster: Time of Static Reading	3rd Street Booster: Static Flow (gpm)	3rd Street Booster: Static Pressure (psi)	3rd Street Booster: Time of Residual Reading	3rd Street Booster: Residual Flow (gpm)	3rd Street Booster: Residual Pressure (psi)
1												
2												
3												
4												
5												
6	3:50:50	0	50.2	3:58:56	0	50.2	3:51:23	90	85	3:59:00	1,223	82.6
7	3:10:30	0	50.5	3:18:10	0	49.4	3:09:23	104	85.3	3:18:22	174	84.4

3285.98
696.98 ft

Updating pressure hydrants to match Flow Hydrant

Test No	Pressure Hydrant A: Time of Static Reading	Pressure Hydrant A: Static Pressure (psi)	Pressure Hydrant A: Time of Residual Pressure	Pressure Hydrant A: Residual Pressure (psi)	Pressure Hydrant A: Pressure Drop (Static minus Residual) (psi)	Pressure Hydrant B: Time of Static Reading	Pressure Hydrant B: Static Pressure (psi)	Pressure Hydrant B: Time of Residual Pressure	Pressure Hydrant B: Residual Pressure (psi)	Pressure Hydrant B: Pressure Drop (Static minus Residual) (psi)
1	11:13:00	69	11:25:25	58	11	11:14:24	68	11:26:10	56	12
2	11:56:45	68	12:04:11	66	2	11:57:30	69	12:02:55	61	8
3	12:29:57	63	12:34:00	62	1	12:30:30	63	12:34:30	61	2
4	1:01:40	62	1:06:30	59	3	1:02:10	62	1:07:00	58	4
5	1:25:30	60	1:30:35	56	4	1:26:00	59	1:31:05	57	2
6	3:49:00	79	3:55:50	66	13	3:49:45	84	3:56:20	69	15
7	3:10:45	116	3:16:30	104	12	3:29:32	115	3:17:00	103	12

Analysis

Test	Change In Time (minutes)	Change in Tank 1 level (ft)	Change in Volume tank 1 (ft^3)	Change in Tank 2 level (ft)	Change in Volume tank 2 (ft^3)	Change in Tank 3 level (ft)	Change in Volume tank 3 (ft^3)	Change volume in all Tanks (ft^3)	Change in volume all tanks (gal)	Tank Flow into system (gpm)	Well Flow (gpm)	Total Flow into system (Demand) (gpm)	Hydrant Flow	System Demands	
1	8.9	(0.2)	(1,731.8)	(0.2)	(475.2)	0.2	565.5	(1,641.5)	(12,278.3)	1,384.8	672.0	2,056.8	1,187.0	869.8	
Static	30.5	(0.2)	(1,731.8)	(0.6)	(1,425.5)	0.7	1,979.2	(1,178.1)	(8,812.2)	288.9	685.5	974.4	-	974.4	"--> Run with 900 gpm for static condition"
2	7.1	(0.1)	(865.9)	(0.2)	(475.2)	0.2	565.5	(775.6)	(5,801.3)	820.9	696.0	1,516.9	1,062.0	454.9	
4	6.1	(0.1)	(865.9)	-	-	-	-	(865.9)	(6,476.9)	1,070.6	695.0	1,765.6	1187	578.6	

ATTACHMENT C

Water Usage Data

KELLER ASSOCIATES

City of Mountain Home

Water demand summary (gpm*)

Year	Population	Average Day	Average Winter	Average Summer	Max Day
2002	11,566	2,759	1,156	5,047	7,200
2003	11,910	2,817	907	5,776	7,242
2004	12,163	2,948	907	5,668	7,483
2005	12,560	2,679	1,027	5,356	7,539
2006	13,015	2,287	904	5,994	9,100
2007	13,364	2,985	845	6,410	8,298
2008	13,851	3,073	907	6,296	7,890
2009	14,091	2,924	1,013	5,745	7,671
2010	14,206	2,808	839	6,051	8,225
2011	13,761	2,717	815	6,215	7,379
2012	13,794	2,983	815	6,156	7,230
2013	13,798	3,011	921	6,126	7,846
2014	13,846	3,096	847	6,285	7,807
2015	13,662	3,100	811	6,107	7,613
2016	13,822	3,069	830	6,465	7,798
2017	14,224	2,806	885	6,160	7,356
2018	14,260	3,000	830	6,340	8,150

*gpm = gallons per minute

Maximum Day demands are based on 2-day average values

Water demand summary (gpcd**)

Year	Population	Average Day	Average Winter	Average Summer	Max Day
2002	11,566	344	144	628	896
2003	11,910	341	110	698	876
2004	12,163	349	107	671	886
2005	12,560	307	118	614	864
2006	13,015	253	100	663	1,007
2007	13,364	322	91	691	894
2008	13,851	319	94	655	820
2009	14,091	299	104	587	784
2010	14,206	285	85	613	834
2011	13,761	284	85	650	772
2012	13,794	311	85	643	755
2013	13,798	314	96	639	819
2014	13,846	322	88	654	812
2015	13,662	327	85	644	802
2016	13,822	320	86	674	812
2017	14,224	284	90	624	745
2018	14,260	303	84	640	823
2014-2018 Average		311	87	647	799
Design 2018		311	87	647	823

**gpcd = gallons per capita per day

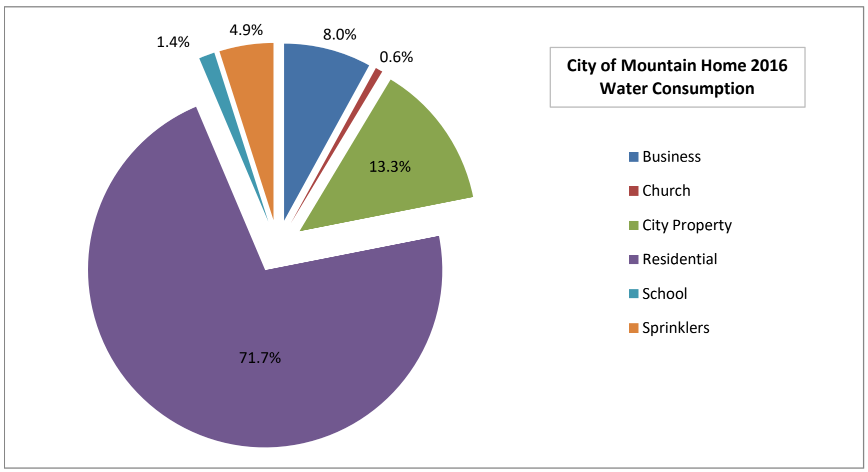
Data includes all domestic, commercial, industrial, and residential water usage - domestic usage is approximately 73% of total usage

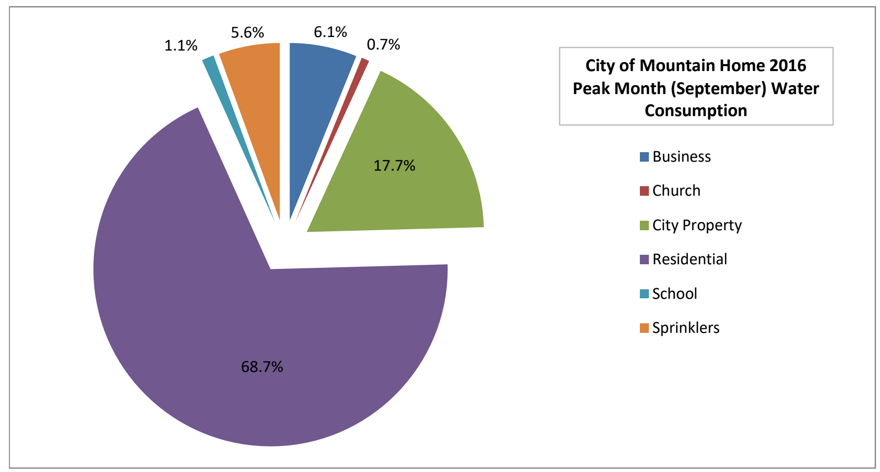
City of Mountain Home
Water Balance

Year	2016	2017	2018	Total
Metered Consumption (gal)	1,419,750,205	1,307,096,400	1,345,778,301	4,072,624,906
Total Production (gal)	1,617,696,624	1,474,716,394	1,578,806,194	4,671,219,212
Unaccounted Water (gal)	197,946,419	167,619,994	233,027,893	598,594,306
Unaccounted Water (%)	12%	11%	15%	13%

Gallons used monthly 2014

Month	Business	Church	City Property	Construction	Daycare	Multiple Rental	OUTSIDE CITY	Residential	School	Sprinklers	Trailer Court	Total	GPD
Januray	5,585,400	98,200	160,900		101,300	4,327,700	8,300	20,499,300	476,100	2,400	3,072,600	34,332,200	1,107,490
February	4,214,600	79,600	94,702		54,500	3,397,500	14,200	16,165,500	541,000	3,000	2,155,700	26,720,302	921,390
March	4,770,200	80,100	141,700	18000	26,600	3,485,100	4,800	16,337,500	590,600	15,600	1,839,200	27,309,400	880,948
April	6,261,500	136,300	4,844,200	41200	26,400	4,321,200	8,200	21,939,500	449,900	449,600	646,500	39,124,500	1,304,150
May	7,912,900	548,100	10,886,400	202100	28,800	6,747,300	9,800	60,616,200	837,700	3,924,700	748,600	92,462,600	2,982,665
June	11,189,500	998,100	15,802,600	378200	37,500	11,142,000	19,000	100,819,401	2,563,500	6,894,200	725,800	150,569,801	5,018,993
July	15,795,200	1,855,700	25,143,600	1076400	56,600	20,150,300	36,500	181,961,300	5,354,400	16,395,200	1,586,000	269,411,200	8,690,684
August	12,342,800	1,714,800	33,210,000	862100	53,500	16,630,800	24,000	145,430,400	2,751,700	12,261,500	1,182,800	226,464,400	7,305,303
September	17,469,200	2,221,900	54,031,700	1156900	64,300	22,165,900	41,600	185,826,900	3,464,400	17,055,700	1,521,100	305,019,600	10,167,320
October	9,915,800	1,044,700	22,758,900	717400	31,300	12,219,300	18,800	82,266,600	1,292,800	8,202,300	676,300	139,144,200	4,488,523
November	7,462,300	295,200	18,412,500	329600	26,900	6,061,800	5,200	37,527,901	1,667,700	4,740,000	546,500	77,075,601	2,569,187
December	4,991,400	73,600	3,095,000	149900	28,500	3,784,000	2,700	18,835,601	554,300	65,400	536,000	32,116,401	1,036,013
Total	**107,910,800**	**9,146,300**	**188,582,202**	**4,931,800**	**536,200**	**114,432,900**	**193,100**	**888,226,103**	**20,544,100**	**70,009,600**	**15,237,100**	1,419,750,205	
% of Total	**8.0%**	**0.6%**	**13.3%**					**71.7%**	**1.4%**	**4.9%**			



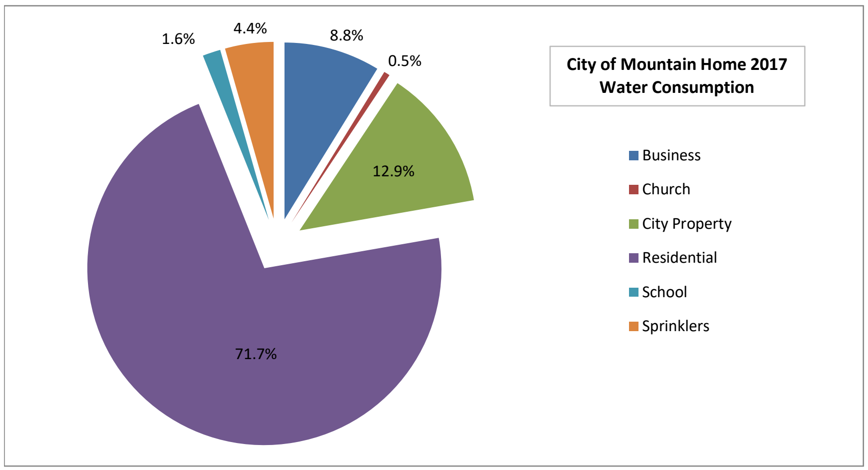


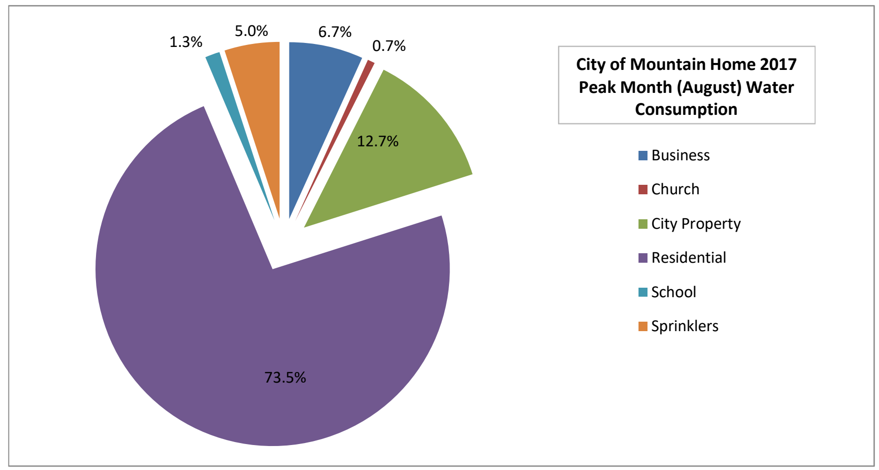
Peak Month

	Business	Church	City Property	CONSTRUCTION	Daycare	Multiple Rental	OUTSIDE CITY	Residential	School	Sprinklers	Trailer Court	
September	17,469,200	2,221,900	54,031,700	1156900	64,300	22,165,900	41,600	185,826,900	3,464,400	17,055,700	1,521,100	305,019,600
	6.1%	**0.7%**	**17.7%**					**68.7%**	**1.1%**	**5.6%**		

Gallons used monthly 2014

Month	Business	Church	City Property	Construction	Daycare	Multiple Rental	OUTSIDE CITY	Residential	School	Sprinklers	Trailer Court	Total	GPD
Januray	5,958,500	59,700	137,400	141500	47,400	5,615,700	10,400	25,622,100	566,700	14,700	1,410,800	39,584,900	1,276,932
February	3,814,500	63,700	83,200	82700	28,400	3,318,900	2,600	15,778,000	540,100	11,000	902,000	24,625,100	879,468
March	4,304,900	50,300	123,200	431100	35,600	4,066,800	3,900	16,798,700	537,800	8,800	880,300	27,241,400	878,755
April	6,015,300	63,100	9,944,700	201600	43,700	4,825,500	8,600	21,338,400	561,100	327,900	827,200	44,157,100	1,471,903
May	5,275,000	132,000	15,570,200	380500	39,100	5,069,600	7,700	24,884,600	810,900	1,441,600	563,200	54,174,400	1,747,561
June	9,783,900	632,500	23,863,400	1006000	43,900	10,389,700	40,900	88,249,100	2,771,800	5,955,400	754,000	143,490,600	4,783,020
July	15,020,100	1,430,300	36,251,200	2096700	62,800	16,849,600	308,900	159,323,200	6,085,500	13,717,500	1,327,900	252,473,700	8,144,313
August	15,863,700	1,870,800	34,798,800	2584000	55,500	19,044,200	222,400	181,081,200	3,692,600	13,798,500	1,483,500	274,495,200	8,854,684
September	15,321,300	1,513,200	28,254,000	2072200	71,100	18,183,800	469,300	158,650,100	2,479,700	14,792,600	1,304,200	243,111,500	8,103,717
October	9,367,100	874,300	6,601,200	929500	38,700	10,303,300	579,800	71,524,800	1,888,500	6,490,100	635,900	109,233,200	3,523,652
November	8,035,100	303,400	13,088,100	413700	135,300	6,132,600	173,300	33,454,900	611,900	1,342,200	778,500	64,469,000	2,148,967
December	4,872,200	61,700	176,400	174500	71,600	4,254,400	10,200	18,860,700	605,800	47,300	905,500	30,040,300	969,042
Total	**103,631,600**	**7,055,000**	**168,891,800**	**10,514,000**	**673,100**	**108,054,100**	**1,838,000**	**815,565,800**	**21,152,400**	**57,947,600**	**11,773,000**	1,307,096,400	
% of Total	**8.8%**	**0.5%**	**12.9%**					**71.7%**	**1.6%**	**4.4%**			

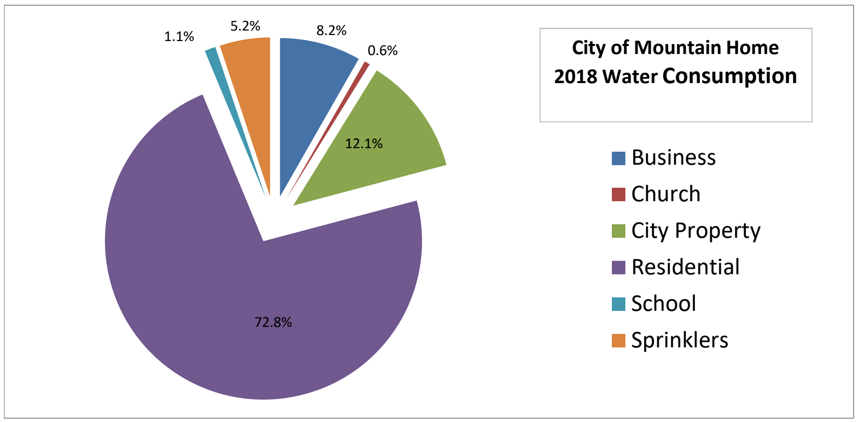


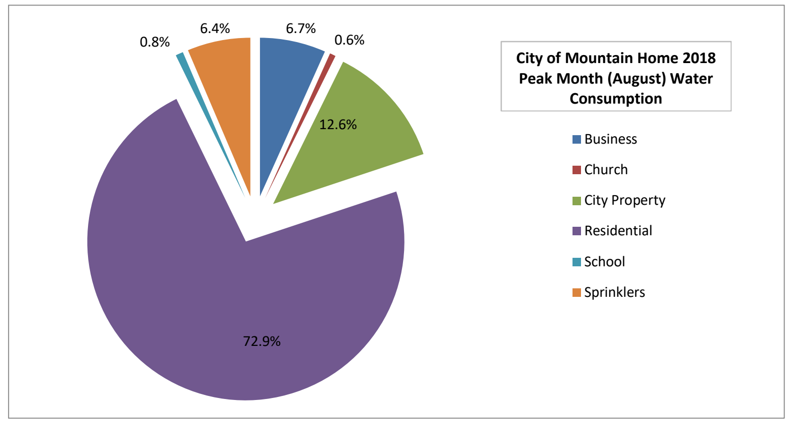


	Business	Church	City Property	CONSTRUCTION	Daycare	Multiple Rental	OUTSIDE CITY	Residential	School	Sprinklers	Trailer Court	
August	15,863,700	1,870,800	34,798,800	2584000	55,500	19,044,200	222,400	181,081,200	3,692,600	13,798,500	1,483,500	274,495,200
	6.7%	**0.7%**	**12.7%**					**73.5%**	**1.3%**	**5.0%**		

Gallons used monthly 2014

Month	Business	Church	City Property	Construction	Daycare	Multiple Rental	OUTSIDE CITY	Residential	School	Sprinklers	Trailer Court	Total	GPD
Januray	4,231,800	91,100	66,200	146,600	31,000	3,946,300	2,700	16,808,400	478,000	48,200	745,900	26,596,200	857,942
February	5,380,200	72,700	84,600	167,400	47,300	4,463,600	4,900	18,725,000	587,500	5,300	682,100	30,220,600	1,079,307
March	4,197,200	44,800	67,000	128,000	45,100	3,283,500	9,100	14,232,301	526,400	3,200	594,100	23,130,701	746,152
April	5,438,100	51,300	3,349,800	177,700	56,200	4,231,600	29,400	18,622,500	570,000	32,400	1,740,700	34,299,700	1,143,323
May	6,526,000	304,800	10,802,700	456,300	81,500	5,457,000	6,500	37,828,600	770,100	1,397,000	1,741,800	65,372,300	2,108,784
June	11,555,700	1,049,900	16,066,500	1,292,900	149,000	13,048,200	4,200	109,687,000	1,995,300	10,218,500	981,700	166,048,900	5,534,963
July	11,212,500	1,180,700	26,387,400	1,626,200	95,700	13,767,500	45,400	126,502,000	1,589,000	11,195,000	963,600	194,565,000	6,276,290
August	15,949,200	1,582,200	33,637,600	1,936,900	68,900	18,633,500	170,700	174,853,500	2,111,700	17,160,200	1,344,200	267,448,600	8,627,374
September	16,730,000	1,870,500	26,149,400	4,200	82,300	19,770,000	177,600	180,218,600	2,737,500	16,615,000	1,363,400	265,718,500	8,857,283
October	10,471,700	933,100	27,681,000	1,400	85,200	11,985,800	129,900	98,160,300	2,022,900	9,946,200	1,931,100	163,348,600	5,269,310
November	7,921,300	450,100	16,035,900	2,600	52,200	6,242,600	43,200	40,334,900	1,019,300	2,749,900	1,661,000	76,513,000	2,550,433
December	4,618,200	58,800	2,122,200	2,600	43,700	3,905,100	5,000	19,309,400	650,100	14,600	1,786,500	32,516,200	1,048,910
Total	**104,231,900**	**7,690,000**	**162,450,300**	**5,942,800**	**838,100**	**108,734,700**	**628,600**	**855,282,501**	**15,057,800**	**69,385,500**	**15,536,100**	1,345,778,301	
% of Total	**8.2%**	**0.6%**	**12.1%**					**72.8%**	**1.1%**	**5.2%**			





	Business	Church	City Property	CONSTRUCTION	Daycare	Multiple Rental	OUTSIDE CITY	Residential	School	Sprinklers	Trailer Court	
August	15,949,200	1,582,200	33,637,600	1936900	68,900	18,633,500	170,700	174,853,500	2,111,700	17,160,200	1,344,200	267,448,600
	6.7%	**0.6%**	**12.6%**					**72.9%**	**0.8%**	**6.4%**		

Mountain Home Facility Plan Update - Water Loss Summary

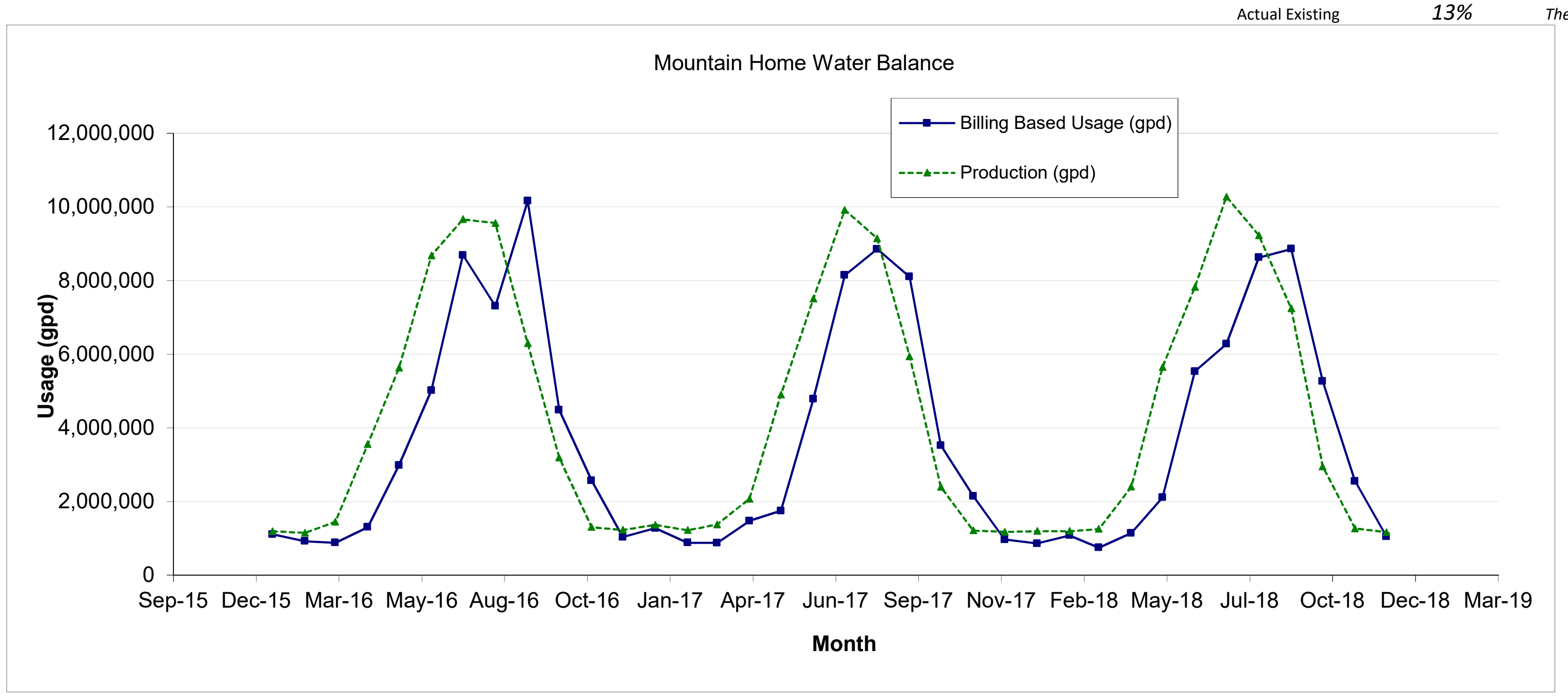
Average Monthly Consumption - Billing Based (gal/day)			
Month	2016	2017	2018
Jan	1,107,490	1,276,932	857,942
Feb	921,390	879,468	1,079,307
Mar	880,948	878,755	746,152
Apr	1,304,150	1,471,903	1,143,323
May	2,982,665	1,747,561	2,108,784
Jun	5,018,993	4,783,020	5,534,963
Jul	8,690,684	8,144,313	6,276,290
Aug	7,305,303	8,854,684	8,627,374
Sep	10,167,320	8,103,717	8,857,283
Oct	4,488,523	3,523,652	5,269,310
Nov	2,569,187	2,148,967	2,550,433
Dec	1,036,013	969,042	1,048,910
Total Annual	*46,472,666*	*42,782,013*	*44,100,072*

Average Monthly Production (gal/day)			
Month	2016	2017	2018
Jan	1,190,254	1,367,638	1,196,480
Feb	1,149,211	1,221,062	1,195,513
Mar	1,448,103	1,373,255	1,255,581
Apr	3,558,544	2,071,095	2,399,127
May	5,628,200	4,902,119	5,649,106
Jun	8,682,831	7,505,123	7,823,962
Jul	9,664,425	9,916,796	10,276,791
Aug	9,559,458	9,146,493	9,229,375
Sep	6,293,355	5,938,571	7,239,811
Oct	3,190,084	2,396,977	2,951,267
Nov	1,304,611	1,213,011	1,267,379
Dec	1,228,810	1,177,130	1,164,736
Total Annual	*52,897,883*	*48,229,270*	*51,649,129*

Production minus Consumption (gal/day)			
Month	2016	2017	2018
Jan	82,763	90,706	338,538
Feb	227,821	341,594	116,206
Mar	567,154	494,500	509,430
Apr	2,254,394	599,192	1,255,804
May	2,645,535	3,154,558	3,540,322
Jun	3,663,838	2,722,103	2,288,999
Jul	973,741	1,772,483	4,000,500
Aug	2,254,155	291,809	602,000
Sep	-3,873,965	-2,165,146	-1,617,472
Oct	-1,298,439	-1,126,674	-2,318,043
Nov	-1,264,576	-935,956	-1,283,054
Dec	192,797	208,088	115,827

Total Consumption Breakdown			
Category	Annual Average	Summer	Winter
Residential	82%	84%	70%
Comm/Pub/Ind	18%	16%	30%
Total	100%	100%	100%

Annual Water Loss Estimate		
Year	Annual Loss	
2016	12%	
2017	11%	
2018	15%	
Planning number	*8%*	*As the future system develops, meters will be more accurate, lines will be newer.*
Assumed Existing	*10%*	*The system is assumed to be fairly tight as it is*
Actual Existing	*13%*	*The current consumption data is missing important pieces and is not considered to reflect actual conditions*



Year	Recorded Well Production (MG/yr)	Billing Based Consumption (MG/yr)	Annual Water Loss (%)
2016	53	46	12%
2017	48	43	11%
2018	52	44	15%

Attachment D

City of Mountain Home Supply vs. Demand

Supply vs. Demand

	100% Firm
Firm Well Supply, gpm*	9,900
Max Day Demand, gpm**	8,150
Remaining Capacity, gpm	1,750

*Firm capacity refers to capacity of supply with largest well off-line

**Assumes 2018 per capita peak day demand

Demand per EDU

Max Day, gpcd	823	(includes all uses)
Residential component	73%	
Max Day Resident, gpcd	600	(includes only residential uses)
People / EDU[3]	2.27	
Max Day EDU, gpd	1362	
Max Day EDU, gpm	0.95	
Peak Hour Demand ERU, gpm	1.64	
2018 Population	14,260	

Remaining EDUs with Existing Storage and Wells

	Max. Additional ERUs	Max. Population Served[1]
2018 Existing System[2]	1,850	18,460
Compare to 2015 Update	453	15,040

Available EDUs after Improvements

	Max. Additional ERUs	Max. Population Served[1]
Phase 1: New Well 17 (1500 gpm)	3,436	22,060
Phase 2: New Well 18 (1500 gpm)	5,022	25,661

Notes:

1 Based on 2018 population, recommended to start design for next stage significantly before this point. Population assumes all growth is residential

2 Based on wells having to deliver peak hour demands and maintain fire storage in tanks

3 EDU = Equivalent Dwelling Unit, i.e. a house with census value of 2.27 people

4 gpm = gallons per minute

5 gpcd = gallons per capita per day

Attachment D

City of Mountain Home
Water Supply vs Water Rights

City of Mountain Home

Well Production Capacity

	Observed Pumping Capacity, gpm		
Existing Water Supply	**2013**	**2015**	**2018**
Well 1	800	750	700
Well 6	2,100	2,000	2,000
Well 9	1,550	900	900
Well 11	2,100	2,150	2,100
Well 12	1,200	1,200	1,200
Well 13	2,100	1,950	1,950
Well 14	1,200	1,200	1,200
Well 15 (VFD)	1,200	1,100	1,100
Well 16			850
Total Production Capacity	**12,250**	**11,250**	**12,000**
Less Largest Well	(2,100)	(2,150)	(2,100)
Firm Pumping Capacity	**10,150**	**9,100**	**9,900**

Existing Water Right

Winter (Nov 16 - March 14)	9,196
Summer (Apr 1 - Oct 15)	16,857

City of Mountain Home

Water Rights

Type	Basin	Sequence	Suffix	Priority Date	Div. Rate (cfs)	Actual Div. Rate (gpm)	Period of Use	Water Use	
WR	61	2072		3/13/1931	2.00	898	1/1 - 12/31	Municipal	
WR	61	2167		4/6/1964	1.97	884	4/1 - 11/1	Municipal	Former Warkentin Right
WR	61	2170		5/27/1964	9.64	4,326	1/1 - 12/31	Municipal	
WR	61	2188		2/17/1966	2.66	1,194	3/15 - 11/15	Municipal	Former Brown Right
WR	61	2210		9/30/1966	5.35	2,401	4/1 - 11/1	Municipal	Former Warkentin Right
WR	61	7151		4/9/1973	1.14	512	4/1 - 10/31	Municipal	Former Brown Right
WR	61	7172	F	11/19/1973	2.81	1,261	3/15 - 10/15	Municipal	
WR	61	7184		4/22/1974	4.35	1,952	1/1 - 12/31	Municipal	
WR	61	7339		8/18/1977	4.50	2,020	1/1 - 12/31	Municipal	
WR	61	7439		6/10/1981	3.14	1,409	4/1 - 10/31	Municipal	Former A&A Development Right
Total					37.56	16,857			
				Approved	36.42	16,345			
					15.93	7,149			

Period of Use Table

WR	61-02072	61-02167	61-02170	61-02188	61-02210	61-07151	61-07172F	61-07184	61-07339	61-07439	Total
gpm	898	884	4,326	1,194	2,401	512	1,261	1,952	2,020	1,409	16,857
Jan	898		4,326					1,952	2,020		9,196
Feb	898		4,326					1,952	2,020		9,196
Mar, 15	898		4,326	1,194			1,261	1,952	2,020		11,651
Apr, 1	898	884	4,326	1,194	2,401	512	1,261	1,952	2,020	1,409	16,857
May	898	884	4,326	1,194	2,401	512	1,261	1,952	2,020	1,409	16,857
Jun	898	884	4,326	1,194	2,401	512	1,261	1,952	2,020	1,409	16,857
Jul	898	884	4,326	1,194	2,401	512	1,261	1,952	2,020	1,409	16,857
Aug	898	884	4,326	1,194	2,401	512	1,261	1,952	2,020	1,409	16,857
Sep	898	884	4,326	1,194	2,401	512	1,261	1,952	2,020	1,409	16,857
Oct, 16	898	884	4,326	1,194	2,401	512		1,952	2,020	1,409	15,596
Nov, 1	898	884	4,326	1,194	2,401			1,952	2,020		13,675
Nov, 2	898		4,326	1,194				1,952	2,020		10,390
Nov, 16	898		4,326					1,952	2,020		9,196
Dec	898		4,326					1,952	2,020		9,196

Mark D. Moore
Fire Chief

city of **Mountain Home Fire Department**

Brian W Reed
Fire Marshal

Date: 9.27.2019
Subject: Water Supply
From: Mark D. Moore

To: Whom it may concern,

The Mountain Home Fire Department supports the efforts of the City of Mountain Home in maintaining an effective and sufficient water supply system within the city. A sufficient water supply system is crucial to the Fire Department during a large commercial fire. The system must be able to meet the fire flow demands to ensure timely extinguishment of fires.

Fire flow requirements are based on the size of a building and whether or not it has a fire suppression system installed. The International Fire Code may require a water fire flow in excess of 4,000 gallons per minute for as much as 4 hours. To meet these requirements, the city must have the storage capacity and the ability to deliver that volume of water throughout the city's hydrant system.

Our Fire Department currently holds and Idaho Survey and Ratings Bureau (ISRB), Fire Class Rating 3. This is an extremely low rating and benefits our citizens by saving them money on insurance. To maintain that rating, we must show that we are capable of meeting the required fire flows and durations for our largest commercial buildings. It is crucial that the city water system meet the needed requirements at all time.

Sincerely,

Mark D. Moore
Fire Chief
208.587.2117 – O
208.861.1461 – C
mmoore@mountain-home.us

Needed Fire Flows for P Code MOUNTAIN HOME

Stories	N.F.F.	PPC & W	OWNER	Address	
1	5,000	06 I-1	DEMEYERS FURNITURE	600 AIRBASE RD	MOUNTAIN HOME
There are(is) 1 in this group					
1	4,500	04 I-1	SCHOOL DISTRICT #193	300 S 11TH EAST	MOUNTAIN HOME
There are(is) 1 in this group					
1	4,000	03 I-1	SCHOOL DIST 193	550 E JACKSON ST	MOUNTAIN HOME
1	4,000	04 I-1	PAULA KAE LLC	2800 AMERICAN LEGION BLV	MOUNTAIN HOME
There are(is) 2 in this group					
1	3,500	03	VACANT	1375 AIRBASE (HWY 51) RD	MOUNTAIN HOME
1	3,500	03	SCHOOL DIST 193	415 W 2ND NORTH	MOUNTAIN HOME
There are(is) 2 in this group					
1	3,000	03	SCHOOL DISTRICT #193	290 E 12TH ST NORTH	MOUNTAIN HOME
2	3,000	03	CNR INVESTMENTS	3195 INDUSTRIAL WAY	MOUNTAIN HOME
1	3,000	03	SCHOOL DISTRICT 193	775 N 10TH EAST	MOUNTAIN HOME
1					MOUNTAIN HOME
2	3,000	03		491 W 6TH S	MOUNTAIN HOME
There are(is) 5 in this group					
1	2,500	03	PILOT TRAVEL CENTER INC	1050 HWY 20	MOUNTAIN HOME
1	2,500		JOES STEAKHOUSE AND LOUNGE		MOUNTAIN HOME
2	03 2,500		PLAZA 51 SHOPPING CENTER	135 143 BITTERBRUSH CT	MOUNTAIN HOME
2	03 2,500		FOOTHILLS MOTOR INN	519 555 W 6TH S	MOUNTAIN HOME
2					MOUNTAIN HOME
1	2,500	03 R1,P1,	MIKE HULSMAN	1130 E HWY 20	
There are(is) 6 in this group					
1	2,250	03	JAMES D & SALLY A WOLFE	1288 NW SAWMILL RD	MOUNTAIN HOME
1	2,250	03	N&G INC	1060 HWY 20	MOUNTAIN HOME
2	2,250	03	URBAN RENEWAL AGENCY	295 N 2ND EAST	MOUNTAIN HOME
1					MOUNTAIN HOME
1	2,250	03	B TRANSFER AND STORAGE COMPAN	890 W AIRBASE RD	
There are(is) 5 in this group					
1	2,000	03	TECH AUTO BODY	195 E 2ND SOUTH ST	MOUNTAIN HOME
2	2,000	03	FREEDOM LANES	830 N 2ND EAST ST	MOUNTAIN HOME
2	2,000	03	HI LANDER MOTEL & STEAK HOUSE	615 S 3RD WEST	MOUNTAIN HOME
1	2,000	03	EL HERRADERO, LLC	535 N MAIN ST	MOUNTAIN HOME
1	2,000	03	CITY OF MOUNTAIN HOME	1000 N 3RD EAST	MOUNTAIN HOME
1	2,000	03	KELLEY BEAN	N 2ND WEST	MOUNTAIN HOME
1	2,000	03	STARDUST PLAZA	210 290 E 5TH NORTH ST	MOUNTAIN HOME
3	2,000	03	LARRY ROGERS	140 170 E JACKSON ST	MOUNTAIN HOME
There are(is) 8 in this group					
1	1,750	03	PERFORMANCE CHEVROLET	1088 W 6TH SOUTH ST	MOUNTAIN HOME
1	1,750	03	LES SCHWAB INC	400 W 6TH SOUTH	MOUNTAIN HOME
1	1,750	03	TETON VALLEY RANCH	475 E 6TH SOUTH	MOUNTAIN HOME
1	1,750	03	B TRANSFER AND STORAGE COMPAN	890 W AIRBASE RD	MOUNTAIN HOME
1	1,750	03	B TRANSFER AND STORAGE COMPAN	890 W AIRBASE RD	MOUNTAIN HOME
1	1,750	03	AMERICAN LEGION HALL #26	515 E 2ND SOUTH ST	MOUNTAIN HOME
1	1,750	03	B TRANSFER AND STORAGE COMPAN	890 W AIRBASE RD	MOUNTAIN HOME
3	1,750	03	AGRISOURCE INC	635 S MAIN ST	MOUNTAIN HOME

Needed Fire Flows for P Code MOUNTAIN HOME

Stories	N.F.F.	PPC & W	OWNER	Address	
3	1,750	03	ELMORE COUNTY	150 S 4TH EAST	MOUNTAIN HOME
There are(is) 9 in this group					
2	1,500	03	FRANKIES BURGERS	260 270 N MAIN ST	MOUNTAIN HOME
1	1,500	03	EVELYN RUBAL	1855 W 6TH S	MOUNTAIN HOME
1	1,500	03	BPOE 2276	325 S 3RD W	MOUNTAIN HOME
1	1,500	03	TONYA MONTESANO	2600 AMERICAN LEGION BLV	MOUNTAIN HOME
2	1,500	03	TAKE ONE CINEMAS	650 W 8TH S	MOUNTAIN HOME
1	1,500	03	ROBERT MORELLI	2910 AMERICAN LEGION BLV	MOUNTAIN HOME
3	1,500	03	AGRISOURCE INC	635 S MAIN ST	MOUNTAIN HOME
1	1,500	03	JAMES D & SALLY A WOLFE	1288 NW SAWMILL RD	MOUNTAIN HOME
There are(is) 8 in this group					
3	1,250	03	SCHOOL DIST 193	550 E JACKSON ST	MOUNTAIN HOME
1	1,250	03	MTN HOME MUNICIPAL GOLF COURS	1880 E 8TH NORTH	MOUNTAIN HOME
1	1,250	03	BOULEVARD EAST RETAIL CENTER	2680 AMERICAN LEGION BLV	MOUNTAIN HOME
2	1,250	03	LUCRETIA SHARP	145 155 N 2ND EAST	MOUNTAIN HOME
					MOUNTAIN HOME
1	1,250	03		1500	
There are(is) 6 in this group			GOLDEN CROWN PROPERTIES, LLC	SUNSETSTRIP	
1	1,000	03	1465 AMERICAN LEGION LLC	2005 AMERICAN LEGION BLV	MOUNTAIN HOME
1	1,000	03	NAIHAO MA	1465 AMERICAN LEGION BLV	MOUNTAIN HOME
1	1,000	03		1525 AMERICAN LEGION BLV	MOUNTAIN HOME
1	1,000	03	AMERICAN LEGION POST 101 INC	715 S 3RD W	MOUNTAIN HOME
1	1,000	03	LOS PINOS	815 S 3RD WEST	MOUNTAIN HOME
1	1,000	03	GRINDES DINER	550 W 6TH SOUTH	MOUNTAIN HOME
1	1,000	03	KURLEY'S SPORTS BAR & GRILL	124 E JACKSON ST	MOUNTAIN HOME
1	1,000	03	STEVEN STROM	495 N MAIN ST	MOUNTAIN HOME
There are(is) 8 in this group					
1	750	03	ROY W. BROWN	950 AIRBASE RD 1288	MOUNTAIN HOME
1	750	03	JAMES D & SALLY A WOLFE	NW SAWMILL RD 1235	MOUNTAIN HOME
1				850 S 3RD W ST	MOUNTAIN HOME
				700 S 3RD WEST 1288	MOUNTAIN HOME
	750	03		NW SAWMILL RD 1288	MOUNTAIN HOME
1	750	03	TRACY REALTY	NW SAWMILL RD	MOUNTAIN HOME
1	750	03	MAPLE COVE CAFÉ		MOUNTAIN HOME
1	750	03	JAMES D & SALLY A WOLFE	590 S 3RD ST W	MOUNTAIN HOME
1	750	03	JAMES D & SALLY A WOLFE	N 2ND WEST	MOUNTAIN HOME
There are(is) 9 in this group				3175 FOOTHILLS AVE	
1	500	03	BRIAN BETHEL	1180 E HWY 20	MOUNTAIN HOME
3	500	03	KELLY BEAN	1288 NW SAWMILL RD	MOUNTAIN HOME
3	500	03	HAMPTON INN AND SUITES	150 E 10TH NORTH	MOUNTAIN HOME
2	500	03	JBH HOSPITALITY		MOUNTAIN HOME
1	500	03	JAMES D & SALLY A WOLFE	215 E JACKSON ST 895	MOUNTAIN HOME
1	500	03	MOUNTAIN HOME REDI MIX	N 6TH EAST ST	MOUNTAIN HOME
There are(is) 6 in this group					

2018 Zone Flow Statistics

	Upper	Medium	Upper & Medium
Average Day (gpm)	128	278	406
Summer (gpm)	280	476	756
Winter (gpm)	43	131	174
Maximum Day (gpm)	**433**	**678**	**989**
Peak Hour* (gpm)	**1,041**	**1,578**	**2,332**

* Used Peaking Factor of 2.28, based off Medium Booster SCADA data in 2015

Note: Upper & Medium totals for maximum day and peak hour do not add to the third column, as these individual zone events do not happen at the same time.

Upper Zone Growth Potential

Maximum Day*(gpm)	**433**
Firm Pumping Capacity (gpm)	**660**
Available for Growth (gpm)	**227**
MDD gpm/ERU	**0.95**
Available ERUs	**240**

*Maximum day used because upper zone includes storage.

Note: If Well 14 is used for back up to the booster station, then Upper Zone Firm capacity is actually closer to 1400 gpm, which equates to 940 available ERUs

Medium Zone Growth Potential

Peak Hour* (gpm)	**1,578**
Firm Pumping Capacity (gpm)	**2,100**
Available for Growth (gpm)	**522**
Peak Hour gpm/ERU	**1.64**
Available ERUs	**318**

*Peak hour used because of lack of storage in medium zone.

Note: It may be possible that additional ERUs could be available based on PRV and transmission pipeline capacities, but these would need to be determined through additional computer modeling. Assume for new growth that demand per ERU will be comparable to system-wide max day and peak hour demands per ERU.

Storage Analysis

Storage Component	Year 2018	With firm capacity	Year 2040[1]	2040
Operating Storage[2] (gal)	498,600	498,600	498,600	498,600
Peaking Storage (gal)	2,184,256	1,727,400	3,040,000	3,040,000
Fire Storage[3] (gal)	960,000	960,000	960,000	960,000
Additional Emergency Storage[4] (gal)	0		538,548	0
Total Storage Required (gal)	*3,642,856*	*3,186,000*	*5,037,148*	*4,444,444*
Total Storage Available (gal)	*4,986,000*	*4,986,000*	*4,986,000*	*4,986,000*
Storage Surplus (MG)	1.34	1.80	-0.05	0.54

Notes:

1. Future conditions correspond to a population of 19,830
2. Operating storage recommendation is 10% of total tank volume.
3. Based on the data provided by the Idaho Survey and Rating Bureau, the maximum existing and future fire storage requirement are assumed to be 4,000 gpm for 4 hours.
4. Current arrangement meets DEQ required storage for power outages during an average day. The City may want to consider more conservative emergency storage criteria. We suggest considering targeting average summer day demand.

Other Notes:

Two storage design options:
1. Peaking + fire + operational storage
2. Emergency (ADD 8hr) + fire +operational

The greater of the two drives the design

Fire Storage Calc				
Scenario	Demand (gpm)		Duration (hr)	Volume (gal)
Existing	4000		4	960,000
Future	4000		4	960,000

Emergency Storage Calc				
Scenario	ADD (gpm)		Duration (hr)	Volume (gal)
Existing	3,100		8	1,488,000
2040 - population 20,610	5,172		8	2,482,548

Emergency Storage Alternate Calc				
Scenario	ASD (gpm)		Duration (hr)	Volume (gal)
Existing	6,336		8	3,041,341
2040 - population 19831	8,811		8	4,229,465

Emergency Storage Reduction Calc for ADD				
Sources with Standby Power	Flow (gpm)		Duration (hr)	Volume (gal)
Well 14	1,200		8	576,000
Well 6	2,000		8	960,000
Well 16	850		8	408,000
Total	4,050			1,944,000
	Existing ADD Requirement			-456,000
	Future ADD Requirement			538,548

The emergency storage component can be reduced by output capacity of well and delivery facilities with standby power.

Emergency Storage Reduction Calc for ASD				
Sources with Standby Power	Flow (gpm)		Duration (hr)	Volume (gal)
Well 14	1,200		8	576,000
Well 6	2,000		8	960,000
Total	3,200			1,536,000
	Existing ASD Requirement			1,505,341
	Future ASD Requirement			2,693,465

The emergency storage component can be reduced by output capacity of well and delivery facilities with standby power.

		Rolling Average Usage	Unit Curve		2018 MDD Pattern (gpm)	Supply* (gpm)	Difference (gallon)
7/25/2018 0:00	0:00	9,330	1.18	Max Day Demand (2018)	9,644	8150	331,212
7/25/2018 0:15	0:15	9,523	1.21	8150 gpm	9,843	8150	356,612
7/25/2018 0:30	0:30	9,497	1.20		9,816	8150	381,601
7/25/2018 0:45	0:45	9,466	1.20		9,785	8150	406,120
7/25/2018 1:00	1:00	9,855	1.25		10,187	8150	436,670
7/25/2018 1:15	1:15	9,927	1.26		10,260	8150	468,327
7/25/2018 1:30	1:30	10,429	1.32		10,780	8150	507,778
7/25/2018 1:45	1:45	10,800	1.37		11,163	8150	552,973
7/25/2018 2:00	2:00	10,975	1.39		11,344	8150	600,878
7/25/2018 2:15	2:15	11,347	1.44		11,729	8150	654,558
7/25/2018 2:30	2:30	11,698	1.48		12,091	8150	713,672
7/25/2018 2:45	2:45	11,900	1.51		12,300	8150	775,929
7/25/2018 3:00	3:00	12,013	1.52		12,417	8150	839,940
7/25/2018 3:15	3:15	12,073	1.53		12,479	8150	904,881
7/25/2018 3:30	3:30	12,073	1.53		12,479	8150	969,814
7/25/2018 3:45	3:45	12,120	1.54		12,528	8150	1,035,482
7/25/2018 4:00	4:00	12,393	1.57		12,810	8150	1,105,380
7/25/2018 4:15	4:15	12,575	1.59		12,998	8150	1,178,093
7/25/2018 4:30	4:30	12,739	1.62		13,167	8150	1,253,350
7/25/2018 4:45	4:45	13,081	1.66		13,521	8150	1,333,916
7/25/2018 5:00	5:00	13,321	1.69		13,769	8150	1,418,206
7/25/2018 5:15	5:15	13,614	1.73		14,072	8150	1,507,041
7/25/2018 5:30	5:30	14,011	1.78		14,482	8150	1,602,023
7/25/2018 5:45	5:45	13,900	1.76		14,368	8150	1,695,292
7/25/2018 6:00	6:00	13,507	1.71		13,961	8150	1,782,458
7/25/2018 6:15	6:15	13,164	1.67		13,606	8150	1,864,305
7/25/2018 6:30	6:30	12,415	1.57		12,832	8150	1,934,542
7/25/2018 6:45	6:45	11,764	1.49		12,160	8150	1,994,689
7/25/2018 7:00	7:00	11,115	1.41		11,489	8150	2,044,772
7/25/2018 7:15	7:15	10,546	1.34		10,901	8150	2,086,037
7/25/2018 7:30	7:30	10,073	1.28		10,412	8150	2,119,962
7/25/2018 7:45	7:45	9,668	1.23		9,993	8150	2,147,608
7/25/2018 8:00	8:00	9,266	1.18		9,578	8150	2,169,028
7/25/2018 8:15	8:15	8,676	1.10		8,967	8150	2,181,287
7/25/2018 8:30	8:30	8,076	1.02		8,348	8150	**2,184,256**
7/25/2018 8:45	8:45	7,706	0.98		7,965	8150	2,181,484
7/25/2018 9:00	9:00	7,241	0.92		7,485	8150	2,171,505
7/25/2018 9:15	9:15	6,639	0.84		6,862	8150	2,152,188
7/25/2018 9:30	9:30	6,351	0.81		6,564	8150	2,128,401
7/25/2018 9:45	9:45	6,027	0.76		6,230	8150	2,099,594
7/25/2018 10:00	10:00	5,853	0.74		6,050	8150	2,068,098
7/25/2018 10:15	10:15	5,784	0.73		5,979	8150	2,035,528
7/25/2018 10:30	10:30	5,446	0.69		5,629	8150	1,997,716
7/25/2018 10:45	10:45	5,105	0.65		5,277	8150	1,954,619
7/25/2018 11:00	11:00	4,791	0.61		4,952	8150	1,906,647
7/25/2018 11:15	11:15	4,706	0.60		4,864	8150	1,857,356
7/25/2018 11:30	11:30	4,583	0.58		4,738	8150	1,806,169
7/25/2018 11:45	11:45	4,620	0.59		4,776	8150	1,755,552
7/25/2018 12:00	12:00	4,609	0.58		4,764	8150	1,704,768
7/25/2018 12:15	12:15	4,409	0.56		4,558	8150	1,650,881
7/25/2018 12:30	12:30	4,226	0.54		4,368	8150	1,594,146
7/25/2018 12:45	12:45	4,325	0.55		4,471	8150	1,538,956
7/25/2018 13:00	13:00	4,410	0.56		4,559	8150	1,485,088
7/25/2018 13:15	13:15	4,749	0.60		4,909	8150	1,436,466
7/25/2018 13:30	13:30	5,315	0.67		5,494	8150	1,396,622
7/25/2018 13:45	13:45	5,109	0.65		5,281	8150	1,353,587
7/25/2018 14:00	14:00	4,930	0.63		5,096	8150	1,307,780
7/25/2018 14:15	14:15	4,466	0.57		4,616	8150	1,254,771
7/25/2018 14:30	14:30	4,145	0.53		4,285	8150	1,196,791
7/25/2018 14:45	14:45	4,106	0.52		4,244	8150	1,138,205
7/25/2018 15:00	15:00	4,061	0.52		4,197	8150	1,078,914
7/25/2018 15:15	15:15	4,853	0.62		5,017	8150	1,031,913
7/25/2018 15:30	15:30	4,621	0.59		4,776	8150	981,302
7/25/2018 15:45	15:45	4,617	0.59		4,772	8150	930,634
7/25/2018 16:00	16:00	4,615	0.59		4,771	8150	879,944
7/25/2018 16:15	16:15	3,519	0.45		3,637	8150	812,256
7/25/2018 16:30	16:30	3,403	0.43		3,517	8150	742,765
7/25/2018 16:45	16:45	3,384	0.43		3,498	8150	672,989
7/25/2018 17:00	17:00	3,577	0.45		3,697	8150	606,191
7/25/2018 17:15	17:15	3,999	0.51		4,134	8150	545,945
7/25/2018 17:30	17:30	4,367	0.55		4,514	8150	491,404
7/25/2018 17:45	17:45	4,778	0.61		4,938	8150	443,229
7/25/2018 18:00	18:00	4,716	0.60		4,875	8150	394,104
7/25/2018 18:15	18:15	4,523	0.57		4,675	8150	341,984
7/25/2018 18:30	18:30	4,673	0.59		4,830	8150	292,179
7/25/2018 18:45	18:45	4,425	0.56		4,574	8150	238,541
7/25/2018 19:00	19:00	4,648	0.59		4,805	8150	188,360
7/25/2018 19:15	19:15	5,125	0.65		5,297	8150	145,566
7/25/2018 19:30	19:30	5,433	0.69		5,615	8150	107,546
7/25/2018 19:45	19:45	5,779	0.73		5,973	8150	74,890
7/25/2018 20:00	20:00	5,885	0.75		6,083	8150	43,880
7/25/2018 20:15	20:15	6,485	0.82		6,704	8150	22,184
7/25/2018 20:30	20:30	6,863	0.87		7,094	8150	6,342
7/25/2018 20:45	20:45	7,476	0.95		7,727	8150	0
7/25/2018 21:00	21:00	8,205	1.04		8,480	8150	4,957
7/25/2018 21:15	21:15	8,492	1.08		8,777	8150	14,368
7/25/2018 21:30	21:30	8,934	1.13		9,235	8150	30,641
7/25/2018 21:45	21:45	9,187	1.17		9,496	8150	50,836
7/25/2018 22:00	22:00	9,606	1.22		9,929	8150	77,519
7/25/2018 22:15	22:15	10,141	1.29		10,482	8150	112,500
7/25/2018 22:30	22:30	10,234	1.30		10,578	8150	148,921
7/25/2018 22:45	22:45	10,359	1.31		10,707	8150	187,283
7/25/2018 23:00	23:00	10,195	1.29		10,538	8150	223,097
7/25/2018 23:15	23:15	9,754	1.24		10,082	8150	252,080
7/25/2018 23:30	23:30	9,717	1.23		10,043	8150	280,481
7/25/2018 23:45	23:45	9,712	1.23		10,038	8150	308,806
						*Assumes Supply = MDD	
Average		7,885	1.0000	Average:	8,150		
						PSR:	2.18 MG
	max		1.7769				18.6%
							18.6%

Mountain Home
Daily Well Production

This spreadsheet shows the daily and weekly pump records. The data here reflects corrections to known typos. Monthly summaries for 2002+ reflect the "averaging" of the readings taken each week as calculated on a separate spreadsheet.

(Gallons)

Day	Jan-95	Feb-95	Mar-95	Apr-95	May-95	Jun-95	Jul-95	Aug-95	Sep-95	Oct-95	Nov-95	Dec-95
1	1,180,800	1,						800	6,203,800	3,302,000	2,605,400	1,464,000
2	1,485,000	1,						200	6,310,000	3,975,200	1,863,200	1,725,000
3	1,450,800	2,						400	4,202,600	3,779,800	3,649,000	2,366,000
4	1,504,800	2,						200	5,841,600	3,345,000	2,204,000	2,528,600
5	1,780,200	1,						400	6,570,000	2,748,000	2,409,000	2,030,000
6	1,677,600	2,						200	6,994,400	2,979,000	2,773,800	2,223,600
7	1,803,600	1,						200	6,889,000	2,559,000	1,994,200	2,605,600
8	1,504,800	3,						600	6,672,000	3,034,000	2,177,800	2,011,000
9	1,674,000	8						200	4,534,000	2,803,000	1,869,600	2,493,000
10	1,607,400	2,147,400	1,292,400	2,804,400	3,032,400	4,679,400	6,542,400	8,669,600	6,985,000	4,651,400	2,025,000	2,122,000
11	1,656,000	1,843,200	928,800	2,820,600	2,539,800	7,056,200	7,536,000	4,867,600	6,560,600	3,212,000	2,277,000	1,086,800
12	1,656,000	1,938,600	1,202,200	3,047,400	2,495,200	6,970,400	6,122,800	7,238,000	6,444,000	3,842,000	1,591,000	1,872,000
13	1,396,800	2,116,800	1,337,400	2,804,400	2,261,800	7,192,600	6,586,600	5,966,400	6,972,000	3,149,800	1,221,200	1,612,800
14	1,278,000	1,996,200	1,310,400	3,524,400	2,355,400	6,065,400	7,692,400	7,125,600	8,087,800	3,914,000	2,814,400	1,037,800
15	1,321,200	1,884,600	549,000	2,633,400	2,693,400	5,057,600	6,590,000	8,662,200	6,436,000	3,531,000	1,961,200	1,300,400
16	1,517,400	2,187,000	2,991,600	2,755,800	3,074,200	6,760,800	6,726,000	6,174,600	5,841,000	3,867,000	2,764,200	1,332,000
17	1,301,400	2,032,200	1,884,600	3,321,000	2,945,800	3,704,400	8,008,800	6,178,400	5,750,000	3,133,000	2,609,400	1,544,000
18	1,171,800	2,032,200	1,348,200	6,418,000	4,177,800	3,181,600	8,506,000	5,486,000	6,297,000	3,128,000	3,189,000	252,600
19	1,319,400	1,996,200	1,508,400	2,855,000	4,691,400	2,695,000	7,509,000	7,673,400	5,672,000	3,279,000	3,356,000	2,128,000
20	1,375,200	2,363,400	1,554,800	4,861,000	4,477,200	3,789,000	8,379,000	7,839,000	5,741,800	4,892,800	1,809,000	1,480,000
21	1,598,400	1,908,000	1,998,000	4,059,200	4,641,200	2,704,000	7,420,200	7,643,800	5,413,000	4,097,000	2,314,600	3,962,000
22	1,103,400	2,579,400	2,164,000	1,620,000	4,256,400	5,067,000	6,648,800	6,817,000	4,337,800	3,649,000	1,784,000	747,000
23	1,771,200	1,470,600	2,174,000	4,852,800	3,783,000	5,485,000	6,520,600	6,549,000	5,295,000	2,787,400	2,858,000	4,011,000
24	1,438,200	2,053,800	2,178,400	5,650,200	3,896,600	4,596,000	7,633,600	5,527,000	5,803,000	3,684,600	2,049,800	2,124,000
25	1,737,000	2,223,000	2,088,000	3,793,800	5,184,600	5,569,000	9,043,800	6,280,000	5,651,400	3,286,000	1,901,000	2,379,000
26	1,515,600	2,559,600	1,981,600	4,578,400	4,583,400	5,082,200	8,190,600	5,833,600	4,179,400	2,077,600	2,180,000	2,692,400
27	1,665,000	1,488,600	2,098,400	5,550,000	5,247,800	3,931,000	9,976,000	6,804,400	3,570,000	1,822,000	1,934,600	1,930,800
28	1,589,400	2,066,400	2,093,000	3,636,200	5,383,200	7,821,000	6,690,200	7,966,600	4,906,000	2,493,000	1,601,800	2,399,800
29	1,839,600		2,394,400	2,975,800	4,574,400	7,238,400	7,518,400	5,986,600	2,657,000	2,944,000	1,931,000	1,341,200
30	1,818,000		2,068,200	3,476,400	7,819,600	6,825,000	5,772,000	6,307,000	3,330,000	2,289,800	2,038,400	1,317,000
31	1,733,400		2,544,800		5,398,000		8,298,000	10,188,800		1,750,000		

Monthly Statistics

	Jan-95	Feb-95	Mar-95	Apr-95	May-95	Jun-95	Jul-95	Aug-95	Sep-95	Oct-95	Nov-95	Dec-95
Total (Gal)	47,471,400	56,460,600	57,811,200	101,046,800	108,413,200	151,620,800	220,273,200	219,746,800	170,147,200	100,005,400	67,756,600	58,119,400
Total (Ac*ft)	146	173	177	310	333	465	676	674	522	307	208	178
Average (gpm)	1,063	1,400	1,295	2,339	2,429	3,510	4,934	4,923	3,939	2,240	1,568	1,345
Minimum (gpm)	766	597	381	613	1,115	1,855	3,395	3,380	1,845	1,215	848	175
Maximum (gal)	1,839,600	3,045,600	2,991,600	6,418,000	7,819,600	7,821,000	9,976,000	10,188,800	8,087,800	4,892,800	3,649,000	4,011,000
Maximum (GPM)	1,278	2,115	2,078	4,457	5,430	5,431	6,928	7,076	5,617	3,398	2,534	2,785
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-96	Feb-96	Mar-96	Apr-96	May-96	Jun-96	Jul-96	Aug-96	Sep-96	Oct-96	Nov-96	Dec-96
1	1,711,000	1,422,000	1,372,000	1,766,000	1,766,000	5,026,400	6,200,600	8,128,400	5,362,000	6,223,400	1,575,000	1,323,000
2	1,752,800	1,359,000	1,417,000	1,460,000	1,460,000	5,280,800	8,303,600	9,980,400	5,661,000	3,933,400	1,143,000	108,000
3	2,100,600	2,079,000	2,079,000	1,692,000	1,692,000	5,182,000	7,216,200	6,692,200	6,103,200	4,769,200	2,079,000	1,548,000
4	2,090,000	1,728,000	2,014,000	1,812,000	1,812,000	7,251,800	8,226,400	6,996,600	5,572,000	4,678,400	1,197,000	1,215,000
5	1,981,800	1,494,000	480,000	2,424,000	2,424,000	5,009,000	6,614,600	7,213,600	6,476,200	4,917,400	1,377,000	1,188,000
6	2,339,000	1,373,000	1,593,000	1,888,000	1,888,000	7,192,800	7,878,000	7,623,400	5,200,200	3,952,000	1,386,000	1,404,000
7	2,042,000	1,886,000	1,845,000	3,880,800	3,880,800	6,792,000	8,572,400	7,511,400	5,015,000	4,228,600	1,305,000	1,323,000
8	2,474,600	846,000	558,000	2,421,800	2,421,800	6,194,000	9,378,800	8,706,000	6,976,200	4,302,400	1,377,000	1,251,000
9	3,776,800	1,323,000	1,387,000	3,772,000	3,772,000	6,577,800	7,794,800	10,264,000	7,256,800	5,454,400	1,404,000	1,368,000
10	1,135,200	1,596,000	1,462,000	0	0	6,975,600	8,008,000	7,609,800	6,430,200	4,840,000	1,431,000	1,404,000
11	2,823,200	1,445,000	1,396,000	3,951,000	3,951,000	9,614,200	8,618,200	6,909,600	5,977,600	2,945,000	1,584,000	0
12	1,401,400	1,553,000	1,525,000	2,230,000	2,230,000	6,215,400	9,255,200	9,391,400	6,944,200	3,524,000	622,800	765,000
13	2,254,000	1,280,000	1,503,000	2,436,000	2,436,000	7,597,600	8,401,000	7,595,800	6,777,000	2,767,000	1,373,400	2,667,600
14	2,267,000	1,473,000	2,017,000	3,131,400	3,131,400	8,332,200	7,888,200	8,072,400	5,229,000	3,344,000	1,404,000	936,000
15	2,449,000	1,548,000	675,000	2,359,200	2,359,200	6,166,400	10,706,200	8,072,400	3,977,000	2,899,000	1,368,000	1,323,000
16	4,425,600	1,254,000	1,604,000	3,137,800	3,137,800	6,372,800	5,619,800	8,547,600	2,030,000	2,959,000	1,170,000	1,413,000
17	2,085,600	1,314,000	0	2,369,000	2,369,000	6,678,200	5,806,400	7,133,000	4,160,000	2,384,000	2,045,000	1,539,000
18	166,800	1,377,000	3,191,000	1,821,000	1,821,000	6,783,800	7,565,200	7,242,800	2,610,000	1,963,000	1,359,000	1,710,000
19	2,159,600	2,037,000	1,152,000	2,090,000	2,090,000	6,721,400	7,833,400	5,217,800	2,860,000	2,182,000	1,467,000	810,000
20	2,242,000	0	1,857,000	1,503,000	1,503,000	6,953,000	7,225,600	8,373,600	4,915,000	1,495,000	1,152,000	1,260,000
21	2,234,000	2,304,000	1,862,000	2,337,000	2,337,000	4,345,000	7,818,000	4,487,800	3,925,000	2,132,000	1,377,000	1,260,000
22	2,249,400	1,857,000	1,644,000	2,497,400	2,497,400	7,575,000	8,301,400	7,448,200	4,288,000	1,771,200	1,584,000	1,971,000
23	2,362,000	603,000	1,227,000	1,628,000	1,628,000	7,432,000	9,843,600	7,316,200	1,666,000	2,662,000	1,089,000	1,080,000
24	2,623,600	1,305,000	1,322,000	1,808,000	1,808,000	4,650,800	8,350,000	7,166,800	2,692,000	1,701,000	1,287,000	1,035,000
25	82,000	1,476,000	1,329,000	1,822,000	1,822,000	4,315,000	9,090,200	7,876,800	3,316,000	1,440,000	1,647,000	1,512,000
26	1,466,200	1,350,000	2,152,000	2,086,000	2,086,000	6,409,400	9,636,800	7,517,600	3,789,000	1,449,000	1,071,000	1,134,000
27	1,355,000	1,656,000	531,000	2,846,000	2,846,000	5,771,200	8,638,800	5,859,200	4,303,000	1,827,000	1,494,000	1,350,000
28	1,694,000	1,026,000	0	2,115,000	2,115,000	4,696,000	8,187,800	7,301,200	4,092,000	1,413,000	1,062,000	1,422,000
29	1,546,000	1,368,000	2,626,000	3,656,400	3,656,400	6,197,000	7,174,000	8,457,200	5,152,000	1,647,000	1,665,000	1,179,000
30	1,093,000		1,377,000	2,653,200	2,653,200	7,377,200	6,826,000	7,211,400	4,814,400	1,269,000	963,000	1,467,000
31	1,432,200		1,633,000				7,440,400	6,120,800	1,042,000	1,458,000		1,332,000

Adjusted

Monthly Statistics

	Jan-96	Feb-96	Mar-96	Apr-96	May-96	Jun-96	Jul-96	Aug-96	Sep-96	Oct-96	Nov-96	Dec-96
Total (Gal)	61,815,400	41,332,000	44,830,000	69,594,000	69,594,000	191,685,800	248,419,600	234,045,400	144,612,000	92,530,400	41,058,200	39,297,600
Total (Ac*ft)	190	127	138	214	214	588	762	718	444	284	126	121
Average (gpm)	1,385	990	1,004	1,611	1,611	4,437	5,565	5,243	3,240	2,073	950	880
Minimum (gpm)	57	0	0	0	0	2,997	3,903	3,117	724	881	432	0
Maximum (gal)	4,425,600	2,304,000	3,191,000	3,951,000	3,951,000	9,614,200	10,706,200	10,264,000	7,256,800	6,223,400	2,079,000	2,667,600
Maximum (GPM)	3,073	1,600	2,216	2,744	2,744	6,677	7,435	7,128	5,039	4,322	1,444	1,853
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-97	Feb-97	Mar-97	Apr-97	May-97	Jun-97	Jul-97	Aug-97	Sep-97	Oct-97	Nov-97	Dec-97
1	1,350,000	1,590,000	1,497,000	1,997,000	2,279,000	5,709,000	6,431,000	7,196,000	8,604,000	5,155,800	1,462,200	1,643,400
2	1,791,000	1,639,000	1,216,000	2,488,000	3,447,000	7,135,000	4,378,600	7,947,000	8,754,000	4,302,200	1,269,000	1,337,400
3	1,143,000	1,548,000	1,420,000	2,483,000	3,615,000	6,672,000	8,074,800	8,516,800	6,589,600	4,607,200	2,775,000	1,685,200
4	1,269,000	1,354,000	1,301,000	2,258,000	4,855,000	4,919,600	6,264,000	8,119,200	9,259,200	4,074,400	2,132,800	1,690,000
5	1,359,000	1,154,000	1,289,000	2,450,000	5,423,200	4,738,000	7,825,000	8,258,400	6,286,600	3,675,200	1,720,800	1,234,800
6	1,458,000	1,503,000	1,491,000	2,734,000	5,279,800	5,836,000	7,247,000	7,419,000	6,970,000	4,491,000	1,701,000	1,531,800
7	1,179,000	1,242,000	1,063,000	1,966,600	5,333,400	6,023,000	9,650,600	8,990,000	7,908,800	3,292,000	1,494,000	1,572,000
8	1,386,000	1,404,000	1,371,000	2,642,000	5,235,600	5,579,200	8,895,200	7,648,000	8,563,400	4,063,000	1,553,400	1,657,000
9	1,350,000	1,431,000	1,501,000	2,718,000	6,238,400	7,311,000	7,003,800	7,268,000	7,349,600	3,034,000	1,629,000	1,233,000
10	612,000	1,287,000	1,710,000	2,619,000	5,784,600	5,327,000	6,806,200	8,305,000	7,155,400	2,693,200	1,494,000	1,377,000
11	741,600	2,096,600	1,352,000	2,514,000	8,940,200	6,272,000	7,159,000	7,772,000	4,141,000	2,672,600	1,445,400	1,526,400
12	3,602,200	2,116,200	1,380,000	3,415,000	7,172,800	4,110,000	6,436,400	9,449,200	4,115,400	2,952,400	1,447,200	1,443,600
13	1,153,800	2,034,800	1,493,000	4,055,000	6,363,000	3,007,000	7,729,000	8,792,200	4,422,200	3,175,000	2,009,600	1,503,000
14	1,709,600	1,056,600	1,187,000	2,639,000	7,253,800	3,897,000	8,184,400	9,621,000	4,643,600	3,685,200	1,711,000	1,454,400
15	1,525,000	1,484,000	1,119,000	4,188,000	6,749,200	6,171,000	11,025,400	7,963,000	5,608,000	4,044,400	1,308,600	1,614,000
16	1,134,000	251,000	1,498,000	4,260,000	6,290,000	6,984,000	6,703,000	7,231,000	5,302,800	4,614,800	2,145,600	1,162,800
17	1,362,000	1,329,000	1,468,000	4,314,600	5,506,000	7,272,000	7,782,400	7,116,000	5,483,200	3,604,000	990,000	1,574,000
18	1,146,000	1,295,000	1,659,000	4,469,000	5,289,000	5,891,000	6,513,200	9,324,000	5,313,200	4,373,000	1,348,200	1,689,200
19	1,351,000	1,511,000	1,646,000	2,147,000	6,131,000	7,577,000	7,012,000	8,509,400	5,006,200	3,659,200	1,431,000	1,584,000
20	1,442,000	1,330,000	1,750,000	2,948,400	6,879,000	7,720,000	7,297,800	8,939,400	5,528,800	3,068,800	1,627,200	1,449,000
21	1,494,000	1,429,000	1,849,000	2,375,000	9,399,200	6,576,000	8,294,800	8,819,600	5,931,000	2,769,000	1,377,000	1,503,000
22	1,275,000	1,339,000	1,765,000	2,964,000	6,962,600	7,699,000	8,051,800	9,311,800	5,779,200	2,805,000	1,485,000	1,621,800
23	1,376,000	1,550,000	1,927,000	2,171,000	5,988,800	7,273,000	9,325,000	8,283,200	5,739,600	1,968,600	1,570,200	1,470,600
24	1,417,000	1,332,000	2,201,000	3,073,000	4,527,000	7,584,200	10,116,400	7,616,000	5,926,800	2,453,800	1,267,200	1,749,600
25	1,060,000	1,443,000	2,325,000	3,587,000	3,607,000	8,134,000	8,807,800	10,314,800	4,580,000	2,457,200	1,735,200	999,000
26	1,492,000	1,187,000	2,739,000	2,160,000	4,959,000	8,419,600	4,617,200	8,491,200	5,093,800	2,181,400	1,422,000	1,425,600
27	1,300,000	1,424,000	2,128,000	3,726,000	4,722,400	7,252,800	7,332,800	8,216,600	5,054,400	2,765,400	1,152,000	1,625,400
28	1,407,000	1,110,000	1,853,000	3,061,000	5,208,000	7,831,200	7,056,000	7,739,400	5,150,400	0	1,341,000	1,422,000
29	1,279,000		2,295,000	3,929,000	5,556,000	8,398,600	7,488,800	8,835,600	5,248,000	4,358,400	1,358,600	1,562,400
30	1,262,000		2,149,000	2,338,200	6,726,000	5,970,000	6,338,000	8,765,000	5,752,200	1,813,600	1,548,000	1,605,600
31	1,135,000		1,859,000		5,573,600		8,235,000	7,431,400		1,424,000		1,497,600

Monthly Statistics

	Jan-97	Feb-97	Mar-97	Apr-97	May-97	Jun-97	Jul-97	Aug-97	Sep-97	Oct-97	Nov-97	Dec-97
Total (Gal)	42,561,200	39,470,200	51,501,000	88,689,800	177,294,600	193,289,200	234,082,400	258,209,200	181,260,400	100,233,800	46,951,200	46,444,600
Total (Ac*ft)	131	121	158	272	544	593	718	792	556	308	144	143
Average (gpm)	953	979	1,154	2,053	3,972	4,474	5,244	5,784	4,196	2,245	1,087	1,040
Minimum (gpm)	425	174	738	1,366	1,583	2,088	3,041	4,942	2,858	0	688	694
Maximum (gal)	3,602,200	2,116,200	2,739,000	4,469,000	9,399,200	8,419,600	11,025,400	10,314,800	9,259,200	5,155,800	2,775,000	1,749,600
Maximum (GPM)	2,502	1,470	1,902	3,103	6,527	5,847	7,657	7,163	6,430	3,580	1,927	1,215
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-98	Feb-98	Mar-98	Apr-98	May-98	Jun-98	Jul-98	Aug-98	Sep-98	Oct-98	Nov-98	Dec-98
1	1,521,000	1,560,800	2,208,000	1,803,000	6,017,200	4,824,800	8,920,200	7,807,400	7,242,000	2,795,000	1,842,000	1,195,200
2	1,395,000	1,453,000	2,289,600	1,689,000	5,865,000	4,484,000	6,570,400	8,479,000	6,884,400	2,814,000	1,322,000	1,445,600
3	1,573,200	1,072,000	2,191,400	1,736,000	6,029,400	4,025,400	6,577,200	10,805,200	8,272,800	2,712,000	1,854,000	1,280,400
4	1,251,000	1,437,800	68,400	1,432,000	4,525,600	4,437,000	5,818,400	9,369,200	7,643,400	2,758,600	1,602,000	1,101,800
5	1,662,000	2,968,200	2,607,800	1,822,000	4,654,400	4,190,000	6,770,600	7,448,800	4,001,800	2,977,200	1,489,000	1,599,000
6	1,495,800	1,830,000	1,505,000	2,428,400	4,829,400	5,097,000	8,613,200	9,809,600	6,765,600	4,196,400	1,490,000	1,346,200
7	1,420,200	2,437,600	1,506,000	1,179,800	5,946,600	4,565,000	8,879,600	6,691,600	5,734,600	3,500,400	995,000	1,450,600
8	1,566,000	2,011,400	3,815,000	3,680,800	4,597,600	4,269,200	8,174,200	7,567,200	6,445,400	3,788,000	1,506,000	1,290,400
9	1,467,000	2,535,600	418,000	2,874,200	2,995,000	4,649,000	7,507,400	7,953,000	4,389,600	4,057,000	1,509,000	1,299,200
10	1,395,000	2,152,000	952,400	2,004,800	3,312,000	3,996,000	7,052,000	11,795,600	4,368,400	2,690,000	1,637,000	1,384,600
11	1,458,000	2,280,000	2,429,200	1,967,400	2,500,000	8,434,200	7,806,000	6,631,800	4,016,600	3,372,000	1,632,000	1,567,400
12	1,773,000	2,248,800	183,600	2,245,000	1,934,200	4,975,800	9,447,800	9,805,400	5,161,200	4,525,000	1,331,000	1,516,800
13	1,126,800	2,285,000	3,691,000	2,352,600	2,014,000	5,089,000	8,799,200	9,866,000	5,355,600	3,061,200	1,341,000	1,124,000
14	1,286,600	2,211,800	2,070,400	1,977,200	1,997,000	3,785,000	8,485,200	8,448,800	5,706,000	2,560,800	1,444,000	1,496,000
15	1,504,000	2,477,800	1,752,200	1,678,000	1,851,000	6,636,400	10,610,400	6,859,000	7,069,600	3,940,000	1,457,000	1,304,000
16	206,800	2,683,000	2,862,000	2,720,000	1,856,000	4,416,200	10,763,600	7,188,200	4,410,200	2,685,200	495,000	1,473,600
17	1,697,400	2,326,400	4,109,000	3,231,000	1,821,000	6,869,400	6,591,200	9,298,000	6,365,600	4,047,000	-879,000	1,311,000
18	1,431,000	2,551,800	2,753,200	2,849,000	2,435,000	5,667,000	11,026,600	7,018,800	3,818,800	1,420,400	1,281,000	1,580,000
19	1,503,000	2,049,000	2,803,200	3,094,800	3,276,000	5,916,600	13,812,900	9,197,600	6,348,000	2,907,400	1,374,000	1,323,200
20	1,233,000	2,724,800	3,274,400	4,318,200	4,239,000	4,308,800	5,772,500	9,915,800	5,887,600	1,454,000	1,468,200	1,302,600
21	1,978,600	2,661,400	3,269,400	5,265,400	2,710,000	6,279,400	10,112,800	6,772,400	3,974,000	2,100,000	1,465,000	1,426,800
22	1,090,800	1,644,000	1,520,000	4,517,800	2,127,000	5,870,400	9,750,800	7,365,800	5,164,400	2,615,800	1,203,600	1,426,000
23	1,683,000	2,385,800	1,320,000	2,574,400	2,981,400	6,748,400	8,612,600	7,580,000	4,709,200	2,998,000	1,416,600	1,554,200
24	1,287,000	2,523,600	2,794,000	3,019,600	3,558,000	5,409,200	7,670,600	7,602,800	4,635,600	2,500,600	1,303,000	1,534,000
25	1,575,000	2,230,200	2,864,200	2,742,600	3,959,200	3,534,400	8,340,800	8,079,800	3,664,200	2,941,800	1,422,800	1,626,800
26	1,674,000	1,852,400	2,187,000	5,550,000	2,057,000	2,888,600	8,983,600	7,574,600	2,988,000	1,907,000	1,093,600	1,677,200
27	1,854,400	2,464,400	2,726,600	2,410,400	2,354,000	5,164,400	8,708,000	7,473,000	3,083,800	2,494,000	1,599,400	1,412,200
28	1,304,000	2,023,200	4,430,200	5,860,400	2,591,000	5,891,800	8,910,800	6,771,600	3,458,600	1,565,600	1,391,000	1,956,600
29	1,228,000		2,195,000	4,284,000	3,212,000	6,162,600	6,592,000	7,945,000	3,602,400	1,707,000	1,138,800	1,251,000
30	1,410,000		2,396,800	5,893,000	3,099,200	9,267,600	8,107,600	8,334,600	3,541,400	1,693,000	1,450,800	1,668,400
31	1,361,000		2,206,600	2,008,000	4,337,200		6,507,200	7,357,000		1,383,000		1,527,800

Monthly Statistics

	Jan-98	Feb-98	Mar-98	Apr-98	May-98	Jun-98	Jul-98	Aug-98	Sep-98	Oct-98	Nov-98	Dec-98
Total (Gal)	44,411,600	61,081,800	71,399,600	91,208,800	105,681,400	157,852,600	260,295,400	254,812,600	154,708,800	86,167,400	39,674,800	44,452,600
Total (Ac*ft)	136	187	219	280	324	484	799	782	475	264	122	136
Average (gpm)	995	1,515	1,599	2,043	2,367	3,654	5,831	5,708	3,581	1,930	918	996
Minimum (gpm)	144	744	48	819	1,265	2,006	4,009	4,605	2,075	960	-610	765
Maximum (gal)	1,978,600	2,968,200	4,430,200	5,893,000	6,029,400	9,267,600	13,812,900	11,795,600	8,272,800	4,525,000	1,854,000	1,956,600
Maximum (GPM)	1,374	2,061	3,077	4,092	4,187	6,436	9,592	8,191	5,745	3,142	1,288	1,359
Avg. GPD												
Max 2-Day (gpm)						Two day high	7086.111111					

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99
1	1,584,000	1,463,600	869,200	1,419,000	3,794,400	6,164,600	8,388,400	6,571,400	6,571,400	5,516,800	633,600	856,800
2	2,564,400	2,011,400	1,574,400	1,829,400	2,677,800	3,496,600	8,227,600	6,044,600	6,044,600	4,942,400	2,574,400	1,423,800
3	1,274,600	1,468,400	1,295,000	1,693,800	2,151,000	4,086,000	7,742,400	6,603,400	6,603,400	4,697,000	1,708,600	2,099,200
4	1,576,600	1,546,600	1,367,000	1,430,600	2,388,400	4,618,000	7,337,600	6,126,200	6,126,200	5,305,600	1,628,400	1,603,600
5	1,511,600	1,031,400	1,602,800	1,954,000	2,982,400	4,975,400	8,311,200	6,289,200	6,289,200	4,910,400	536,400	1,766,800
6	1,446,200	1,329,400	1,279,800	2,525,600	3,819,400	5,409,400	9,378,400	6,817,600	6,817,600	5,165,600	3,636,800	2,051,800
7	1,540,800	1,280,800	1,259,400	2,179,800	4,313,400	6,166,400	9,424,000	6,428,600	6,428,600	4,787,200	1,781,800	1,510,000
8	1,699,400	1,519,200	1,705,000	2,432,000	3,621,600	6,539,400	8,528,400	6,152,200	6,152,200	5,409,800	1,799,000	1,379,600
9	1,593,800	1,332,200	1,239,000	1,711,200	3,189,000	5,676,600	9,677,000	6,481,000	6,481,000	4,545,800	1,600,000	1,380,600
10	1,171,600	874,400	1,289,400	2,354,600	4,182,000	7,219,600	9,275,600	6,721,800	6,721,800	5,179,800	1,527,400	311,600
11	1,436,200	1,464,800	1,629,800	3,011,200	5,529,000	7,459,400	9,480,800	6,051,400	6,051,400	4,550,600	1,760,000	878,400
12	1,566,000	1,416,200	1,418,200	3,535,400	3,906,400	7,195,800	10,269,600	6,661,000	6,661,000	5,349,800	1,566,600	1,618,200
13	1,342,000	1,372,000	1,541,400	1,880,600	4,001,000	6,912,400	9,774,200	6,249,400	6,249,400	4,586,200	1,975,800	1,351,800
14	1,365,000	1,815,000	1,685,000	3,727,400	4,997,400	7,705,800	8,655,800	6,617,600	6,617,600	3,365,000	1,705,200	1,425,600
15	1,587,000	1,116,200	874,800	3,920,600	4,474,800	8,829,400	10,525,800	5,910,600	5,910,600	3,909,000	1,519,000	1,584,000
16	1,319,000	2,537,400	2,745,400	4,987,200	5,466,400	7,570,600	8,195,200	6,834,000	6,834,000	3,246,600	1,368,000	1,452,600
17	1,545,200	456,400	1,937,600	4,232,400	4,957,000	7,791,400	8,937,000	5,593,400	5,593,400	4,622,800	1,294,400	1,688,400
18	2,731,400	1,165,600	1,589,200	5,199,400	5,889,400	7,870,200	9,044,000	6,716,000	6,716,000	3,870,000	1,590,200	1,441,800
19	967,200	230,400	2,247,800	3,968,400	6,052,000	7,968,800	9,036,200	6,071,200	6,071,200	4,333,600	1,172,000	1,449,000
20	448,800	3,023,200	1,990,200	3,691,600	5,231,400	7,537,200	8,210,800	5,717,000	5,717,000	3,287,000	1,335,000	1,641,600
21	1,560,000	1,433,800	1,483,600	3,171,200	5,555,600	10,663,600	9,047,200	7,050,800	7,050,800	4,038,400	1,360,000	1,413,000
22	1,407,400	1,229,600	864,000	4,572,000	6,768,400	6,420,600	10,833,200	5,556,600	5,556,600	3,146,600	1,368,000	837,000
23	1,465,600	1,352,400	2,448,000	4,227,400	8,637,000	5,980,600	8,775,000	5,585,600	5,585,600	3,595,800	270,000	2,428,000
24	1,465,200	1,509,400	1,949,000	4,576,000	5,943,000	8,368,800	8,978,000	5,324,000	5,324,000	4,601,200	1,503,000	1,738,800
25	1,533,600	1,463,200	2,782,400	5,712,400	7,214,600	7,384,600	9,025,800	5,689,400	5,689,400	5,260,600	1,179,000	1,278,000
26	1,376,800	1,958,800	1,720,600	3,572,400	7,172,400	7,953,200	9,096,200	5,298,200	5,298,200	2,928,400	1,845,000	1,366,200
27	1,451,000	817,200	1,734,200	4,405,200	7,311,200	7,209,400	9,856,400	4,524,400	4,524,400	2,035,400	1,555,000	1,530,000
28	1,382,600	1,663,200	1,618,200	1,956,000	6,914,600	7,869,200	8,656,000	6,032,000	6,032,000	1,808,000	1,453,800	1,470,600
29	1,495,200		1,780,200	4,185,400	6,150,200	8,548,400	9,292,400	4,861,000	4,861,000	1,891,800	1,611,000	1,546,200
30	1,510,600		846,000	3,396,200	5,824,200	8,403,800	8,156,200	6,099,400	6,099,400	1,778,400	1,645,200	1,450,800
31	1,356,000		2,257,200		7,255,000		9,160,600			1,872,800		1,724,400
						Peak Two Day	6903					

Monthly Statistics

	Jan-99	Feb-99	Mar-99	Apr-99	May-99	Jun-99	Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99
Total (Gal)	46,274,800	39,882,200	50,623,800	97,458,400	158,370,400	209,995,200	279,297,000	182,679,000	182,679,000	124,538,400	46,502,600	45,698,200
Total (Ac*ft)	142	122	155	299	486	644	857	561	561	382	143	140
Average (gpm)	1,037	989	1,134	2,256	3,548	4,861	6,257	4,229	4,229	2,790	1,076	1,024
Minimum (gpm)	312	160	588	985	1,494	2,428	5,096	3,142	3,142	1,235	188	216
Maximum (gal)	2,731,400	3,023,200	2,782,400	5,712,400	8,637,000	10,663,600	10,833,200	7,050,800	7,050,800	5,516,800	3,636,800	2,428,000
Maximum (GPM)	1,897	2,099	1,932	3,967	5,998	7,405	7,523	4,896	4,896	3,831	2,526	1,686
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-00	Feb-00	Mar-00	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00
1	1,225,800	2,098,800	1,602,000	2,278,000	6,833,800	7,502,000	8,838,000	10,172,000	7,341,000	4,979,000	1,290,000	1,352,000
2	1,746,000	1,947,600	1,413,000	2,230,000	5,552,600	9,360,600	8,374,000	8,256,000	4,172,000	4,670,000	1,479,000	1,281,000
3	1,371,600	2,172,600	1,751,400	2,750,400	6,305,400	7,953,200	8,470,000	8,088,000	3,878,000	5,101,000	1,307,000	1,224,000
4	2,052,000	1,927,800	1,857,600	3,270,000	5,037,800	7,891,600	8,639,000	7,953,000	4,512,000	4,179,000	1,538,000	1,377,000
5	2,007,000	2,304,000	1,701,000	3,716,000	4,372,800	9,554,600	8,281,000	9,315,000	4,101,000	4,608,000	1,941,000	1,919,000
6	2,180,600	2,146,400	1,674,800	2,429,600	3,259,800	8,595,000	8,297,000	7,972,000	4,534,000	3,947,000	908,000	1,080,000
7	1,458,000	2,224,800	1,611,000	5,223,000	3,427,400	9,349,600	10,321,000	7,778,000	4,801,000	4,338,000	1,461,000	442,000
8	1,731,600	2,464,200	1,481,400	4,029,000	3,592,000	7,117,800	9,091,000	9,393,000	5,528,000	4,442,000	1,322,000	2,410,000
9	1,481,400	1,848,600	1,398,600	2,607,000	4,200,400	7,164,600	8,378,000	9,031,000	4,800,000	3,984,000	1,210,000	1,204,000
10	2,295,000	2,124,000	1,852,200	3,562,200	3,268,000	8,615,200	9,778,000	8,546,000	5,140,000	2,731,000	1,404,000	1,260,000
11	2,034,000	1,904,400	1,409,400	3,846,200	3,467,800	8,123,600	9,289,000	9,263,000	5,708,000	2,477,000	1,437,000	1,292,000
12	2,169,000	2,179,800	1,359,000	4,424,000	3,958,600	5,952,000	9,476,000	8,358,000	6,493,000	2,270,000	1,227,000	1,343,000
13	1,884,600	2,147,400	2,371,000	2,889,000	3,606,000	7,363,200	9,052,000	8,158,000	6,163,000	2,415,000	1,386,000	1,280,000
14	1,872,000	2,152,800	2,052,000	3,019,200	5,188,400	7,938,000	11,484,000	8,523,000	6,927,000	2,290,000	1,246,000	1,190,000
15	1,501,200	2,043,000	871,200	3,083,600	5,509,600	7,659,000	10,746,000	9,086,000	6,007,000	2,204,000	1,402,000	1,825,000
16	1,400,400	2,035,800	835,200	3,448,000	4,783,600	8,152,200	7,672,000	7,793,000	6,147,000	2,206,000	1,341,000	1,204,000
17	1,513,800	2,134,800	1,601,400	4,116,800	4,841,400	7,782,400	9,487,000	7,851,000	6,031,000	2,803,000	1,344,000	1,235,000
18	2,197,800	2,163,600	1,727,000	3,606,600	6,306,600	8,138,000	8,899,000	9,104,000	5,768,000	2,712,000	1,300,000	931,000
19	2,143,800	2,113,200	1,226,600	3,549,200	6,956,000	6,968,000	9,307,000	7,445,000	5,511,000	2,399,000	1,306,000	1,531,000
20	2,206,800	2,010,600	1,576,000	3,203,600	7,370,800	8,570,000	9,097,000	6,259,000	5,524,000	1,688,000	1,405,000	1,364,000
21	2,323,800	2,300,400	1,764,400	3,606,800	5,854,200	9,420,000	9,361,000	4,974,000	5,202,000	2,003,000	1,254,000	1,435,000
22	2,068,200	2,035,800	1,639,400	3,374,000	6,517,600	8,013,000	9,328,000	10,792,000	4,373,000	2,089,000	1,264,000	1,427,000
23	2,178,000	1,740,600	1,385,600	3,686,200	6,373,400	8,281,000	9,356,000	7,760,000	4,533,000	1,769,000	1,370,000	1,395,000
24	2,088,000	1,891,800	1,782,600	4,304,600	8,193,400	9,116,000	8,975,000	7,899,000	5,129,000	2,081,000	1,224,000	1,179,000
25	1,956,600	2,435,400	1,668,800	4,329,000	6,881,800	9,200,000	8,168,000	7,768,000	4,324,000	1,904,000	1,192,000	1,043,000
26	2,183,400	1,902,600	1,503,800	5,125,400	6,957,000	9,191,000	10,553,000	7,821,000	6,242,000	1,597,000	1,397,000	1,486,000
27	1,998,000	2,280,600	1,497,800	867,600	6,830,600	9,088,000	8,749,000	6,931,000	4,189,000	1,866,000	1,338,000	1,861,000
28	2,061,000	2,160,000	1,617,600	7,551,400	7,105,600	9,876,000	9,414,000	7,416,000	6,442,000	1,652,000	1,259,000	1,861,000
29	1,405,800	1,391,400	1,556,400	4,962,000	7,816,000	8,934,000	9,065,000	7,766,000	4,956,000	1,566,000	1,380,000	1,048,000
30	1,288,800	0	1,781,600	5,927,600	5,501,400	10,631,000	9,400,000	6,749,000	5,306,000	1,893,000	1,231,000	1,311,000
31	2,140,600	31,000	2,458,000	0	7,545,000	0	9,493,000	6,341,000	0	1,311,000	0	1,324,000

Monthly Statistics

	Jan-00	Feb-00	Mar-00	Apr-00	May-00	Jun-00	Jul-00	Aug-00	Sep-00	Oct-00	Nov-00	Dec-00
Total (Gal)	58,164,600	60,313,800	50,027,800	111,016,000	173,414,800	251,500,600	284,838,000	250,561,000	159,782,000	86,174,000	40,163,000	42,114,000
Total (Ac*ft)	179	185	154	341	532	772	874	769	490	264	123	129
Average (gpm)	1,303	1,351	1,121	2,487	3,885	5,634	6,381	5,613	3,579	1,930	900	943
Minimum (gpm)	851	0	580	0	2,264	0	5,328	3,454	0	910	0	307
Maximum (gal)	2,323,800	2,464,200	2,458,000	7,551,400	8,193,400	10,631,000	11,484,000	10,792,000	7,341,000	5,101,000	1,941,000	2,410,000
Maximum (GPM)	1,614	1,711	1,707	5,244	5,690	7,383	7,975	7,494	5,098	3,542	1,348	1,674
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01	Oct-01	Nov-01	Dec-01
1	1,180,000	2,176,000	1,925,000	0	3,786,000	*7,047,000*	*8,567,000*	*8,546,000*	9,382,000	6,434,000	2,237,000	1,620,000
2	1,278,000	2,105,000	1,554,000	1,928,000	4,683,000	*6,138,000*	*9,645,500*	*8,929,000*	8,131,000	5,584,000	2,066,000	1,584,000
3	654,000	714,000	1,337,000	2,243,000	4,621,000	*6,019,500*	*10,543,000*	*9,101,500*	8,075,000	6,188,000	2,464,000	1,647,000
4	1,670,000	1,409,000	1,301,000	5,161,000	4,302,000	*6,795,000*	*9,359,000*	*8,670,000*	8,327,000	5,719,000	2,264,000	2,169,000
5	1,480,000	1,987,000	1,369,000	2,729,000	4,507,000	*6,977,000*	*9,135,000*	*8,401,000*	8,487,000	8,720,000	1,728,000	1,413,000
6	1,448,000	2,038,000	1,313,000	2,543,000	8,353,000	*7,722,500*	*9,667,500*	*8,835,000*	5,148,000	3,332,000	1,800,000	1,422,000
7	1,260,000	2,200,000	1,851,000	2,080,000	6,082,000	*6,967,000*	*8,064,500*	*9,376,500*	6,355,000	6,081,000	1,683,000	1,701,000
8	1,741,000	1,964,000	1,614,000	1,498,000	6,732,000	*7,948,000*	*8,304,500*	*9,033,000*	6,432,000	4,700,000	1,458,000	1,611,000
9	1,488,000	1,640,000	1,184,000	3,040,000	5,886,000	*9,505,500*	*8,437,500*	*8,457,000*	7,648,000	4,215,000	1,683,000	1,765,000
10	1,647,000	1,321,000	1,405,000	2,813,000	6,277,000	*7,723,000*	*6,908,000*	*8,853,000*	7,731,000	5,039,000	1,548,000	1,566,000
11	1,517,000	1,289,000	1,316,000	1,971,000	7,405,000	*6,243,000*	*6,572,000*	*9,023,000*	7,356,000	3,325,000	1,525,000	1,700,000
12	1,555,000	1,162,000	1,314,000	2,669,000	6,627,000	*6,262,000*	*7,958,000*	*7,627,500*	7,082,000	3,864,000	1,495,000	1,395,000
13	1,127,000	1,508,000	977,000	2,473,000	6,045,000	*7,790,500*	*8,207,500*	*7,596,000*	5,848,000	3,860,000	1,935,000	1,873,000
14	1,111,000	1,405,000	984,000	3,198,000	6,502,000	*8,410,000*	*7,199,000*	*8,891,000*	4,812,000	4,324,000	1,638,000	2,032,000
15	1,599,000	428,001	872,001	3,768,000	4,599,000	*8,180,500*	*6,998,000*	*9,342,500*	6,336,000	4,312,000	1,484,000	1,179,000
16	1,708,000	1,586,000	1,272,000	3,736,000	4,579,000	*7,952,000*	*8,032,500*	*9,225,000*	6,400,000	3,727,000	1,700,000	1,602,000
17	2,154,000	1,425,000	1,444,000	4,007,000	4,851,000	*7,656,500*	*8,506,500*	*8,174,500*	6,793,000	3,300,000	1,440,000	1,593,000
18	1,864,000	886,000	1,385,000	4,430,000	5,535,000	*7,956,000*	*8,575,000*	*7,558,000*	6,982,000	2,115,000	1,773,000	1,862,000
19	1,560,000	1,478,000	2,068,000	4,060,000	6,227,000	*8,796,000*	*8,319,000*	*8,223,500*	4,755,000	7,851,000	1,866,000	1,368,000
20	1,251,000	2,038,000	1,643,000	3,363,000	5,722,000	*9,377,000*	*8,258,500*	*8,973,500*	6,100,000	2,061,000	1,291,000	1,536,000
21	1,329,000	2,178,000	1,513,000	3,062,000	7,672,000	*8,402,000*	*8,722,000*	*8,453,000*	7,683,000	4,401,000	1,782,000	1,683,000
22	2,117,000	1,795,000	1,873,000	3,370,000	7,841,000	*8,862,000*	*8,791,000*	*8,378,000*	6,532,000	2,719,000	1,278,000	1,623,000
23	2,043,000	1,454,000	1,918,000	4,003,000	6,193,000	*8,805,000*	*8,835,500*	*8,977,500*	6,308,000	2,794,000	1,089,000	1,675,000
24	2,076,000	1,240,000	1,619,000	4,714,000	8,569,000	*7,934,000*	*8,590,500*	*9,109,500*	6,591,000	3,220,000	1,296,000	3,340,000
25	2,195,000	1,348,000	1,538,000	5,071,000	7,122,000	*8,287,500*	*9,441,000*	*8,394,000*	5,600,000	2,963,000	1,512,000	1,404,000
26	1,390,000	1,958,000	2,113,000	5,038,000	6,715,000	*8,242,000*	*9,773,500*	*7,604,000*	6,492,000	3,758,000	1,661,000	576,000
27	1,372,000	2,009,000	1,753,000	5,125,000	7,229,000	*8,547,000*	*9,713,000*	*9,176,000*	7,843,000	2,842,000	1,539,000	936,000
28	1,224,000	1,895,000	1,567,000	4,193,000	7,822,000	*9,420,000*	*9,608,500*	*9,780,000*	4,878,000	2,061,000	1,691,000	1,620,000
29	2,035,000		4,259,000	6,082,000	6,174,000	*9,514,000*	*7,510,500*	*8,724,000*	6,609,000	1,900,000	1,359,000	1,512,000
30	0		2,292,000	4,808,000	7,590,500	*8,382,000*	*6,580,500*	*8,401,500*	5,775,000	2,551,000	1,322,000	1,975,000
31	3,811,000		1,753,000		7,779,500		*7,661,500*	*8,774,500*	0	1,805,000		1,476,000

Note: Italics indicate that values have been adjusted to reflect an error in data recording

Monthly Statistics

	Jan-01	Feb-01	Mar-01	Apr-01	May-01	Jun-01	Jul-01	Aug-01	Sep-01	Oct-01	Nov-01	Dec-01
Total (Gal)	48,884,000	44,636,001	50,326,001	103,176,000	194,028,000	237,861,500	262,485,000	268,608,500	202,491,000	125,765,000	49,607,000	50,458,000
Total (Ac*ft)	150	137	154	317	595	730	806	824	621	386	152	155
Average (gpm)	1,095	1,107	1,127	2,388	4,347	5,506	5,880	6,017	4,536	2,817	1,148	1,130
Minimum (gpm)	0	297	606	0	2,629	4,180	4,564	5,249	0	1,253	756	400
Maximum (gal)	3,811,000	2,200,000	4,259,000	6,082,000	8,569,000	9,514,000	10,543,000	9,780,000	9,382,000	8,720,000	2,464,000	3,340,000
Maximum (GPM)	2,647	1,528	2,958	4,224	5,951	6,607	7,322	6,792	6,515	6,056	1,711	2,319
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-02	Feb-02	Mar-02	Apr-02	May-02	Jun-02	Jul-02	Aug-02	Sep-02	Oct-02	Nov-02	Dec-02
1	1,620,000	1,368,000		16,612,117			55,458,199					
2	1,584,000	1,602,000							50,566,655			9,029,736
3	1,647,000	1,548,000				50,068,914						
4	2,169,000	2,169,000									11,125,246	
5	1,413,000	1,413,000						59,070,109				
6	1,422,000	1,684,000			31,529,848							
7	1,701,000	1,536,000								29,359,458		
8	1,611,000	1,654,000		23,471,443			58,970,377					
9	1,765,000	1,989,000							44,963,997			9,211,661
10	1,566,000	1,206,000				46,080,983						
11	1,700,000	1,566,000	16,266,999								9,090,643	
12	1,395,000	1,600,000						56,805,943				
13	1,873,000	1,557,000			35,059,381							
14	2,032,000	1,467,000								31,134,197		
15	1,179,000	1,548,000		23,081,120			63,946,359					
16	1,602,000	2,365,000							44,696,393			8,803,327
17	1,593,000	1,431,000				52,832,874						
18	1,862,000	1,611,000	10,924,932								9,331,966	
19	1,368,000	1,809,000						59,485,955				
20	1,536,000	3,113,000			42,079,019							
21	1,683,000	2,135,000								25,451,217		
22	1,623,000	1,440,000		17,927,705			57,291,709					
23	1,503,000	1,611,000							39,102,802			8,707,814
24	3,187,000	1,881,000				49,691,801						
25	1,729,000	1,224,000	11,427,467								9,000,717	
26	576,000	1,602,000						56,236,979				
27	936,000	1,584,000			39,941,250							
28	1,620,000	1,955,000								16,305,145		
29	1,512,000			28,301,534			58,833,355					
30	1,975,000								40,081,561			9,249,722
31	1,476,000		0		0	0		0		0		

Monthly Statistics

	Jan-02	Feb-02	Mar-02	Apr-02	May-02	Jun-02	Jul-02	Aug-02	Sep-02	Oct-02	Nov-02	Dec-02
Total (Gal)	50,458,000	47,668,000	38,619,398	109,393,919	148,609,498	198,674,572	294,499,999	231,598,986	219,411,408	102,250,017	38,548,572	45,002,260
Total (Ac*ft)	155	146	119	299	442	610	785	659	673	314	138	122
Average (gpm)	1,130	1,182	6,705	15,194	20,640	27,594	40,903	32,167	30,474	14,201	6,692	6,250
Minimum (gpm)	400	838	0	11,536	0	0	38,513	0	27,155	0	6,250	6,047
Maximum (gal)	3,187,000	3,113,000	1,632,495	4,504,264	6,011,288	16,689,638	9,135,194	8,497,994	25,283,328	4,447,742	2,781,312	1,321,389
Maximum (GPM)												
Avg. GPD			assumes a peak day factor of 1.135Xpeak week									
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03
1									47,224,547			8,568,000
2						48,569,771						
3		9,280,969	9,067,595								13,927,571	
4								61,015,679				
5					16,133,112							
6	8,993,793									40,463,618		
7				12,108,000			61,801,725					
8									51,929,664			8,163,000
9						52,161,077						
10		9,287,639	9,186,231								9,601,000	
11								58,610,957				
12					16,689,108							
13	9,159,364									32,998,113		
14				16,679,000			64,185,483					
15									44,100,993			8,114,000
16						56,861,680						
17		10,531,378	9,924,816								8,842,000	
18								61,456,231				
19					24,574,223							
20	9,230,047									31,120,415		
21				21,463,000			64,312,985					
22									38,981,623			7,396,000
23						60,517,802						
24		7,757,762	10,396,247								8,443,000	
25								53,216,886				
26					42,229,710							
27	9,429,464									23,137,038		
28				16,902,000			59,878,736					
29									43,327,379			7,965,000
30						57,091,938						
31			12,591,334									

Monthly Statistics

Total (Gal)	36,812,668	36,857,748	51,166,223	67,152,000	99,626,153	275,202,268	250,178,929	234,299,753	225,564,206	127,719,184	40,813,571	40,206,000
Total (Ac*ft)	125	113	141	220	398	738	848	763	586	399	123	108
Average (gpm)	6,391	6,399	7,106	11,658	17,296	38,223	43,434	40,677	31,328	22,173	7,086	5,584
Minimum (gpm)	6,246	5,387	6,297	8,408	11,204	33,729	41,582	36,956	27,071	16,067	5,863	5,136
Maximum (gal)	1,347,066	1,504,483	1,798,762	3,066,143	6,938,539	8,645,400	9,187,569	8,779,462	7,418,523	5,780,517	1,989,653	1,224,000
Maximum (GPM)												
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-04	Feb-04	Mar-04	Apr-04	May-04	Jun-04	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04
1			17141598.6								14,714,683	
2		9,408,520						64703217				
3					29,948,365							
4										42275561		
5	8,189,000			14,284,666			66,265,919					
6									45883029			13,103,664
7						44,219,197						
8			17141598.6								12,105,067	
9		8,713,581						65392314				
10					35,803,120							
11										34635502		
12	8,632,000			28,655,257			61,362,047					
13									49133453			11,491,673
14						46,566,542						
15			17141598.6								10,724,965	
16		8,548,810						65564492				
17					37,541,023							
18										29967856		
19	8,431,000			32,602,133			66,453,203					
20									37369328			10,738,513
21						53,590,799						
22											10,979,110	
23		9,415,493	17141598.6					50158293				
24					28,787,587							
25										18556489		
26	7,617,000			20,079,024			63,547,073					
27									41552166			10,401,614
28						61,616,320						
29											10,609,652	
30			17141598.6					43002149				
31					29,276,197							

Monthly Statistics

	Jan-04	Feb-04	Mar-04	Apr-04	May-04	Jun-04	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04
Total (Gal)	32,869,000	36,086,404	85,707,993	95,621,080	161,356,292	205,992,858	257,628,242	288,820,465	173,937,976	125,435,408	59,133,477	45,735,464
Total (Ac*ft)	114	150	232	333	443	690	874	765	569	368	149	159
Average (gpm)	5,706	6,265	11,904	16,601	22,411	35,763	44,727	40,114	30,198	21,777	8,213	7,940
Minimum (gpm)	5,290	5,937	11,904	9,920	19,991	30,708	42,613	29,863	25,951	12,886	7,368	7,223
Maximum (gal)	1,344,074	2,448,800	2,448,800	4,657,448	5,363,003	9,466,560	9,493,315	9,366,356	7,019,065	6,039,366	2,102,098	1,998,313
Maximum (GPM)												
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-05	Feb-05	Mar-05	Apr-05	May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
1								55,849,578				
2					19,667,391							
3	13,988,193									36,936,389		
4				11,063,394			50,049,767					
5									58,007,143			10,164,265
6						24,234,921						
7		9,856,240	9,691,632								12,376,473	
8								65,394,071				
9					23,108,263							
10	10,395,366									48,008,536		
11				14,438,357			59,318,956					
12									51,925,068			9,056,425
13						33,003,040						
14		9,809,422	11,892,962								9,145,959	
15								64,281,465				
16					17,862,171							
17	10,356,608									26,552,343		
18				18,167,776			65,547,048					
19									41,691,001			10,825,443
20						41,309,963						
21		9,695,422	11,650,049								8,866,733	
22								61,507,964				
23					12,699,689							
24	9,913,948									25,083,769		
25				18,336,599			66,950,751					
26									44,519,118			10,275,982
27						53,879,763						
28		10,186,422	10,595,255								7,054,419	
29								62,794,474				
30					29,524,436							
31	9,460,359									18,557,111		

Well No. 1 pump run times (from SCADA system) were used to determine flow volumes from Well No. 1 for the Months of January through July.

Monthly Statistics

Total (Gal)	54,114,474	39,547,507	43,829,898	62,006,126	102,861,950	152,427,687	241,866,522	309,827,552	196,142,331	155,138,148	37,443,584	40,322,115
Total (Ac*ft)	142	121	149	219	283	523	823	855	616	411	124	137
Average (gpm)	7,516	6,866	7,609	10,765	14,286	26,463	41,991	43,032	34,052	21,547	6,501	7,000
Minimum (gpm)	6,570	6,733	6,730	7,683	8,819	16,830	34,757	38,784	28,952	12,887	4,899	6,289
Maximum (gal)	1,998,313	1,455,203	1,698,995	2,809,627	4,217,777	7,697,109	9,564,393	9,342,010	8,286,735	6,858,362	1,768,068	1,546,492
Maximum (GPM)												
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06
1					33,237,032						2,102,600	3,143,420
2	11,633,199									38,301,106	2,102,600	3,143,420
3				9,377,541			52,836,604				2,102,600	3,143,420
4									53,827,455		2,102,600	1,334,661
5						39,359,910					2,102,600	1,334,661
6		8,956,352	10,422,465								1,475,143	1,334,661
7								70,530,452			1,475,143	1,334,661
8					28,005,832						1,475,143	1,334,661
9	10,258,345									25,744,416	1,475,143	1,334,661
10				9,303,581			69,818,431				1,475,143	1,334,661
11									55,892,604		1,475,143	1,273,644
12						47,124,778					1,475,143	1,273,644
13		8,959,479	8,966,979								1,475,143	1,273,644
14								67,056,614			1,379,943	1,273,644
15					36,242,008						1,379,943	1,273,644
16	7,558,051									22,774,399	1,379,943	1,273,644
17				12,131,740			69,556,653				1,379,943	1,273,644
18									46,832,042		1,379,943	1,345,854
19						42,700,788					1,379,943	1,345,854
20		8,972,159	9,085,400								1,341,742	1,345,854
21								64,699,601			1,341,742	1,345,854
22					44,040,799						1,341,742	1,345,854
23	8,458,634									17,528,000	1,341,742	1,345,854
24				13,542,000			84,500,831				1,341,742	1,345,854
25									36,426,904		1,341,742	734,099
26						50,323,962					1,341,742	734,099
27		9,351,753	9,449,464								1,341,742	734,099
28								62,917,752			1,341,742	734,099
29					35,432,000						1,341,742	734,099
30	8,985,436									16,816,000	1,341,742	734,099
31							62,832,616					734,099

Monthly Statistics

	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06
Total (Gal)	46,893,665	36,239,743	37,924,308	44,354,862	176,957,671	179,509,438	339,545,135	265,204,419	192,979,005	121,163,921	45,352,965	42,248,062
Total (Ac*ft)	122	112	128	207	490	609	949	885	605	288	139	130
Average (gpm)	6,513	6,292	6,584	7,700	24,577	31,165	47,159	46,042	33,503	16,828	1,050	946
Minimum (gpm)	5,249	6,220	6,227	6,461	19,448	27,333	36,692	43,693	25,296	11,678	932	510
Maximum (gal)	1,661,886	1,488,924	1,488,924	4,748,147	6,291,543	7,548,086	12,071,547	10,075,779	7,984,658	5,471,587	2,102,600	3,143,420
Maximum (GPM)											1,460	2,183
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07
1	734,099	959,359	0	2,016,000	4,911,000	9,569,000	9,882,000	11,126,796	7,842,350	4,205,419	1,458,438	1,074,174
2	734,099	959,359	1,062,000	2,653,000	6,302,000	6,710,000	10,755,000	10,605,299	6,960,214	3,663,986	1,636,271	1,214,734
3	734,099	959,359	1,115,000	2,104,000	3,630,000	7,575,000	13,142,000	9,338,895	7,969,498	3,906,888	225,000	947,267
4	734,099	959,359	1,559,000	2,160,000	3,540,000	11,884,000	9,358,000	9,978,666	7,062,386	2,454,302	2,688,390	1,038,852
5	734,099	1,191,724	640,000	2,817,000	3,903,000	8,781,000	8,499,000	9,085,687	7,104,423	2,217,707	1,572,880	1,111,248
6	734,099	1,191,724	1,539,000	3,151,000	3,857,000	7,198,000	8,861,000	10,025,753	7,778,228	1,488,609	1,467,211	1,067,706
7	734,099	1,191,724	978,000	434,000	5,294,000	5,618,000	11,335,000	9,421,154	6,445,101	1,643,158	1,391,736	992,438
8	1,094,907	1,191,724	1,301,000	4,087,000	6,387,000	7,285,000	9,318,000	10,036,152	5,694,000	1,985,259	1,533,871	1,053,025
9	1,094,907	1,191,724	1,205,000	4,688,000	6,160,000	7,847,000	10,412,000	9,393,236	6,434,000	1,858,692	1,593,877	1,047,444
10	1,094,907	1,191,724	751,000	2,434,000	6,607,000	8,372,000	9,672,000	8,180,706	9,815,701	3,641,783	1,257,860	922,521
11	1,094,907	363,751	917,000	2,797,000	6,419,000	6,540,000	10,919,000	10,308,398	7,757,733	3,635,096	1,421,040	995,399
12	1,094,907	363,751	2,044,000	2,807,000	5,714,000	6,771,000	11,970,000	9,164,921	7,550,494	2,992,229	1,407,369	1,168,448
13	1,094,907	363,751	1,262,000	2,737,000	6,095,000	7,439,000	10,075,000	8,586,008	7,853,104	2,650,276	1,456,509	1,341,496
14	1,094,907	363,751	686,000	3,403,000	7,138,000	8,604,000	9,059,000	9,456,324	6,850,403	3,002,615	1,318,357	969,085
15	857,335	363,751	1,978,000	3,268,000	6,796,000	8,239,000	11,386,000	9,667,285	6,880,143	2,997,188	1,232,240	741,458
16	857,335	363,751	1,156,000	3,136,000	7,787,000	8,570,000	10,364,000	9,578,712	6,089,124	2,826,496	1,361,779	529,203
17	857,335	363,751	1,679,000	3,828,000	7,247,000	9,918,000	10,103,000	9,880,419	8,754,004	3,212,238	1,397,481	529,203
18	857,335	363,751	1,468,000	3,257,000	8,140,000	6,646,000	9,598,000	8,669,000	6,521,001	2,243,682	1,355,427	316,948
19	857,335	268,536	1,675,000	2,949,000	6,886,000	8,086,000	10,201,000	8,840,000	6,008,327	2,342,737	1,174,278	692,981
20	857,335	268,536	1,271,000	3,665,000	7,847,000	8,440,000	10,949,000	9,574,344	5,173,048	1,662,008	1,578,561	692,981
21	857,335	268,536	1,443,000	3,423,000	7,081,000	9,214,000	8,227,000	8,891,876	7,449,819	2,108,281	1,023,862	1,069,014
22	1,012,613	268,536	3,716,000	3,052,000	6,522,000	9,511,000	9,828,000	9,737,615	4,698,075	2,330,472	1,253,881	938,483
23	1,012,613	268,536	73,000	3,530,000	7,210,000	8,820,000	10,634,000	8,999,508	6,075,612	1,880,765	1,390,639	1,004,541
24	1,012,613	268,536	1,102,000	2,483,000	7,919,000	8,725,000	9,432,000	8,895,724	4,492,978	2,109,032	1,172,427	926,996
25	1,012,613	268,536	2,029,000	3,555,000	8,184,000	8,826,000	9,128,000	9,334,148	4,004,324	1,947,332	1,310,546	1,025,014
26	1,012,613		1,590,000	3,317,000	6,927,000	7,761,000	8,519,000	9,029,347	4,381,506	2,100,084	1,482,045	1,146,481
27	1,012,613		1,813,000	3,872,000	8,035,000	10,716,000	8,364,000	8,991,511	4,554,161	1,563,266	1,230,687	1,077,319
28	1,012,613		1,631,000	3,749,000	7,822,000	9,793,000	10,529,000	9,519,871	5,385,107	1,801,472	1,307,717	1,073,327
29	959,359		1,496,000	4,529,000	7,422,000	9,649,000	8,641,000	9,278,643	4,042,430	1,989,207	1,277,978	1,054,310
30	959,359		1,879,000	6,122,000	8,034,000	8,691,000	9,040,000	9,853,456	2,895,604	1,650,812	1,357,516	1,191,641
31	959,359		2,611,000		8,274,000		7,485,000	9,074,464		1,733,460		1,021,402

Monthly Statistics

	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07
Total (Gal)	28,770,761	15,777,535	43,669,000	96,023,000	204,090,000	251,798,000	305,685,000	292,523,918	190,522,898	75,844,551	41,335,873	29,975,139
Total (Ac*ft)	88	48	134	295	626	773	938	898	585	233	127	92
Average (gpm)	645	438	978	2,223	4,572	5,829	6,848	6,553	4,410	1,699	957	671
Minimum (gpm)	510	186	0	301	2,458	3,901	5,198	5,681	2,011	1,034	156	220
Maximum (gal)	1,094,907	1,191,724	3,716,000	6,122,000	8,274,000	11,884,000	13,142,000	11,126,796	9,815,701	4,205,419	2,688,390	1,341,496
Maximum (GPM)	760	828	2,581	4,251	5,746	8,253	9,126	7,727	6,816	2,920	1,867	932
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08
1	301,000	140,000	1,359,406	1,358,757	3,419,000	4,859,872	9,825,022	10,100,690	8,287,709	6,110,404	1,462,360	1,265,618
2	1,332,413	1,405,135	1,391,874	1,266,758	4,913,000	3,638,854	9,558,452	10,583,046	9,125,013	6,276,012	2,345,033	1,252,907
3	1,325,183	1,367,561	1,359,599	1,603,113	4,691,000	4,479,011	10,533,781	10,273,216	8,010,964	5,838,314	1,351,093	1,068,924
4	1,223,495	1,158,738	1,432,878	1,979,055	3,310,000	3,823,245	8,663,389	9,469,709	9,403,565	4,928,066	1,491,912	1,310,759
5	1,483,517	1,144,034	1,582,775	1,644,945	6,064,899	3,828,187	10,669,161	11,265,138	8,344,903	3,809,788	1,641,261	975,982
6	1,403,012	1,604,886	1,314,651	1,603,627	6,810,742	4,532,194	9,272,440	10,297,345	7,494,753	4,420,906	1,485,932	1,144,450
7	1,188,317	1,260,448	1,306,906	1,911,238	5,307,202	3,822,776	10,602,438	10,282,991	8,660,114	3,922,214	1,233,594	1,139,214
8	1,077,675	1,442,876	1,410,704	1,460,797	6,026,368	4,794,648	9,838,039	9,507,099	8,302,769	4,170,521	1,205,233	1,529,136
9	1,621,751	1,503,302	1,261,503	1,665,302	4,291,805	6,566,305	10,526,043	7,588,761	8,228,582	4,049,674	1,655,357	1,213,443
10	1,152,940	1,363,587	1,595,328	1,555,686	7,328,917	5,607,358	10,995,050	11,886,851	8,556,139	3,314,561	1,384,654	1,383,107
11	1,400,641	1,432,779	1,798,619	2,100,572	6,579,997	5,694,613	9,945,051	10,630,478	7,689,222	2,546,483	1,237,801	1,151,329
12	1,248,127	1,498,821	1,289,408	1,567,705	5,560,019	4,752,626	9,469,195	9,641,380	8,243,900	2,657,711	1,453,377	1,157,964
13	1,256,936	1,312,846	1,537,629	2,498,006	5,627,011	6,068,042	10,995,155	9,905,776	7,669,460	2,417,114	1,271,940	1,272,819
14	1,417,680	1,368,123	1,304,593	2,973,667	6,497,366	7,190,395	10,542,869	10,327,605	7,759,478	2,719,628	1,351,077	1,094,937
15	1,362,373	1,413,786	1,341,659	2,596,011	6,213,494	6,835,590	10,796,277	10,000,701	8,131,296	2,725,634	977,842	1,336,367
16	1,238,969	1,178,356	1,214,777	2,509,516	7,685,644	7,702,608	10,066,620	10,182,001	7,640,653	3,044,787	1,309,557	1,088,549
17	1,246,667	1,538,959	1,590,360	2,761,970	9,154,493	7,941,342	10,917,072	10,703,360	8,386,756	2,476,212	1,512,827	1,283,838
18	1,358,701	1,675,409	1,598,712	3,303,000	6,426,810	8,021,615	10,851,016	9,349,364	7,819,976	2,349,438	1,177,989	1,152,975
19	1,362,561	1,288,597	1,475,854	3,804,003	7,070,231	9,037,744	11,305,902	10,632,655	8,411,115	2,740,085	1,343,649	1,322,277
20	1,423,754	1,465,639	1,194,949	2,773,997	7,309,057	7,910,488	11,415,939	9,571,489	6,516,501	2,647,031	1,074,598	1,448,869
21	1,716,928	1,413,476	1,501,252	1,800,000	6,212,807	9,564,154	10,170,767	10,092,791	6,064,682	2,575,390	1,262,152	1,147,807
22	1,190,445	1,220,230	1,210,552	3,205,000	5,536,294	8,034,889	9,433,276	9,893,879	6,503,652	2,660,923	929,183	1,441,414
23	1,255,980	1,494,641	1,547,000	2,999,000	5,910,755	8,873,600	9,875,054	9,895,404	6,407,310	2,644,878	1,453,489	1,326,698
24	1,553,332	1,419,660	1,575,000	2,966,000	6,628,097	9,395,475	10,316,956	9,188,684	6,742,090	2,854,583	1,389,153	1,712,555
25	1,367,891	1,263,044	1,417,031	3,266,000	6,547,103	9,000,681	9,886,669	8,862,359	6,842,243	1,949,744	1,268,437	1,514,119
26	1,544,279	1,428,908	1,215,781	2,707,000	6,238,381	9,958,398	12,017,570	9,331,673	6,653,241	2,377,704	1,247,361	1,454,344
27	1,259,451	1,493,960	1,592,375	4,260,000	6,291,948	9,349,827	10,452,975	8,881,688	6,205,404	2,098,060	1,102,290	1,416,428
28	1,190,399	1,305,070	1,240,424	4,364,000	4,219,409	10,493,513	9,557,870	10,520,688	7,035,027	2,057,544	1,133,735	1,144,463
29	1,457,243	1,385,733	1,409,033	5,001,000	4,226,208	10,303,855	10,478,146	9,095,264	4,997,273	2,199,516	1,113,350	1,462,130
30	1,227,014		1,311,953	4,260,249	4,423,723	7,745,014	10,846,880	9,057,933	7,427,284	2,107,227	852,601	1,333,778
31	1,288,076		1,622,231		4,938,683		10,428,256	9,016,521		1,984,389		1,463,250

Monthly Statistics

	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08
Total (Gal)	40,476,750	38,988,604	44,004,816	77,765,974	181,460,463	209,826,919	320,253,330	306,036,539	227,561,074	98,674,541	39,718,837	40,010,450
Total (Ac*ft)	124	120	135	239	557	644	983	939	698	303	122	123
Average (gpm)	907	934	986	1,800	4,065	4,857	7,174	6,856	5,268	2,210	919	896
Minimum (gpm)	209	97	830	880	2,299	2,527	6,016	5,270	3,470	1,354	592	678
Maximum (gal)	1,716,928	1,675,409	1,798,619	5,001,000	9,154,493	10,493,513	12,017,570	11,886,851	9,403,565	6,276,012	2,345,033	1,712,555
Maximum (GPM)	1,192	1,163	1,249	3,473	6,357	7,287	8,346	8,255	6,530	4,358	1,628	1,189
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09
1	1,299,031	1748316	1388525	1357428	3290170	8397826	8767562	11390944	7459097	5102803	1399221	2359917
2	1,137,667	1517620	1411461	1263409	3899906	8092803	9189478	10700539	8885197	5457417	1390549	391790
3	2,005,180	1384635	1200611	1293432	2958863	6027249	8718073	10905145	9825808	4888214	1502008	1309450
4	1,511,701	1131268	1398177	1084480	3557236	6911058	8147995	10604908	6791946	3820543	1543212	1563797
5	1,580,090	1336938	1165902	1592647	3575369	6997905	8501264	9076230	9638074	3841003	1675461	1455197
6	1,166,546	1311028	1019317	1355069	3698912	5612917	7834452	8193229	9806627	3247203	1685535	1387106
7	1,612,833	1336331	1155922	1651283	3441026	4433649	10521166	9946028	7933805	3038465	1034070	1545233
8	1,249,736	973072	1319160	1559091	3817372	4539504	8460709	6760894	7092470	2589150	1175678	1342640
9	1,306,283	1674262	1260710	2015377	3960137	4966713	8381019	7989543	9197194	2623865	2120274	1385318
10	1,024,505	998729	1320602	1963809	5081907	5360258	7666724	9150872	8461219	2583617	1553755	1426053
11	1,311,344	1238859	1363942	1146823	5596447	5383713	9012830	9242245	8120696	2180000	1709405	2285345
12	1,585,411	1204641	1068873	1472262	5676384	5695786	8791401	9138091	7991920	2726000	1313090	697167
13	1,312,983	1486566	1396076	1620252	4754547	5658016	10433420	9611192	7360966	2574865	1456793	1277051
14	1,165,403	869882	972519	1513992	5701917	5419585	8156758	9630538	8665637	2587043	1408365	1582766
15	1,353,836	953615	1300403	1603108	4955943	5602840	9306424	8140332	6439116	2027000	1269857	1406903
16	1,158,025	1062398	1388618	1506503	5432395	5470676	8619101	8740395	9192308	1817000	1586462	1595224
17	1,225,238	2053854	1251943	1710455	5860024	7049901	9239773	10039614	8124013	2055000	1570462	940435
18	1,118,884	1249665	1173207	2549332	7344377	6462892	9771194	9374877	8247069	1952000	1608870	2478163
19	1,467,447	1345461	1448824	2762263	7211313	7370741	8366890	8738663	7719950	2148000	1541750	1762790
20	1,535,930	935164	1240309	4039657	6984374	6307316	8810853	9214582	7894136	1869000	1420128	1428398
21	989,578	1449723	1390192	3724433	7160722	6303052	8984541	9239000	7463441	1798000	1271460	1278000
22	1,220,817	1249491	1338132	4181004	7098983	2982122	11328142	9069121	7523224	1646780	1529917	1654425
23	1,447,595	1460388	1321562	4468995	7490808	7709534	8233633	9180560	8028763	1854748	1448254	1383388
24	951,015	1070137	1182317	4154719	7038125	6958083	8815050	9869479	7415246	1153985	742680	1560572
25	1,134,491	1470161	1254696	3962897	7456969	8179452	9488791	8224379	8306469	1075807	2447927	1325100
26	1,648,971	1024524	1138917	1145830	9478529	9993358	10315471	9351450	7759095	2145024	1379071	1365528
27	1,092,716	1403296	1269535	6612004	7425319	7965698	10187970	9344200	7198328	1761327	1316323	1608150
28	1,623,312	860893	1010726	4330176	8461398	6357257.5	9011512	8738536	7234706	1725114	1292562	1244819
29	999,362		1499180	3494365	8529916	8387300.5	11280216	10178911	7127808	1474915	1480560	1406425
30	968,970		1393794	3964478	8749436	8338231	8499466	8494031	6562341	1530960	1447923	1278423
31	1,209,341		1286572		9084988		9075444	7678808		1488282		1489870

Monthly Statistics

	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09
Total (Gal)	40,414,241	35,800,917	39,330,724	75,099,573	184,773,812	194,935,436	281,917,322	285,957,336	239,466,669	76,783,130	44,321,621	45,215,443
Total (Ac*ft)	124	110	121	230	567	598	865	878	735	236	136	139
Average (gpm)	905	888	881	1,738	4,139	4,512	6,315	6,406	5,543	1,720	1,026	1,013
Minimum (gpm)	660	598	675	753	2,055	2,071	5,324	4,695	4,472	747	516	272
Maximum (gal)	2,005,180	2,053,854	1,499,180	6,612,004	9,478,529	9,993,358	11,328,142	11,390,944	9,825,808	5,457,417	2,447,927	2,478,163
Maximum (GPM)	1,392	1,426	1,041	4,592	6,582	6,940	7,867	7,910	6,823	3,790	1,700	1,721
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10
1	1695006	1457699	1292000	1429851	2287692	4006994	8194616	9627569	8208494	6762578	1683000	1424000
2	1147151	1330871	1390000	1240870	3137452	3978710	8734154	9688241	7854050	6838867	1479000	1161000
3	1534115	1490383	1264000	1205386	3457675	3536152	8519511	11115197	8208666	6502821	319200	1161000
4	1312648	1181916	1590035	1323126	2686440	3851481	6769929	12573577	8146220	5667862	303000	1069000
5	1381903	1396852	996000	1341458	3879524	2802844	8791489	9749212	7227866	4496002	389000	1438000
6	1551283	1399643	1314000	1535520	3002283	2910882	6775593	10020915	7523746	4183000	344000	1295000
7	1312051	1434359	1390000	1407556	3954568	3388127	10817010	10161234	8326500	4420766	379000	1218000
8	1562458	1331358	1320000	2353770	3545078	3570163	9396525	10525127	7307735	4207155	414000	1267000
9	1208494	1334296	1436401	1876952	4022245	3570163	8154479	11147172	7546100	3476123	139100	1295000
10	2298405	1497525	921583	1612739	5715776	3706404	9317200	9351238	6288410	3487745	1372000	1147000
11	700782	1339226	1696588	1820376	2808672	3982106	8995790	9900917	6771200	4073102	2068000	1057000
12	1331403	1481721	1553316	2023655	3826080	3764787	8086965	9070401	6602331	3333985	69000	1281000
13	1590024	1333038	1725193	1892338	3591561	4655274	8476163	9375249	8224796	3831029	2550000	1291000
14	1482834	1315183	1429805	1629552	5185152	6124017	9325096	10183682	7285097	3076017	2084000	1157000
15	1465635	1407788	1531058	2309001	4943668	6199040	9846580	9543832	7596801	4096383	2618000	1154000
16	1381520	1379487	1883331	2530683	5539571	5813025	10313124	10888837	6952530	2974000	2277000	1412000
17	1429690	1384344	1500609	2396548	6100627	5072521	8151097	10206210	7018701	3587000	2323000	1139000
18	1380807	1598806	1673952	3054226	5427189	6334388	11656542	9816479	7380245	3748000	1790000	1108000
19	1747907	916699	1575808	4108782	3342162	6746612	9540148	10168258	6239995	2978000	2205000	1118000
20	1493202	1657000	1815122	3169720	4494449	7339407	9618707	8460233	7298013	3348000	2232000	1503000
21	1310303	1293000	1633000	2293883	4670174	6391860	12032650	10577600	6566316	2697000	2440000	1140000
22	1488411	1426000	1457730	2638088	4739809	9548629	7154125	8951600	6740909	3037000	2150000	1132000
23	713069	1350000	1594876	2343130	3241739	5022036	10406875	9483132	6202700	2844000	2300000	1090000
24	2402497	1452000	1766444	1569827	3856571	6055071	9374287	8892105	6926834	2499000	2404000	1096000
25	1392299	1301000	1471586	2592973	3634872	7409140	9680523	9710301	6451402	2258000	1822000	1112000
26	806470	1402000	1753000	3171440	4777561	6967159	10905553	9188458	6767922	2317313	1967000	1105000
27	2019020	1231000	1475041	2800819	3078777	8816100	9899899	9386000	6491583	2004781	2450000	1152000
28	1317623	1424000	1380788	2533236	3805493	6632872	9810574	8941846	6797995	1271200	2078000	1221000
29	1574592		1510887	2581592	3419548	9959565	10196907	7412915	6817568	1846200	1724000	1105000
30	1274918		1573715	3088110	3055633	8542297	10591626	7643117	6579184	775600	2212000	1129000
31	1406816		1326190		4466924		9979452	7540900		2262400		1073000

Monthly Statistics

	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10
Total (Gal)	44,713,336	38,547,194	46,242,058	65,875,207	123,694,965	166,697,826	289,513,189	299,301,554	214,349,909	108,900,929	48,584,300	37,050,000
Total (Ac*ft)	137	118	142	202	380	512	889	919	658	334	149	114
Average (gpm)	1,002	956	1,036	1,525	2,771	3,859	6,486	6,705	4,962	2,440	1,125	830
Minimum (gpm)	487	637	640	837	1,589	1,946	4,701	5,148	4,307	539	48	734
Maximum (gal)	2,402,497	1,657,000	1,883,331	4,108,782	6,100,627	9,959,565	12,032,650	12,573,577	8,326,500	6,838,867	2,618,000	1,503,000
Maximum (GPM)	1,668	1,151	1,308	2,853	4,237	6,916	8,356	8,732	5,782	4,749	1,818	1,044
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11
1	1225000	1145000	1297000	1173000	2245900	4893400	8375104	9005318	9139092	7028052	1295000	1133966
2	1069000	1095000	1201000	1288000	2758655	4072000	8915329	9629001	9448979	8476218	1334000	1130270
3	1246000	1305000	1284000	1071000	2519831	3688000	8608671	9835855	7858210	4772407	1348266	1197601
4	1148000	1124000	1513000	1347000	3182001	3484000	8711513	10039735	8554284	5858284	1254000	1203328
5	1452000	1167000	960000	1291000	4393883	5350600	9186586	9495785	9251093	6792416	1107000	952874
6	1152000	1849000	1382000	1161000	3246200	5269700	9954927	9284045	9340175	3404007	1382000	1293698
7	1138000	767000	1172000	1176000	3769141	4055000	9301827	9675931	9094425	3529798	1390000	1190101
8	1075000	1193000	1248000	1310000	3302585	3563000	7495815	10623476	7984400	2746000	1232000	1111956
9	1282000	1172299	1239000	1138000	3088204	3669000	9324273	8568636	8179968	3130000	1343000	1206332
10	1229000	1118000	1163000	1228000	2456278	4519500	8708719	10698297	8594807	3213000	1177000	1140578
11	1498000	1381000	1178000	1486000	3441727	4441000	9549655	8572299	8086925	2884001	1044000	1047037
12	1129000	1125000	1162000	1502000	4127512	5120000	10193819	9142132	8561234	2910000	1170000	1279757
13	1052000	1198000	1118000	1452000	4701131	4858700	9672155	10245810	8566037	2338000	1150000	1377259
14	1150000	1357000	1305000	1369000	3763988	4807200	9676952	10081879	8706542	2461000	1643000	1123707
15	1427568	1044698	1211000	1814000	3742800	5972700	8442460	8936686	7126032	2514000	1354000	1228225
16	1098000	1486378	1201000	1399000	3932755	5297000	9310583	9273763	6825868	2727000	1239000	1209017
17	1222000	1363000	1254000	1535000	3213903	5721100	9411502	9627259	6674522	2484000	1127000	982942
18	1276000	1211235	1164000	1719000	4081867	5737700	10950342	9102944	6683643	2366000	1218500	1187726
19	1164000	1093000	1193000	1452000	3267005	4761000	9737598	10412777	7232431	2194000	1218500	1291842
20	1250000	1173000	1241000	1590000	4195000	5766300	10081829	9134900	7578590	1987000	1165000	1142799
21	1154000	1245000	1297000	1594000	3695000	6230400	9509508	8702955	7301416	1786000	1328000	1273799
22	1130000	1317000	1290000	1759000	4936000	7332200	10102003	9406330	6658131	1840000	1426001	1210690
23	1255000	1255000	1262000	1649000	5436500	7528200	9324192	9259539	7153063	1738001	1046000	1204424
24	1453000	1172000	1242000	1470000	1520000	7374700	9977494	9523616	7813342	2039000	1093000	1005957
25	914000	1194000	1279000	1595000	8264100	6493700	10565373	9714421	7345804	1796000	1240000	1313787
26	1220000	1235000	1302000	2076800	3694800	7128400	10668591	6638583	6585553	1639600	1162000	988743
27	1112000	1229000	1264000	2530200	3978000	8657200	10086846	11223238	7856983	1425000	1224000	1319273
28	1253000	1184000	1066000	3381600	2879600	8363800	9597008	10028808	6607503	1408000	1376000	1231500
29	1031000		1190000	2486200	3361300	8692300	9559927	10318202	7323876	1433001	1221000	1153507
30	1163000		1398000	2524800	3891900	8649104	10024409	9803238	7070822	1454000	1219000	1517639
31	1424000		893000		4703000		8653316	9557627		1601000		91000

Monthly Statistics

Total (Gal)	37,391,568	34,198,610	37,969,000	48,567,600	115,790,566	171,496,904	293,678,326	295,563,085	235,203,750	91,974,785	37,526,267	35,741,334
Total (Ac*ft)	115	105	117	149	355	526	901	907	722	282	115	110
Average (gpm)	838	848	851	1,124	2,594	3,970	6,579	6,621	5,445	2,060	869	801
Minimum (gpm)	635	533	620	744	1,056	2,419	5,205	4,610	4,573	978	725	63
Maximum (gal)	1,498,000	1,849,000	1,513,000	3,381,600	8,264,100	8,692,300	10,950,342	11,223,238	9,448,979	8,476,218	1,643,000	1,517,639
Maximum (GPM)	1,040	1,284	1,051	2,348	5,739	6,036	7,604	7,794	6,562	5,886	1,141	1,054
Avg. GPD												
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
1	1880491	1264507	855416	2831096	4958067	6982829	8491800	11112409	8466686	5390213	1525722	2395000
2	1066100	1008353	1300200	1499534	4344817	7384229	9194847	8694506	8137058	4902910	1459000	2264000
3	1306933	1107596	139000	1312483	4081986	6715745	9831792	9883922	8180392	5396967	1125000	3035000
4	1127397	1011308	2130206	955173	3574521	7595085	8757921	9822092	8118200	4200716	1790000	2309000
5	1237621	1365382	1153798	1794483	3252040	6196887	9455536	8659200	8500972	4217106	1436809	2182000
6	916693	1249090	1230055	0	3675834	6042414	9456985	10276985	8568200	3686348	1538201	2596000
7	1074868	1463389	1153615	2873333	4303264	6004517	9388715	9872894	6851453	4178457	1297000	2442000
8	1140394	889318	1223417	1609705	1185998	8175143	9274148	10673392	7492201	4581379	1583000	2539000
9	1388711	924497	1058329	1869174	1645975	6724200	10342264	10262403	8047100	4447363	952001	2683000
10	1304179	1232528	1134715	1979978	4604809	5379575	10403610	11678692	8312921	3925217	1547007	2374000
11	1119078	1228945	1303127	2345179	11839079	7019305	10419828	6979300	7265932	5020132	1262000	2645000
12	1184864	1148100	1298042	2228888	8051571	7099833	10248670	9239500	7280362	3893210	1366000	2384000
13	1133131	1341988	1230624	2484161	7323236	7956108	8885470	11052393	7361222	3221031	1244000	2504000
14	1094161	967308	1391055	1949765	5640746	7124882	8661741	9717517	7281766	3413000	1223001	2456000
15	1230943	1346034	857531	2731593	4208794	8066461	7880630	9348664	6536377	4006000	1380000	2252000
16	1217675	992673	1037597	2531117	10066974	7547200	11008223	9014441	8007009	3302000	1313000	2504000
17	1128849	1267743	1154416	2531117	6248353	7234701	8873459	9416149	7610298	3090759	1304001	771000
18	1298191	1047768	1136307	2531117	6294084	8244844	10108608	8731491	7146758	2652618	1362000	1437000
19	1136696	1156253	1189638	2223851	5748410	7328300	8295465	8233780	8245151	3132186	1086000	2173000
20	1330667	1130867	1255249	2397504	5995992	8200735	10730400	9971242	6432239	1996000	1414000	144000
21	1095979	1163797	958975	3251282	7385541	7775200	9292240	9148600	7240605	2098000	1294000	271000
22	1137200	1224494	1517483	3927498	6937171	9344146	9631000	8813777	6279342	2579000	1281000	139000
23	1176867	1110307	871773	4434536	6709145	8843700	10179804	9533275	6502038	2235000	1276000	242000
24	1156336	1223174	1216954	4888358	6179041	8395900	9709755	8372186	6364870	2230000	1123000	121000
25	1358373	1053388	1245795	4448976	6994643	8876603	10393253	7708000	5758026	1835214	1376000	208000
26	1335152	1327854	904534	4003461	4926209	8410000	9697046	8069600	5821724	1629000	1349000	222000
27	940142	1419158	209000	3269768	5064973	8606468	10618333	9272459	6024288	1467000	1378000	129000
28	1030860	945498	1767606	2848490	4633937	9253596	9241200	9606615	6284050	1377000	1331623	246000
29	790842	1294263	1290319	2946231	5874082	9540550	9623629	8614196	4872761	1689000	1256464	152000
30	1596110		1093282	4641508	6531677	7304452	9916540	9044770	4648900	1707000	1199001	239000
31	1241642		1172009		6659784		9903549	8656749		1509000		210000

Monthly Statistics

Total (Gal)	37,177,145	33,905,580	35,480,067	79,339,358	174,940,753	229,373,608	297,916,461	289,481,199	213,638,901	99,008,825	40,071,830	46,268,000
Total (Ac*ft)	114	104	109	244	537	704	914	888	656	304	123	142
Average (gpm)	833	812	795	1,837	3,919	5,310	6,674	6,485	4,945	2,218	928	1,036
Minimum (gpm)	549	618	97	0	824	3,736	5,473	4,847	3,228	956	661	84
Maximum (gal)	1,880,491	1,463,389	2,130,206	4,888,358	11,839,079	9,540,550	11,008,223	11,678,692	8,568,200	5,396,967	1,790,000	3,035,000
Maximum (GPM)	1,306	1,016	1,479	3,395	8,222	6,625	7,645	8,110	5,950	3,748	1,243	2,108
Avg. GPD										3,193,833	1,335,728	1,492,516
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
1	1356021	1367452	1092148	2208856	5393434.3	7787509	10626990	9481302	8632494	3947019	1290000	2334346
2	1288131	1225182	1060002	3056520	6274358.4	9396024	6642330	9024026	9871020	4017554	1431000	1448106
3	1190472	1329844	1349564	2485417	5285830	7242280	6684487	9260811	7041377	3785394	1673420	1279662
4	1367654	1346115	1163603	2675944	5159620	8941212	5359036	8596109	7406721	3193120	1268000	1195898
5	1245914	1275234	1258904	2666659	8018621	8107747	5202800	11621672	7303533	2988720	1664000	1421307
6	1180354	1212813	1140621	2216613	6027963	10207741	5323034	10183995	6101274	2825650	1083000	1454482
7	1334410	1293958	1323474	2168180	6566751	7194685	5754535	8756697.4	7084919	3975990	1120000	1344762
8	1142017	1308172	981038	2056786	6075552	7756128	6122900	10437939.6	7668265	2678660	1228000	1348989
9	1255979	1176059	1314717	3143413	6212624	9777183	6673909	10714327	6963569	0	1236000	1116892
10	1259206	1325066	1151215	2327020	5944481	8982701	6407392	6320900	10997883	6566821	1216000	1241746
11	1274054	1283251	1472650	3705236	7057255	9672429	6219149	7764638	8221233	3042870	1050000	1524525
12	1285837	1224711	1589855	3530522	8362821	7914450	9768716	9798692	6347494	2493540	1246000	1262276
13	1489415	1390004	1393591	2473570	6772293	8900047	9031393	6640240	5510589	2937090	1050001	1123143
14	1126429	1235081	1840539	3251592	8272650	7722940	8685997	10754667	4428360	2852790	1114000	1425154
15	1332955	1198608	1150188	3545548	7239250	9308363	10023620	9478803	7546460	3733070	957000	1301762
16	1166898	1137396	1302390	2986380	7478575	11489996	9833174	11176925	8712735	2676540	1250000	1545906
17	1227895	1265057	1712189	2550366	5548600	11025004	10296617	9193673	6472595	2394180	1294000	1327361
18	1519661	1192378	1290163	3319984	6651919	9961890	10273982	8872306	5628428	2218080	1081000	1330885
19	1260879	1241645	1393924	3164277	6940987	6669519	10802094	9501251	6799491	1876670	1082000	1291949
20	1201050	1266889	1078579	2434885	7387206	5956441	10543744	10507933	6356014	2312900	1078000	1251219
21	926378	1156219	2029184	3771492	7564914	7200704	8875241	8476797	5385703	3960670	1125000	1288010
22	1276641	1150575	1233755	3154126	6816528	8283877	10951890	9579855	7028671	2405110	1074000	1282064
23	1316918	744238	1126599	4184029	8519518	9227021	10560933	9623502	6244964	2062030	1168000	1409587
24	1270021	1784227	1260197	0	7012316	7597318	10699527	7476701	4494190	3341110	1307000	1321917
25	1116145	1124893	1367955	9387202	7460661	5968778.4	10339167	8645356	4228175	1739640	1236000	1283197
26	1342954	1288154	1718988	4239000	7143991	8574272.6	12257134	9330255	3840100	1715040	1223000	1376479
27	1483477	1112403	1974256	6069000	4009995	7604614	8854464	8391407	3811047	2055270	1098290	1305052
28	1237334	1517499	1913655	5333152	6373556	7839186	9008363	7607396	3316960	1669310	1025471	1235718
29	1345024	0	1679585	5033948	3794417	8684444	11507552	9518942	4308094	1587630	1465450	1298529
30	1325456		2145466	4439344	7360613	9203186	9576254	8889684	3687868	1297620	1064714	
31	1384385		2169244		7592410		11765294	7482826		1211001		1281520

Monthly Statistics

	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13
Total (Gal)	39,529,964	35,173,123	44,678,238	101,579,061	206,319,710	254,197,690	274,671,718	283,109,628	191,440,226	83,561,089	36,198,346	40,652,443
Total (Ac*ft)	121	108	137	312	633	780	843	869	588	256	111	125
Average (gpm)	886	842	1,001	2,351	4,622	5,884	6,153	6,342	4,431	1,872	838	941
Minimum (gpm)	643	0	681	0	2,635	4,136	3,613	4,390	2,303	0	665	776
Maximum (gal)	1,519,661	1,784,227	2,169,244	9,387,202	8,519,518	11,489,996	12,257,134	11,621,672	10,997,883	6,566,821	1,673,420	2,334,346
Maximum (GPM)	1,055	1,239	1,506	6,519	5,916	7,979	8,512	8,071	7,637	4,560	1,162	1,621
Avg. GPD	1,275,160	1,212,866	1,441,233	3,385,969	6,655,475	8,473,256	8,860,378	9,132,569	6,381,341	2,695,519	1,206,612	1,355,081
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
1	1192956	1179390	1227887	1119891	5280247	8482428	10451262	10119331	6802101	4080716	1659083	1063893
2	1273659	1408848	1239912	0	5552326	8316721	10069008	10512360	8932660	4327560	1811505	1226950
3	1298973	1018338	1199833	0	5872883	8588940	9803318	9244871	7190811	2327664	1597935	1082360
4	1286263	1209697	1190495	4314863	6613382	8480755	10073603	8998075	8031413	5611016	1632317	1207163
5	992349	1263630	929958	1286637	5393524	8333282	9419520	9059570	6760041	5282511	1358312	987598
6	1059420	1204936	1128155	1712124	5726915	7663816	10825926	7622023	7299800	4895180	1588211	1238108
7	1015115	1017796	977191	2290449	5346624	7979187	11492131	8118088	8959976	4679541	1334495	1272218
8	1930108	1143707	1224396	3007600	6079547	8431749	10619205	9109229	7778731	5851011	1343924	1266937
9	1254893	1299171	1073363	2930582	4384132	9177147	10514233	7601591	7885870	4783980	1501796	1160526
10	1265434	1298178	1461882	2523847	4131823	9032195	10431793	8585832	7656660	2712601	1216569	1401779
11	1016333	1184785	1027050	3595852	5229347	8905664	10854904	9279827	7692410	3813070	1420005	1112340
12	1141388	1167981	1142407	3351130	6039643	8664995	11133914	8490716	6848621	4148060	1103241	1301801
13	1522690	1007551	1241505	3506285	5897023	8946942	8914260	8059421	7305621	4271440	1144161	1037927
14	594591	1094343	1027469	4214769	6053955	7648355	11477338	8052533	7698580	6148700	1235756	1127252
15	1996356	1075309	1409584	2925948	6920098	6948259	11007755	8492672	7837191	4008080	1417954	1316865
16	1239908	1243336	1174857	4090402	7227355	7800034	11025185	8214911	5206674	3986390	1169476	1175086
17	1198114	1171690	1037502	3859489	5880432	5357551	11179908	9313425	9653996	3364390	1351461	1223776
18	826510	1186154	1160693	4990003	6561213	7421531	10192036	8734537	7443750	5195130	938143	1283872
19	1568829	1325556	1363348	4994422	7347436	7536516	10012774	9880703	7004551	3192030	1360719	1140601
20	1334170	890016	1685361	3300050	968000	8775067	11474242	8208950	6015791	3518162	1222043	1226566
21	1131785	1099668	1931200	5850223	10500003	8236926	7405161	8343793	7331801	3006060	1148635	1028251
22	1265371	1142012	1574291	3734854	7648248	9078149	9884336	8691231	6668091	2728900	1288602	1113133
23	1164059	1342612	1070287	3447675	6533496	8338352	10679109	6893222	7325130	2936431	1818767	1105780
24	1091457	1194837	1167104	3545988	5977499	9020890	9368980	8202891	6540361	2337220	1291379	991042
25	1069347	1120733	3449048	2413905	6254272	9092681	9947892	7488362	6382530	2535680	1084024	1197214
26	1423514	1174149	1197133	3889663	8984111	8318671	10024540	8762762	5862180	2655521	1147295	1061938
27	1140881	1107418	2490355	3409460	7776713	11339636	9948718	7959091	5140790	2277211	1231965	1267691
28	1127030	1093383	1245433	3496961	7411480	7865929	10493932	8397560	5580460	2234259	1182650	1123782
29	1322519		942092	4894527	7514587	9237247	10358081	8828593	4441732	2821172	1053237	1231385
30	1152560		207220	4948940	7337264	8722791	8974619	6951421	4496001	2629857	1325750	1116726
31	1010872		1383649		5451617		9357546	7879764		1928298		1156199
Monthly Statistics												
Total (Gal)	37,907,454	32,665,224	40,580,660	97,646,539	193,895,195	251,742,406	317,415,229	264,097,355	209,774,324	114,287,841	39,979,410	36,246,759
Total (Ac*ft)	116	100	125	300	595	773	974	811	644	351	123	111
Average (gpm)	849	810	909	2,260	4,344	5,827	7,111	5,916	4,856	2,560	925	812
Minimum (gpm)	413	618	144	0	672	3,721	5,142	4,787	3,085	1,339	651	686
Maximum (gal)	1,996,356	1,408,848	3,449,048	5,850,223	10,500,003	11,339,636	11,492,131	10,512,360	9,653,996	6,148,700	1,818,767	1,401,779
Maximum (GPM)	1,386	978	2,395	4,063	7,292	7,875	7,981	7,300	6,704	4,270	1,263	973
Avg. GPD	1,222,821	1,166,615	1,309,054	3,254,885	6,254,684	8,391,414	10,239,201	8,519,270	6,992,477	3,686,705	1,332,647	1,169,250
Max 2-Day (gpm)												

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
1	1110397	1127082	1287992	3398942	6135266	4922082	10583212	9376434	8651138	5,972,300	1735014	1744983
2	1034198	1330699	1050514	2983782	5861980	6206091	10953842	9539644	8687363	4,936,087	2593367	1308958
3	1327162	1226002	1232056	2762083	5907522	6159231	9021335	9383138	6864790	4,447,035	1476579	1966868
4	1406552	121060	1144853	2774007	5055500	6380322	11001826	8207876	6822397	4,859,239	58000	1074666
5	1200877	2039050	1169622	2902180	5385462	6661820	9131999	9116876	6521705	3,113,138	1359076	1297067
6	1413838	1269288	1392458	3080289	8713599	5540530	10176024	8284660	7308685	7,066,946	1280166	1307859
7	1169921	1085992	1201701	3248463	5318562	6431311	9765796	6465525	8570884	4,827,290	1322521	597467
8	1200758	1263105	2026904	2633115	4858782	8017101	9874081	7235447	8062658	5,243,324	1245977	1673266
9	1379241	1325728	1531538	4632373	4868881	7189270	10110832	7366664	7144052	4,733,007	1128608	1251726
10	1050721	1224788	1069037	3545844	6396181	9385563	10773058	8418884	7633525	4,523,389	1433886	0
11	1390039	1157628	1563055	3070027	4321831	7443960	8010744	8077094	7062302	5,773,126	1015264	2236046
12	1181840	30825	1470679	3736050	6910741	8056302	7589203	8710983	7476132	5,254,100	1279376	1094721
13	1250937	2030306	1518366	3344413	6352203	7589592	8314345	9305728	7,747,184	5,007,070	1043615	1544302
14	1234976	1136674	1535932	3463327	5543942	8486313	9019392	9155504	7,072,805	4,859,164	1229884	1423897
15	1153571	1128284	1382440	3308669	4689801	8946785	6997356	8726202	6,006,602	4,978,000	1235967	1093474
16	1108039	1143235	1578061	2370162	-293179	9457364	9300441	8906225	5,339,504	4,277,085	1160004	1267866
17	1232239	1344743	1522334	7403318	11503552	9610456	11813443	9341038	5,145,604	3,908,115	1181207	1060731
18	1190046	1005280	1736413	3248207	5692821	8567054	8698297	8994356	5,052,506	4,467,125	1321054	1232735
19	1327067	1199290	1866735	5490542	4866928	9470023	9965647	9265776	4,804,403	3,842,009	1287434	1028131
20	1210638	1236298	1905277	5792113	4526241	8367280	11254032	9290090	6,376,124	2,962,007	1099683	1271555
21	1189459	1107750	2026412	5207249	5869451	8291159	8962793	8050454	6,511,021	2,671,008	1254418	1182809
22	1249688	1109747	1936359	4821748	5017212	9737787	7945201	8422817	8,135,378	2,492,014	1302724	1225138
23	1127549	1191787	1626352	6054612	4667500	9628240	8458212	8667952	5,413,884	2,304,000	1347610	1104596
24	1145178	1014268	1859643	3408816	5337531	10343514	7752567	8995458	6,986,386	2,212,000	148481	1268879
25	1183606	1178990	2298695	4381761	5525471	9503993	7983118	9589953	5,504,983	2,483,021	2261931	1064574
26	1242695	1172880	2429200	4723313	5436511	11926186	11343194	8763771	6,054,578	2,268,008	1371207	1177323
27	1137734	1003340	2081292	5957276	5577680	9281314	8317545	8988816	7,232,525	2,338,012	1074784	2251924
28	1088066	1188852	3077709	5140845	6644703	9074750	9261547	8365674	5,981,510	2,214,186	1122630	90059
29	1256294	0	2908650	5719460	6173532	11877325	8032957	7798999	6,526,186	2,114,017	1402310	1157048
30	1276102		2668548	8059166	6144011	9856499	7683627	8640370	5,872,812	1,822,019	1121304	1219860
31	1240144		1226153		7238011		10962424	8482726		1,514,009		1272503
Monthly Statistics												
Total (Gal)	37,709,572	32,392,971	53,324,980	126,662,152	176,248,229	252,409,217	289,058,090	267,935,134	202,569,626	114,031,805	37,894,081	38,491,031
Total (Ac*ft)	116	99	164	389	541	775	887	822	622	350	116	118
Average (gpm)	845	776	1,195	2,932	3,948	5,843	6,475	6,002	4,689	2,677	877	862
Minimum (gpm)	718	0	730	1,646	-204	3,418	4,859	4,490	3,336	1,536	40	0
Maximum (gal)	1,413,838	2,039,050	3,077,709	8,059,166	########	########	########	9,589,953	8,687,363	7,066,946	2,593,367	2,251,924
Maximum (GPM)	982	1,416	2,137	5,597	7,989	8,282	8,204	6,660	6,033	4,908	1,801	1,564
Avg. GPD	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######	#######
Max 2-Day (gpm)	949	1149	2079	5597	5971	7546	7613	6570	5776	4130	1413	1191

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
1	1,158,419	937,143	990,816	1,811,345	4,177,507	5,845,300	11,204,782	10,549,976	8,921,717	4,985,000	1,379,357	1,054,261
2	1,155,893	953,998	1,776,065	2,368,929	6,251,565	9,892,635	9,949,187	10,034,527	8,638,542	4,821,900	1,455,434	1,136,816
3	1,241,391	1,756,029	1,563,132	2,629,481	4,952,262	8,191,100	10,719,641	10,583,934	7,366,323	2,838,020	1,350,038	1,317,617
4	1,592,385	1,134,469	1,516,489	2,223,552	6,259,544	7,550,500	8,869,351	9,674,589	7,389,929	5,952,300	1,224,391	1,115,748
5	1,266,508	1,343,817	1,864,728	2,434,821	5,101,200	7,993,305	10,375,534	10,455,605	7,009,810	4,865,001	1,413,196	1,036,185
6	1,158,000	997,897	1,177,704	3,056,667	5,880,238	8,434,500	9,657,164	9,026,917	7,480,479	4,972,005	1,414,629	1,192,421
7	1,399,357	965,711	1,072,820	3,175,994	3,693,900	9,751,873	10,359,589	9,504,641	7,207,905	4,570,001	1,447,681	1,079,207
8	925,011	1,359,947	1,020,596	2,938,507	4,304,288	7,484,372	8,733,861	9,661,249	7,704,917	4,368,000	1,324,035	1,221,088
9	1,170,012	1,149,500	1,034,002	3,168,163	4,264,267	9,383,637	8,862,283	9,689,014	7,325,114	4,733,000	2,125,825	1,385,403
10	1,360,000	1,343,552	1,952,476	3,881,682	4,992,149	9,056,805	8,020,788	9,630,674	7,146,537	4,164,000	1,436,000	1,165,593
11	1,454,000	1,177,178	1,132,732	3,704,134	5,330,244	8,066,834	8,406,258	9,426,878	7,256,502	3,639,148	1,335,323	1,193,188
12	1,284,037	1,015,975	1,051,563	3,561,935	7,068,278	7,530,472	8,831,547	10,550,434	7,248,668	3,734,038	1,151,322	1,152,459
13	574,031	986,898	1,533,656	2,884,719	6,291,102	9,036,133	9,468,839	9,462,094	6,941,353	3,624,001	1,305,828	1,251,212
14	1,225,084	1,250,153	1,269,061	3,356,697	5,355,745	7,243,962	9,922,964	8,819,505	5,961,261	3,441,007	1,368,049	1,105,110
15	1,234,713	1,025,934	1,055,821	2,707,979	5,982,805	9,063,119	11,126,964	9,693,839	5,883,224	2,717,000	1,647,656	1,187,073
16	1,097,989	1,249,342	1,173,414	3,758,787	5,210,671	7,868,597	9,118,805	10,079,284	4,815,739	2,780,002	1,152,664	1,030,097
17	1,405,626	1,675,243	1,999,232	4,196,111	6,449,795	8,552,445	8,293,054	10,199,966	5,464,707	2,923,904	1,308,904	1,339,221
18	1,075,825	1,150,336	1,220,727	5,063,562	6,082,299	6,847,826	9,870,158	8,834,220	6,811,209	2,069,917	1,112,462	1,283,021
19	1,508,173	1,015,442	1,252,842	4,044,159	5,833,647	8,150,937	9,361,455	9,975,571	6,449,414	2,155,113	1,374,247	1,203,458
20	1,009,188	898,572	689,117	5,526,347	4,493,563	9,277,621	9,821,546	9,005,843	6,828,253	2,251,825	1,153,482	1,393,805
21	1,301,039	1,562,683	2,562,238	4,837,985	3,856,484	9,855,151	9,496,926	8,957,755	5,488,297	2,325,938	1,299,814	1,208,530
22	1,125,651	1,082,767	2,024,715	4,648,581	4,298,694	9,200,070	9,950,201	10,321,557	4,441,598	2,139,028	1,095,183	1,179,194
23	841,763	1,026,192	1,585,312	3,109,044	5,266,280	9,179,915	8,231,401	8,166,860	4,455,145	2,649,495	1,120,555	1,398,999
24	945,811	1,157,731	1,429,998	3,955,393	5,467,886	10,163,060	10,977,312	9,758,592	3,718,005	2,789,958	1,097,114	1,314,406
25	1,054,965	1,588,029	1,180,586	3,373,873	5,369,914	8,627,975	9,790,676	9,049,668	4,477,200	2,811,588	1,115,623	1,168,588
26	1,739,389	1,219,656	1,114,495	3,900,735	8,691,396	7,635,271	9,560,621	9,859,699	4,458,000	2,364,859	1,179,568	1,368,886
27	1,187,935	948,700	2,147,631	4,148,998	5,109,907	9,881,472	10,420,541	8,452,237	5,611,600	2,069,318	1,262,635	1,341,941
28	1,023,981	1,354,223	1,296,802	4,184,538	6,123,815	9,452,806	11,229,141	8,961,098	5,194,000	1,496,545	1,198,038	1,293,131
29	1,191,175	-	1,169,364	4,047,667	6,165,718	10,587,285	9,007,254	9,502,893	5,946,200	1,435,150	1,108,127	1,318,728
30	1,047,190		2,758,489	4,055,926	5,935,926	10,679,949	10,556,217	9,417,668	5,159,000	1,825,729	1,181,147	1,377,084
31	1,143,322		1,274,562		10,213,109		9,403,105	9,036,405		1,379,800		1,280,630

Monthly Statistics

	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
Total (Gal)	36,897,863	33,327,118	44,891,185	106,756,311	174,474,198	260,484,927	299,597,165	296,343,192	188,800,648	98,892,590	39,138,327	38,093,100
Total (Ac*ft)	113	102	138	328	535	799	919	910	579	304	120	117
Average (gpm)	827	798	1,006	2,471	3,908	6,030	6,711	6,639	4,370	2,215	906	853
Minimum (gpm)	399	0	479	1,258	2,565	4,059	5,570	5,671	2,582	958	761	715
Maximum (gal)	1,739,389	1,756,029	2,758,489	5,526,347	10,213,109	10,679,949	11,229,141	10,583,934	8,921,717	5,952,300	2,125,825	1,398,999
Maximum (GPM)	1,208	1,219	1,916	3,838	7,092	7,417	7,798	7,350	6,196	4,134	1,476	972
Avg. GPD	1,190,254	1,149,211	1,448,103	3,558,544	5,628,200	8,682,831	9,664,425	9,559,458	6,293,355	3,190,084	1,304,611	1,228,810
Max 2-Day (gpm)	1016	1015	1593	3599	7092	7417	7517	7159	5557	3756	1237	942

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17
1	1,217,724	1,400,054	1,266,484	1,296,730	2,975,981	6,561,800	8,350,953	9,849,911	7,483,462	2,718,500	1,465,983	1,091,415
2	1,286,167	1,059,731	1,156,062	1,985,216	3,727,896	5,799,000	8,787,022	10,134,753	8,042,591	5,170,109	1,399,797	1,242,089
3	1,475,641	1,248,716	1,135,211	1,989,602	3,991,389	6,917,800	10,713,233	10,398,097	8,990,318	3,037,500	1,455,432	993,715
4	1,257,736	1,853,481	1,249,989	1,721,893	2,926,439	6,062,800	9,069,191	10,367,128	8,441,473	2,975,000	1,242,352	1,486,889
5	1,379,649	969,080	1,229,423	1,778,563	4,156,238	6,857,400	9,017,968	9,394,585	6,466,168	3,002,504	1,283,440	980,342
6	1,217,911	1,141,523	1,140,784	2,361,226	3,000,251	7,915,800	9,476,901	9,870,380	9,799,648	2,817,000	1,305,116	1,321,887
7	1,526,956	1,297,416	1,132,794	2,412,024	3,001,993	8,463,600	9,549,609	10,461,466	8,339,952	2,713,001	6,000	1,133,555
8	1,534,936	1,475,011	1,160,797	1,436,234	3,685,482	8,124,291	8,368,806	10,159,100	6,918,835	2,951,744	2,448,459	1,198,508
9	1,497,946	988,743	1,342,797	1,862,633	4,422,591	8,097,600	10,130,685	9,490,946	7,461,437	2,892,000	1,977,831	1,217,407
10	1,430,214	1,153,827	1,185,227	2,478,682	5,559,923	6,826,600	10,439,661	9,588,875	8,944,313	3,466,000	431,526	1,140,356
11	1,539,208	1,141,460	1,222,621	2,351,829	5,132,858	5,320,700	10,116,392	10,252,619	6,640,448	2,716,639	1,173,680	1,189,848
12	1,470,378	1,221,256	1,136,338	2,192,771	3,866,824	5,318,700	10,385,737	8,465,884	6,630,023	3,036,038	1,238,123	1,249,248
13	1,309,144	1,393,081	1,635,516	1,804,152	4,351,034	5,795,000	10,667,382	7,338,659	5,209,095	2,718,000	1,320,570	1,144,552
14	1,426,023	1,209,939	1,807,626	1,630,150	4,959,945	6,011,601	10,345,958	8,846,887	9,880,664	2,594,000	1,143,613	1,177,009
15	1,512,026	1,128,444	1,436,120	1,872,724	5,083,638	7,029,211	9,652,321	8,504,538	6,139,355	2,754,851	1,115,650	1,255,746
16	1,282,553	1,226,254	1,425,413	1,942,424	4,464,298	6,569,600	10,114,307	8,885,704	3,621,924	2,282,875	1,245,010	1,055,250
17	1,274,729	1,181,272	1,186,143	2,208,823	3,650,896	6,424,300	10,406,027	9,006,986	6,642,821	2,362,005	1,310,664	1,159,167
18	1,297,123	1,054,783	1,717,262	2,391,577	4,360,760	7,071,459	10,451,854	8,848,290	4,529,292	2,418,000	902,600	1,193,225
19	1,377,197	1,467,399	1,956,947	2,409,251	4,458,988	8,819,613	10,124,839	8,287,404	4,497,012	1,662,864	1,379,389	1,187,453
20	1,313,744	1,185,957	1,268,092	2,037,151	5,254,452	7,998,911	10,430,476	8,093,447	4,105,180	1,694,000	1,216,880	1,211,121
21	1,336,190	1,208,302	1,742,384	2,196,618	4,902,632	8,334,468	10,517,125	8,847,658	3,726,606	1,711,000	897,814	1,106,020
22	1,427,219	1,140,136	1,451,557	2,567,471	6,248,256	8,580,696	9,945,950	9,083,434	3,896,654	2,454,877	1,523,713	1,047,681
23	1,443,023	810,106	1,199,254	2,541,753	6,065,294	8,449,752	10,310,538	7,986,099	3,394,841	2,091,000	1,212,590	1,323,539
24	1,415,911	1,546,678	1,323,135	1,958,324	5,960,509	7,927,000	10,284,962	9,026,200	4,161,835	1,822,000	946,422	1,101,591
25	1,299,507	1,203,865	1,274,648	1,184,553	6,439,030	8,377,384	10,350,902	7,836,639	4,059,930	1,745,002	1,141,884	1,531,184
26	1,187,027	1,114,566	1,200,797	2,916,880	4,904,251	9,027,764	9,959,932	8,380,200	3,979,415	1,880,000	1,229,725	941,573
27	1,446,983	1,312,249	1,350,185	1,901,907	5,179,090	8,924,251	10,025,800	9,520,342	4,062,381	1,671,693	917,857	1,561,623
28	1,288,517	1,056,394	1,864,552	1,984,748	5,686,859	8,491,571	10,662,322	8,746,767	6,020,360	1,492,199	1,223,760	798,846
29	1,371,306		1,583,341	2,315,189	9,188,585	8,462,575	9,707,183	9,348,502	4,436,197	1,264,040	1,195,519	1,192,190
30	1,304,574		1,446,755	2,401,754	7,147,320	10,592,446	9,118,126	8,588,934	1,634,902	1,094,088	1,038,920	1,209,641
31	1,249,512		1,342,648		7,212,000		9,938,519	9,930,849		1,097,772		1,048,362

Monthly Statistics

Total (Gal)	42,396,774	34,189,723	42,570,902	62,132,852	151,965,702	225,153,693	307,420,681	283,541,283	178,157,132	74,306,301	36,390,319	36,491,032
Total (Ac*ft)	130	105	131	191	466	691	944	870	547	228	112	112
Average (gpm)	950	848	954	1,438	3,404	5,212	6,887	6,352	4,124	1,665	842	817
Minimum (gpm)	824	563	787	823	2,032	3,694	5,799	5,096	1,135	760	4	555
Maximum (gal)	1,539,208	1,853,481	1,956,947	2,916,880	9,188,585	10,592,446	10,713,233	10,461,466	9,880,664	5,170,109	2,448,459	1,561,623
Maximum (GPM)	1,069	1,287	1,359	2,026	6,381	7,356	7,440	7,265	6,862	3,590	1,700	1,084
Avg. GPD	1,367,638	1,221,062	1,373,255	2,071,095	4,902,119	7,505,123	9,916,796	9,146,493	5,938,571	2,396,977	1,213,011	1,177,130
Max 2-Day (gpm)	1063	1077	1276	1774	5672	7356	7310	7210	6298	2850	1537	914

Mountain Home
Daily Well Production

(Gallons)

Day	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
1	1,394,542	1,144,911	1,056,602	1,481,561	5,045,103	5,953,802	9,760,802	10,523,585	6,745,763	5,618,286	2,088,211	1,151,357
2	1,089,680	1,354,615	1,285,574	1,209,890	4,936,054	6,299,309	8,151,261	10,770,091	7,317,508	5,820,626	1,920,961	1,387,061
3	1,162,370	1,025,642	986,920	1,135,992	5,659,068	7,863,852	8,754,501	10,458,863	9,066,799	6,201,738	2,001,269	1,150,837
4	1,593,143	1,328,154	1,183,778	1,244,426	5,169,000	7,419,348	9,629,268	9,929,725	8,551,242	4,704,526	1,765,320	1,048,000
5	1,076,170	1,392,000	1,267,610	3,163,261	5,363,000	8,713,606	10,368,126	8,845,870	8,698,526	3,838,001	1,286,464	1,209,259
6	1,063,862	1,362,161	1,299,503	1,443,465	6,442,313	8,137,459	10,466,903	9,754,737	8,259,205	3,451,001	1,390,424	1,139,309
7	1,212,293	994,198	1,325,234	1,459,694	5,540,386	8,100,201	9,964,782	10,234,569	7,783,244	4,412,000	1,128,624	1,190,640
8	1,196,814	1,216,108	1,284,083	1,497,861	7,333,389	7,704,306	9,127,340	10,678,871	7,124,398	3,457,000	1,214,402	1,251,821
9	1,317,607	1,031,875	1,080,356	1,444,337	5,976,385	6,666,256	9,871,716	10,603,280	8,208,662	3,038,000	1,192,268	1,135,651
10	1,132,442	1,192,492	1,145,009	1,169,021	5,347,402	7,265,510	9,305,551	9,710,550	8,161,534	3,049,671	1,147,128	1,180,382
11	1,204,268	1,201,947	1,315,898	2,388,273	4,858,005	7,507,303	10,594,184	10,144,698	7,161,363	2,600,414	1,239,797	1,166,586
12	1,118,989	1,358,973	1,117,679	947,758	4,415,884	9,520,718	11,420,220	9,499,667	6,808,369	2,570,629	1,224,151	1,180,693
13	1,174,376	1,225,517	1,105,715	1,535,704	4,740,353	7,933,736	10,664,973	10,243,423	6,740,450	2,201,190	1,225,880	1,227,390
14	1,108,435	1,194,276	1,119,544	1,946,622	4,802,126	9,303,822	9,236,692	9,733,273	7,736,323	3,007,841	1,156,846	1,098,035
15	1,410,928	1,078,395	1,185,413	2,883,650	6,294,202	7,461,305	10,587,059	10,277,106	5,771,277	2,640,267	1,132,812	1,080,155
16	1,198,084	882,805	1,285,217	1,672,275	5,412,025	6,120,000	9,290,117	8,807,728	6,925,240	2,310,707	1,086,599	1,319,301
17	1,183,845	1,223,269	1,125,879	2,202,964	5,921,902	5,915,427	11,129,210	8,821,577	7,244,980	2,014,695	1,121,989	1,163,400
18	1,273,346	1,156,286	1,438,526	1,912,451	5,115,341	6,615,613	10,832,502	8,055,883	6,980,071	2,265,694	1,283,280	1,123,992
19	1,210,744	1,264,613	1,273,841	2,123,954	7,006,470	7,680,808	11,614,314	8,616,442	6,939,940	2,548,361	1,103,225	1,274,062
20	996,072	1,145,307	1,111,011	2,212,699	5,690,568	7,772,953	10,722,348	9,610,639	7,649,863	2,616,166	1,052,540	1,213,129
21	1,266,872	1,241,964	1,250,768	2,683,534	5,616,706	8,131,780	9,539,718	8,242,346	7,152,416	2,447,910	1,179,385	1,021,687
22	1,256,114	1,204,896	1,024,212	2,891,121	6,080,097	8,206,861	9,763,120	8,500,720	6,299,410	2,847,694	1,060,990	1,125,592
23	1,189,577	1,027,975	1,532,191	2,735,768	6,047,483	7,042,002	11,514,581	8,721,653	7,226,409	2,297,591	1,136,816	1,311,186
24	1,128,347	1,223,008	1,470,954	3,602,932	6,051,935	8,478,086	10,593,033	8,872,816	6,374,459	1,959,954	1,112,696	975,419
25	1,158,604	1,340,165	1,247,922	3,923,554	3,909,389	8,526,336	10,946,486	8,054,116	6,948,699	2,051,886	1,123,309	1,133,978
26	1,128,024	1,238,657	1,128,526	4,534,774	4,194,874	8,822,808	11,747,913	7,366,098	6,383,025	1,561,815	1,143,406	1,034,936
27	993,883	1,126,663	1,327,630	4,184,788	3,650,768	9,286,139	10,313,545	7,871,868	7,088,313	1,985,271	1,106,035	1,129,477
28	1,347,920	1,297,501	1,840,095	4,300,950	9,947,028	9,488,806	10,229,620	8,434,701	7,026,400	1,681,956	1,148,941	1,219,356
29	1,472,979		1,290,520	3,830,272	6,788,506	8,266,790	10,716,465	8,253,888	5,953,779	2,204,195	1,133,106	1,068,897
30	803,901		1,214,313	4,210,265	5,951,200	8,513,932	10,842,308	8,453,149	6,866,671	2,182,607	1,114,508	1,166,905
31	1,226,655		1,602,497		5,815,311		10,881,853	8,018,680		1,901,588		1,228,336

Monthly Statistics

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Total (Gal)	37,090,886	33,474,373	38,923,020	71,973,816	175,122,273	234,718,874	318,580,511	286,110,612	217,194,338	91,489,280	38,021,382	36,106,829
Total (Ac*ft)	114	103	119	221	537	720	978	878	667	281	117	111
Average (gpm)	831	830	872	1,666	3,923	5,433	7,137	6,409	5,028	2,049	880	809
Minimum (gpm)	558	613	685	658	2,535	4,108	5,661	5,115	4,008	1,085	731	677
Maximum (gal)	1,593,143	1,392,000	1,840,095	4,534,774	9,947,028	9,520,718	11,747,913	10,770,091	9,066,799	6,201,738	2,088,211	1,387,061
Maximum (GPM)	1,106	967	1,278	3,149	6,908	6,612	8,158	7,479	6,296	4,307	1,450	963
Avg. GPD	1,196,480	1,195,513	1,255,581	2,399,127	5,649,106	7,823,962	10,276,791	9,229,375	7,239,811	2,951,267	1,267,379	1,164,736
Max 2-Day (gpm)	979	956	1113	3028	5811	6519	7880	7390	6117	4174	1362	881

Upper & Medium

2 Day Average Calculations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	424,710	233,240	254,417	335,195	873,269	1,013,380	1,161,230	1,068,436	1,079,286	571,923	253,282	300,996
2	265,416	264,326	257,705	357,309	878,264	1,111,594	1,125,197	1,225,958	1,043,544	573,218	320,037	242,420
3	281,075	262,806	258,630	391,888	740,868	922,534	1,081,543	1,003,221	917,405	572,809	257,438	238,124
4	350,244	260,786	256,599	385,511	868,457	986,926	1,010,062	991,948	958,810	558,488	234,241	284,100
5	269,373	250,433	249,983	341,713	930,076	1,097,628	949,341	1,185,689	903,678	542,020	281,235	262,341
6	285,229	241,931	261,612	364,275	899,449	1,006,806	981,338	1,138,659	852,800	595,232	234,399	251,327
7	241,082	258,414	248,628	359,279	939,660	853,684	1,023,634	1,157,961	872,937	594,947	235,581	272,861
8	263,524	249,379	245,005	396,458	948,077	972,494	996,695	1,126,577	780,782	513,583	243,498	275,064
9	313,646	253,832	277,841	432,630	897,325	1,085,748	1,033,703	1,013,152	827,570	552,462	298,976	260,229
10	252,455	265,819	277,032	448,177	832,986	1,095,225	1,024,744	1,044,300	1,042,068	559,693	291,060	264,017
11	241,725	253,335	262,256	412,260	998,564	1,049,535	1,118,499	1,197,272	996,678	479,394	212,362	273,329
12	293,821	253,833	258,910	378,135	971,452	1,039,921	1,131,595	1,205,725	832,505	458,849	235,046	253,712
13	274,229	251,509	313,603	452,133	910,727	1,045,398	1,052,503	1,198,264	774,535	517,503	211,638	279,985
14	238,183	243,057	244,823	467,718	881,392	992,913	1,100,862	1,169,030	836,900	534,683	227,297	310,877
15	256,884	246,318	247,633	431,598	893,072	1,402,149	1,106,030	1,214,537	885,034	488,136	278,976	297,326
16	254,199	259,225	282,117	432,776	858,272	1,461,023	1,116,854	1,180,341	875,635	463,967	259,939	286,918
17	286,358	272,384	274,313	501,978	732,180	1,087,822	1,266,079	951,054	796,663	417,982	253,839	277,908
18	258,856	270,763	296,319	537,288	846,151	988,153	1,272,806	1,073,010	821,028	388,157	284,812	270,908
19	226,035	293,804	244,306	531,272	860,867	1,337,532	1,143,618	1,195,077	845,714	387,239	238,459	271,702
20	267,072	259,581	244,857	627,686	855,822	1,350,210	1,073,701	1,162,523	730,384	408,632	239,965	260,755
21	288,427	264,050	282,852	644,380	827,393	894,497	1,112,824	1,102,472	789,334	409,730	235,733	254,388
22	248,123	257,258	234,924	613,456	892,496	953,854	1,186,957	1,110,206	851,134	383,234	241,438	306,241
23	228,311	227,740	250,339	660,500	1,015,318	972,585	1,216,420	1,063,498	829,450	369,421	305,443	274,636
24	248,877	257,767	296,369	703,325	993,574	1,031,914	1,166,797	913,355	695,680	370,456	252,110	196,863
25	245,812	304,531	263,573	663,492	954,805	872,090	1,184,059	1,028,169	569,288	311,926	242,194	226,841
26	272,424	252,870	256,465	703,052	787,089	547,046	1,149,205	1,065,807	604,230	314,355	281,328	268,984
27	262,245	258,446	279,536	870,508	781,403	388,438	1,013,035	1,024,216	570,543	344,997	228,080	269,868
28	246,902	162,478	266,909	814,238	820,228	690,126	1,141,526	1,084,211	539,631	320,305	264,738	254,467
29	251,070		285,928	756,907	857,963	1,171,704	1,200,646	1,053,392	582,056	299,462	252,282	255,102
30	246,363		332,994	402,543	865,679	624,016	1,227,432	943,954	305,423	283,644	79,765	263,345

Upper 2-Day Average Calculation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	210,500	34,000	56,000	74,500	252,000	157,000	462,500	415,500	398,000	157,000	57,000	91,500
2	70,500	58,000	58,500	74,500	255,000	197,000	458,500	415,000	375,000	162,000	91,000	44,500
3	83,500	58,000	58,500	108,000	189,500	195,000	425,500	337,000	318,000	133,000	44,500	47,000
4	145,000	59,500	59,000	106,500	174,000	261,000	348,000	446,500	351,500	146,000	46,500	93,500
5	63,000	59,500	59,000	73,500	231,000	288,500	295,000	482,000	321,500	132,500	91,500	73,000
6	83,500	58,500	66,000	72,000	239,000	233,000	315,000	457,000	394,500	157,500	45,000	58,000
7	86,500	58,500	66,000	70,000	265,500	215,500	365,500	462,000	528,000	154,500	46,500	65,500
8	60,000	58,500	59,500	107,500	305,000	277,500	348,000	460,000	604,500	126,500	46,500	68,000
9	63,500	58,500	59,500	122,000	230,500	354,500	379,500	385,000	529,500	154,500	92,500	67,000
10	59,000	59,500	58,000	116,000	169,000	363,500	364,500	327,500	412,000	141,500	92,500	69,000
11	51,000	59,500	58,000	66,500	223,500	314,500	406,000	464,000	362,500	118,000	22,000	71,000
12	58,500	59,000	60,000	49,000	181,000	324,500	414,000	518,500	277,500	102,000	46,500	64,500
13	58,500	59,000	119,000	97,500	114,500	368,000	369,500	517,500	173,000	144,500	24,500	87,000
14	58,500	60,000	59,000	95,500	118,000	312,500	428,000	498,500	209,500	161,000	47,500	100,500
15	58,500	60,000	58,000	95,000	172,500	290,500	437,000	495,500	298,500	155,500	92,500	88,000
16	58,000	59,000	58,000	125,000	188,500	366,000	451,000	444,500	288,000	150,500	45,000	89,000
17	61,000	59,000	57,500	154,500	131,000	451,000	462,500	299,500	223,000	100,500	46,000	86,000
18	59,000	59,000	104,000	191,500	135,000	379,500	483,500	424,000	241,000	94,500	92,000	78,500
19	56,000	95,000	46,500	218,000	133,500	357,000	459,500	515,000	287,000	91,000	46,000	75,500
20	58,000	59,000	48,000	205,500	109,500	351,500	375,000	492,000	182,500	97,000	46,500	67,500
21	83,000	82,000	93,500	212,500	123,000	250,500	426,500	431,000	199,000	100,500	46,500	55,000
22	51,000	59,000	45,500	208,000	196,000	341,000	490,000	419,000	257,000	99,000	47,000	55,000
23	26,000	58,500	49,000	206,500	248,500	381,000	526,000	385,500	254,000	95,500	91,500	56,500
24	59,500	58,500	94,000	224,000	273,000	371,000	475,500	283,000	199,500	92,000	44,500	45,000
25	59,500	59,000	67,500	173,000	224,500	347,500	459,500	386,000	119,000	46,500	47,000	46,500
26	60,000	59,000	58,500	181,500	120,000	339,000	448,000	416,500	157,000	47,500	91,500	61,500
27	60,000	59,000	72,000	242,500	143,500	279,000	349,500	376,500	154,000	93,500	44,500	62,500
28	60,000	118,000	65,000	224,500	170,000	255,500	432,000	424,000	102,000	95,000	47,000	59,500
29	60,000		65,500	234,000	169,000	435,500	506,500	393,000	153,000	93,500	47,000	60,500
30	57,500		74,500	258,000	166,500	526,000	542,500	297,500	211,000	81,000	0	62,000

Medium
2-Day Average Calculation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	214,210	199,240	198,417	260,695	621,269	856,380	698,730	652,936	681,286	414,923	196,282	209,496
2	194,916	206,326	199,205	282,809	623,264	914,594	666,697	810,958	668,544	411,218	229,037	197,920
3	197,575	204,806	200,130	283,888	551,368	727,534	656,043	666,221	599,405	439,809	212,938	191,124
4	205,244	201,286	197,599	279,011	694,457	725,926	662,062	545,448	607,310	412,488	187,741	190,600
5	206,373	190,933	190,983	268,213	699,076	809,128	654,341	703,689	582,178	409,520	189,735	189,341
6	201,729	183,431	195,612	292,275	660,449	773,806	666,338	681,659	458,300	437,732	189,399	193,327
7	154,582	199,914	182,628	289,279	674,160	638,184	658,134	695,961	344,937	440,447	189,081	207,361
8	203,524	190,879	185,505	288,958	643,077	694,994	648,695	666,577	176,282	387,083	196,998	207,064
9	250,146	195,332	218,341	310,630	666,825	731,248	654,203	628,152	298,070	397,962	206,476	193,229
10	193,455	206,319	219,032	332,177	663,986	731,725	660,244	716,800	630,068	418,193	198,560	195,017
11	190,725	193,835	204,256	345,760	775,064	735,035	712,499	733,272	634,178	361,394	190,362	202,329
12	235,321	194,833	198,910	329,135	790,452	715,421	717,595	687,225	555,005	356,849	188,546	189,212
13	215,729	192,509	194,603	354,633	796,227	677,398	683,003	680,764	601,535	373,003	187,138	192,985
14	179,683	183,057	185,823	372,218	763,392	680,413	672,862	670,530	627,400	373,683	179,797	210,377
15	198,384	186,318	189,633	336,598	720,572	1,111,649	669,030	719,037	586,534	332,636	186,476	209,326
16	196,199	200,225	224,117	307,776	669,772	1,095,023	665,854	735,841	587,635	313,467	214,939	197,918
17	225,358	213,384	216,813	347,478	601,180	636,822	803,579	651,554	573,663	317,482	207,839	191,908
18	199,856	211,763	192,319	345,788	711,151	608,653	789,306	649,010	580,028	293,657	192,812	192,408
19	170,035	198,804	197,806	313,272	727,367	980,532	684,118	680,077	558,714	296,239	192,459	196,202
20	209,072	200,581	196,857	422,186	746,322	998,710	698,701	670,523	547,884	311,632	193,465	193,255
21	205,427	182,050	189,352	431,880	704,393	643,997	686,324	671,472	590,334	309,230	189,233	199,388
22	197,123	198,258	189,424	405,456	696,496	612,854	696,957	691,206	594,134	284,234	194,438	251,241
23	202,311	169,240	201,339	454,000	766,818	591,585	690,420	677,998	575,450	273,921	213,943	218,136
24	189,377	199,267	202,369	479,325	720,574	660,914	691,297	630,355	496,180	278,456	207,610	151,863
25	186,312	245,531	196,073	490,492	730,305	524,590	724,559	642,169	450,288	265,426	195,194	180,341
26	212,424	193,870	197,965	521,552	667,089	208,046	701,205	649,307	447,230	266,855	189,828	207,484
27	202,245	199,446	207,536	628,008	637,903	109,438	663,535	647,716	416,543	251,497	183,580	207,368
28	186,902	206,956	201,909	589,738	650,228	434,626	709,526	660,211	437,631	225,305	217,738	194,967
29	191,070		220,428	522,907	688,963	736,204	694,146	660,392	429,056	205,962	205,282	194,602
30	188,863		258,494	547,085	699,179	722,032	684,932	646,454	399,846	202,644	159,530	201,345

STATE OF IDAHO

DEPARTMENT OF WATER RESOURCES

TRANSFER OF WATER RIGHT
TRANSFER NO. 78273

SUPPORT DATA

IN FILE # 61-2072

This is to certify that: CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME, ID 83647

has requested a change to the water right(s) listed below. This change in water right(s) is authorized pursuant to the provisions of Section 42-222, Idaho Code. A summary of the changes is also listed below. The authorized change for each affected water right, including conditions of approval, is shown on the following pages of this document.

Summary of Water Rights Before the Proposed Changes

Water Right	Origin/Basis	Priority Date	Diversion Rate	Diversion Volume	Acre Limit	Total Acres	Source
61-2072	WR/DECREED	3/13/1931	2.000 cfs	N/A	N/A	N/A	GROUND WATER
61-2167	WR/DECREED	4/6/1964	1.970 cfs	628.0 af	157.0	N/A	GROUND WATER
61-2170	WR/DECREED	5/27/1964	9.640 cfs	N/A	N/A	N/A	GROUND WATER
61-2188	WR/DECREED	2/17/1966	2.660 cfs	593.7 af	133.2	260.0	GROUND WATER
61-2210	WR/DECREED	9/30/1966	5.350 cfs	1172.0 af	293.0	N/A	GROUND WATER
61-7151	WR/DECREED	4/9/1973	1.140 cfs	400.0 af	100.0	260.0	GROUND WATER
61-7172F	WR/DECREED	11/19/1973	2.810 cfs	885.3 af	N/A	221.0	GROUND WATER
61-7184	WR/DECREED	4/22/1974	4.350 cfs	N/A	N/A	N/A	GROUND WATER
61-7339	WR/DECREED	8/18/1977	4.500 cfs	N/A	N/A	N/A	GROUND WATER
61-7439	WR/LICENSE	6/10/1981	3.140 cfs	628.0 af	N/A	157.0	GROUND WATER

Purpose of Transfer (Changes Proposed)

Current Number	Split	POD	POU	Add POD	Period of Use	Nature of Use
61-2072	NO	YES	YES	YES	NO	NO
61-2167	NO	YES	YES	YES	NO	YES
61-2170	NO	YES	YES	YES	NO	NO
61-2188	NO	YES	YES	YES	NO	YES
61-2210	NO	YES	YES	YES	NO	YES
61-7151	NO	YES	YES	YES	NO	YES
61-7172F	NO	YES	YES	YES	NO	YES
61-7184	NO	YES	YES	YES	NO	NO
61-7339	NO	YES	YES	YES	NO	NO
61-7439	NO	YES	YES	YES	NO	YES

Summary Of Water Rights After the Approved Change

Existing Right	New No. (Changed Portion)	Transfer Rate	Transfer Volume	Acre Limit	Total Acres	New No. (remaining portion)	Remaining Rate	Remaining Volume	Remaining Acre Limit	Remaining Total Acres
61-2072	61-2072	2.000 cfs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
61-2167	61-2167	1.970 cfs	628.0 af	157.0	N/A	N/A	N/A	N/A	N/A	N/A
61-2170	61-2170	9.640 cfs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
61-2188	61-2188	2.660 cfs	593.7 af	133.2	N/A	N/A	N/A	N/A	N/A	N/A
61-2210	61-2210	5.350 cfs	1172.0 af	293.0	N/A	N/A	N/A	N/A	N/A	N/A

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

TRANSFER OF WATER RIGHT
TRANSFER NO. 78273

Summary Of Water Rights After the Approved Change

Existing Right	New No. (Changed Portion)	Transfer Rate	Transfer Volume	Acre Limit	Total Acres	New No. (remaining portion)	Remaining Rate	Remaining Volume	Remaining Acre Limit	Remaining Total Acres
61-7151	61-7151	1.140 cfs	400.0 af	100.0	N/A	N/A	N/A	N/A	N/A	N/A
61-7172F	61-7172F	2.810 cfs	885.3 af	221.0	N/A	N/A	N/A	N/A	N/A	N/A
61-7184	61-7184	4.350 cfs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
61-7339	61-7339	4.500 cfs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
61-7439	61-7439	3.140 cfs	628.0 af	157.0	N/A	N/A	N/A	N/A	N/A	N/A
COMBINED TOTALS		**36.420 cfs**	**N/A**	**N/A**	**N/A**		**N/A**	**N/A**	**N/A**	**N/A**

This water right(s) is subject to all prior water rights and shall be administered in accordance with Idaho law and applicable rules of the Department of Water Resources. Detailed Water Right Description(s) attached.

Dated this 22nd day of September, 2014.

John Westra

Western Regional Manager

WATER RIGHT NO. 61-7439

As Modified by Transfer No. 78273

In accordance with the approval of Transfer No. 78273, Water Right No. 61-7439 is now described as follows:

Right Holder: CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME, ID 83647

Priority Date: 6/10/1981

Source: GROUND WATER

BENEFICIAL USE	From		To	Diversion Rate	Diversion Volume
MUNICIPAL	04/01	to	10/31	3.140 cfs	628.0 af
				3.140 cfs	628.0 af

LOCATION OF POINT(S) OF DIVERSION

GROUND WATER	NWSW	Sec 13	Twp 03S	Rge 06E	ELMORE County	Well 16
GROUND WATER	SESW	Sec 13	Twp 03S	Rge 06E	ELMORE County	Well 12
GROUND WATER	SESE	Sec 22	Twp 03S	Rge 06E	ELMORE County	
GROUND WATER	NENE	Sec 23	Twp 03S	Rge 06E	ELMORE County	
GROUND WATER	NWNW	Sec 25	Twp 03S	Rge 06E	ELMORE County	Well 15
GROUND WATER	SESE	Sec 25	Twp 03S	Rge 06E	ELMORE County	
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County	Well 1
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County	Well 6
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County	Well 13
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County	
GROUND WATER	SESE	Sec 27	Twp 03S	Rge 06E	ELMORE County	
GROUND WATER	SWNE	Sec 36	Twp 03S	Rge 06E	ELMORE County	New Shop Well
GROUND WATER	NESE	Sec 19	Twp 03S	Rge 07E	ELMORE County	Well 14
GROUND WATER	SWSE	Sec 19	Twp 03S	Rge 07E	ELMORE County	
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County	
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County	
GROUND WATER	L1 (NWNW)	Sec 30	Twp 03S	Rge 07E	ELMORE County	Well 9
GROUND WATER	NWNE	Sec 13	Twp 04S	Rge 06E	ELMORE County	
GROUND WATER	NESW	Sec 13	Twp 04S	Rge 06E	ELMORE County	
GROUND WATER	L1 (NENE)	Sec 3	Twp 04S	Rge 06E	ELMORE County	

CONDITIONS OF APPROVAL

1. Place of use is within the service area of the City of Mountain Home municipal water supply system as provided for under Idaho Law.

2. A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustrative purposes.

3. The right holder shall accomplish the change authorized by this transfer within five years of the date of this approval.

4. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

Transfer No. 78273

WATER RIGHT NO. 61-7439

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

5. Municipal use is limited to municipal type irrigation of 157.0 acres within the authorized place of use in a single irrigation season.

6. Rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 when combined shall not exceed a total diversion rate of 15.93 cfs and an annual diversion volume of 4,305.7 af for the municipal type irrigation of 1,061.2 acres.

7. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 when combined shall not exceed a total diversion rate of 36.42 cfs.

8. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 4.0 afa per acre at the field headgate for municipal type irrigation within the place of use.

9. The period of use for the municipal type irrigation described in this approval may be extended to a beginning date of 3/15 and an ending date of 11/15 provided that beneficial use of the water can be shown and other elements of the right are not exceeded. The use of water before 4/1 and after 10/31 is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than date of Transfer No. 78273 approval.

10. Prior to diversion and use of water under this right, the right holder shall install a totalizing measuring device of a type approved by the department on each point of diversion to measure the volume of water diverted. The measuring devices shall be read and recorded on a weekly basis.

11. Starting January 15, 2016, and continuing every January 15 until notified by the department, the right holder shall submit a report annually to the department demonstrating that the water diverted under rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 is necessary to satisfy demands for municipal type irrigation use during the authorized period of use. The annual report shall include the maximum weekly volume diverted for all purposes during both the irrigation season and the non-irrigation season. The annual report shall also include the total volume diverted for all purposes during both the irrigation season and non-irrigation season. After specific notification by the department, the right holder shall provide to the department any data used to compile the report.

12. Every five (5) years, or more or less frequently if deemed necessary by the department, the right holder shall submit an analysis, based on a current aerial photo, of the number of acres irrigated for municipal type irrigation within the authorized place of use that are not already covered by Mountain Home Irrigation District or other surface water rights.

13. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.

14. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 are diverted through points of diversion described above.

15. This right does not grant any right-of-way or easement across the land of another.

WATER RIGHT NO. 61-7339

As Modified by Transfer No. 78273

In accordance with the approval of Transfer No. 78273, Water Right No. 61-7339 is now described as follows:

Right Holder: CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME, ID 83647

Priority Date: 8/18/1977

Source: GROUND WATER

BENEFICIAL USE	From		To	Diversion Rate
MUNICIPAL	1/01	to	12/31	4.500 cfs
				4.500 cfs

LOCATION OF POINT(S) OF DIVERSION

GROUND WATER	NWSW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 22	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NENE	Sec 23	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NWNW	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 36	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NESE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	SWSE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	L1 (NWNW)	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NWNE	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	NESW	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	L1 (NENE)	Sec 3	Twp 04S	Rge 06E	ELMORE County

CONDITIONS OF APPROVAL

1. Place of use is within the service area of the City of Mountain Home municipal water supply system as provided for under Idaho Law.
2. A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustrative purposes.
3. The right holder shall accomplish the change authorized by this transfer within five years of the date of this approval.
4. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

WATER RIGHT NO. 61-7339

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

5. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

6. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 when combined shall not exceed a total diversion rate of 36.42 cfs.

7. Prior to diversion and use of water under this right, the right holder shall install a totalizing measuring device of a type approved by the department on each point of diversion to measure the volume of water diverted. The measuring devices shall be read and recorded on a weekly basis.

8. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.

9. The diversion and use of water described in Transfer 72128, and in previous Transfer 69591 may be subject to additional limitations agreed to by the protestant(s) and the right holder under separate agreement to which the Department is not a party and which may be enforceable by a court of law.

10. All water rights within Basin 61 are from connected sources of water in the Snake River Basin and shall be administered conjunctively.

11. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 are diverted through points of diversion described above.

12. This right does not grant any right-of-way or easement across the land of another.

WATER RIGHT NO. 61-2188

As Modified by Transfer No. 78273

In accordance with the approval of Transfer No. 78273, Water Right No. 61-2188 is now described as follows:

Right Holder: JAY B BROWN
595 E 13TH N
MOUNTAIN HOME, ID 83647

Priority Date: 2/17/1966

Source: GROUND WATER

BENEFICIAL USE	From		To	Diversion Rate	Diversion Volume
MUNICIPAL	03/15	to	11/15	2.660 cfs	593.7 af
				2.660 cfs	593.7 af

LOCATION OF POINT(S) OF DIVERSION

GROUND WATER	NWSW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 22	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NENE	Sec 23	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NWNW	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 36	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NESE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	SWSE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	L1 (NWNW)	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NWNE	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	NESW	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	L1 (NENE)	Sec 3	Twp 04S	Rge 06E	ELMORE County

CONDITIONS OF APPROVAL

1. Place of use is within the service area of the City of Mountain Home municipal water supply system as provided for under Idaho Law.

2. A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustrative purposes.

3. The right holder shall accomplish the change authorized by this transfer within five years of the date of this approval.

4. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

WATER RIGHT NO. 61-2188

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

5. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

6. Municipal use is limited to municipal type irrigation of 133.2 acres within the authorized place of use in a single irrigation season.

7. Rights 61-2188 and 61-7151 when combined shall not exceed a total diversion rate of 2.66 cfs for the municipal type irrigation of 233.2 acres.

8. Rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 when combined shall not exceed a total diversion rate of 15.93 cfs and an annual diversion volume of 4,305.7 af for the municipal type irrigation of 1,061.2 acres.

9. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 when combined shall not exceed a total diversion rate of 36.42 cfs.

10. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 4.0 afa per acre at the field headgate for municipal type irrigation within the place of use.

11. Prior to diversion and use of water under this right, the right holder shall install a totalizing measuring device of a type approved by the department on each point of diversion to measure the volume of water diverted. The measuring devices shall be read and recorded on a weekly basis.

12. Starting January 15, 2016, and continuing every January 15 until notified by the department, the right holder shall submit a report annually to the department demonstrating that the water diverted under rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 is necessary to satisfy demands for municipal type irrigation use during the authorized period of use. The annual report shall include the maximum weekly volume diverted for all purposes during both the irrigation season and the non-irrigation season. The annual report shall also include the total volume diverted for all purposes during both the irrigation season and non-irrigation season. After specific notification by the department, the right holder shall provide to the department any data used to compile the report.

13. Every five (5) years, or more or less frequently if deemed necessary by the department, the right holder shall submit an analysis, based on a current aerial photo, of the number of acres irrigated for municipal type irrigation within the authorized place of use that are not already covered by Mountain Home Irrigation District or other surface water rights.

14. The diversion and use of water described in this right per Transfer 78273 is subject to additional conditions and limitations agreed to by the City of Mountain Home and Jay Brown stipulated in the "Acknowledgement and Agreement" signed 7/29/14.

15. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.

16. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 are diverted through points of diversion described above.

WATER RIGHT NO. 61-2188

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

17. This right does not grant any right-of-way or easement across the land of another.
18. All water rights within Basin 61 are from connected sources of water in the Snake River Basin and shall be administered conjunctively.

WATER RIGHT NO. 61-7151

As Modified by Transfer No. 78273

In accordance with the approval of Transfer No. 78273, Water Right No. 61-7151 is now described as follows:

Right Holder: JAY B BROWN
595 E 13TH N
MOUNTAIN HOME, ID 83647

Priority Date: 4/9/1973

Source: GROUND WATER

BENEFICIAL USE	From		To	Diversion Rate	Diversion Volume
MUNICIPAL	04/01	to	10/31	1.140 cfs	400.0 af
				1.140 cfs	400.0 af

LOCATION OF POINT(S) OF DIVERSION

GROUND WATER	NWSW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 22	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NENE	Sec 23	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NWNW	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 36	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NESE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	SWSE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	L1 (NWNW)	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NWNE	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	NESW	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	L1 (NENE)	Sec 3	Twp 04S	Rge 06E	ELMORE County

CONDITIONS OF APPROVAL

1. Place of use is within the service area of the City of Mountain Home municipal water supply system as provided for under Idaho Law.

2. A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustrative purposes.

3. The right holder shall accomplish the change authorized by this transfer within five years of the date of this approval.

4. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

WATER RIGHT NO. 61-7151

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

5. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

6. Municipal use is limited to municipal type irrigation of 100.0 acres within the authorized place of use in a single irrigation season.

7. Rights 61-2188 and 61-7151 when combined shall not exceed a total diversion rate of 2.66 cfs for the municipal type irrigation of 233.2 acres.

8. Rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 when combined shall not exceed a total diversion rate of 15.93 cfs and an annual diversion volume of 4,305.7 af for the municipal type irrigation of 1,061.2 acres.

9. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 when combined shall not exceed a total diversion rate of 36.42 cfs.

10. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 4.0 afa per acre at the field headgate for municipal type irrigation within the place of use.

11. The period of use for the municipal type irrigation described in this approval may be extended to a beginning date of 3/15 and an ending date of 11/15 provided that beneficial use of the water can be shown and other elements of the right are not exceeded. The use of water before 4/1 and after 10/31 is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than 10/26/2000.

12. Prior to diversion and use of water under this right, the right holder shall install a totalizing measuring device of a type approved by the department on each point of diversion to measure the volume of water diverted. The measuring devices shall be read and recorded on a weekly basis.

13. Starting January 15, 2016, and continuing every January 15 until notified by the department, the right holder shall submit a report annually to the department demonstrating that the water diverted under rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 is necessary to satisfy demands for municipal type irrigation use during the authorized period of use. The annual report shall include the maximum weekly volume diverted for all purposes during both the irrigation season and the non-irrigation season. The annual report shall also include the total volume diverted for all purposes during both the irrigation season and non-irrigation season. After specific notification by the department, the right holder shall provide to the department any data used to compile the report.

14. Every five (5) years, or more or less frequently if deemed necessary by the department, the right holder shall submit an analysis, based on a current aerial photo, of the number of acres irrigated for municipal type irrigation within the authorized place of use that are not already covered by Mountain Home Irrigation District or other surface water rights.

15. The diversion and use of water described in this right per Transfer 78273 is subject to additional conditions and limitations agreed to by the City of Mountain Home and Jay Brown stipulated in the "Acknowledgement and Agreement" signed 7/29/14.

WATER RIGHT NO. 61-7151

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

16. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.

17. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 are diverted through points of diversion described above.

18. This right does not grant any right-of-way or easement across the land of another.

19. All water rights within Basin 61 are from connected sources of water in the Snake River Basin and shall be administered conjunctively.

WATER RIGHT NO. 61-2167

As Modified by Transfer No. 78273

In accordance with the approval of Transfer No. 78273, Water Right No. 61-2167 is now described as follows:

Right Holder: CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME, ID 83647

Priority Date: 4/6/1964

Source: GROUND WATER

BENEFICIAL USE	From		To	Diversion Rate	Diversion Volume
MUNICIPAL	04/01	to	11/01	1.970 cfs	628.0 af
				1.970 cfs	628.0 af

LOCATION OF POINT(S) OF DIVERSION

GROUND WATER	NWSW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 22	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NENE	Sec 23	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NWNW	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 36	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NESE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	SWSE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	L1 (NWNW)	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NWNE	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	NESW	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	L1 (NENE)	Sec 3	Twp 04S	Rge 06E	ELMORE County

CONDITIONS OF APPROVAL

1. Place of use is within the service area of the City of Mountain Home municipal water supply system as provided for under Idaho Law.

2. A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustrative purposes.

3. The right holder shall accomplish the change authorized by this transfer within five years of the date of this approval.

4. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

WATER RIGHT NO. 61-2167

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

5. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

6. Municipal use is limited to municipal type irrigation of 157.0 acres within the authorized place of use in a single irrigation season.

7. Rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 when combined shall not exceed a total diversion rate of 15.93 cfs and an annual diversion volume of 4,305.7 af for the municipal type irrigation of 1,061.2 acres.

8. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 when combined shall not exceed a total diversion rate of 36.42 cfs.

9. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 4.0 afa per acre at the field headgate for municipal type irrigation within the place of use.

10. The period of use for the municipal type irrigation described in this approval may be extended to a beginning date of 3/15 and an ending date of 11/15 provided that beneficial use of the water can be shown and other elements of the right are not exceeded. The use of water before 4/1 and after 10/31 is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than 10/26/2000.

11. Prior to diversion and use of water under this right, the right holder shall install a totalizing measuring device of a type approved by the department on each point of diversion to measure the volume of water diverted. The measuring devices shall be read and recorded on a weekly basis.

12. Starting January 15, 2016, and continuing every January 15 until notified by the department, the right holder shall submit a report annually to the department demonstrating that the water diverted under rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 is necessary to satisfy demands for municipal type irrigation use during the authorized period of use. The annual report shall include the maximum weekly volume diverted for all purposes during both the irrigation season and the non-irrigation season. The annual report shall also include the total volume diverted for all purposes during both the irrigation season and non-irrigation season. After specific notification by the department, the right holder shall provide to the department any data used to compile the report.

13. Every five (5) years, or more or less frequently if deemed necessary by the department, the right holder shall submit an analysis, based on a current aerial photo, of the number of acres irrigated for municipal type irrigation within the authorized place of use that are not already covered by Mountain Home Irrigation District or other surface water rights.

14. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.

15. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 are diverted through points of diversion described above.

16. This right does not grant any right-of-way or easement across the land of another.

WATER RIGHT NO. 61-2167

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

17. The diversion and use of water described in Transfer 72128 may be subject to additional limitations agreed to by the protestant(s) and the right holder under separate agreement to which the Department is not a party and which may be enforceable by a court of law.

18. Any diversions of water under this right shall not be allowed if irrigation within the authorized place of use is curtailed or ceases for any reason.

19. All water rights within Basin 61 are from connected sources of water in the Snake River Basin and shall be administered conjunctively.

WATER RIGHT NO. 61-2210

As Modified by Transfer No. 78273

In accordance with the approval of Transfer No. 78273, Water Right No. 61-2210 is now described as follows:

Right Holder: CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME, ID 83647

Priority Date: 9/30/1966

Source: GROUND WATER

BENEFICIAL USE	From		To	Diversion Rate	Diversion Volume
MUNICIPAL	04/01	to	11/01	5.350 cfs	1172.0 af
				5.350 cfs	1172.0 af

LOCATION OF POINT(S) OF DIVERSION

GROUND WATER	NWSW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 22	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NENE	Sec 23	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NWNW	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 36	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NESE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	SWSE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	L1 (NWNW)	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NWNE	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	NESW	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	L1 (NENE)	Sec 3	Twp 04S	Rge 06E	ELMORE County

CONDITIONS OF APPROVAL

1. Place of use is within the service area of the City of Mountain Home municipal water supply system as provided for under Idaho Law.
2. A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustrative purposes.
3. The right holder shall accomplish the change authorized by this transfer within five years of the date of this approval.
4. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

WATER RIGHT NO. 61-2210

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

5. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

6. Municipal use is limited to municipal type irrigation of 293.0 acres within the authorized place of use in a single irrigation season.

7. Rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 when combined shall not exceed a total diversion rate of 15.93 cfs and an annual diversion volume of 4,305.7 af for the municipal type irrigation of 1,061.2 acres.

8. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 when combined shall not exceed a total diversion rate of 36.42 cfs.

9. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 4.0 afa per acre at the field headgate for municipal type irrigation within the place of use.

10. The period of use for the municipal type irrigation described in this approval may be extended to a beginning date of 3/15 and an ending date of 11/15 provided that beneficial use of the water can be shown and other elements of the right are not exceeded. The use of water before 4/1 and after 10/31 is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than 10/26/2000.

11. Prior to diversion and use of water under this right, the right holder shall install a totalizing measuring device of a type approved by the department on each point of diversion to measure the volume of water diverted. The measuring devices shall be read and recorded on a weekly basis.

12. Starting January 15, 2016, and continuing every January 15 until notified by the department, the right holder shall submit a report annually to the department demonstrating that the water diverted under rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 is necessary to satisfy demands for municipal type irrigation use during the authorized period of use. The annual report shall include the maximum weekly volume diverted for all purposes during both the irrigation season and the non-irrigation season. The annual report shall also include the total volume diverted for all purposes during both the irrigation season and non-irrigation season. After specific notification by the department, the right holder shall provide to the department any data used to compile the report.

13. Every five (5) years, or more or less frequently if deemed necessary by the department, the right holder shall submit an analysis, based on a current aerial photo, of the number of acres irrigated for municipal type irrigation within the authorized place of use that are not already covered by Mountain Home Irrigation District or other surface water rights.

14. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.

15. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 are diverted through points of diversion described above.

16. This right does not grant any right-of-way or easement across the land of another.

WATER RIGHT NO. 61-2210

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

17. The diversion and use of water described in Transfer 72128 may be subject to additional limitations agreed to by the protestant(s) and the right holder under separate agreement to which the Department is not a party and which may be enforceable by a court of law.

18. All water rights within Basin 61 are from connected sources of water in the Snake River Basin and shall be administered conjunctively.

19. Any diversions of water under this right shall not be allowed if irrigation within the authorized place of use is curtailed or ceases for any reason.

WATER RIGHT NO. 61-7172F

As Modified by Transfer No. 78273

In accordance with the approval of Transfer No. 78273, Water Right No. 61-7172F is now described as follows:

Right Holder: CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME, ID 83647

Priority Date: 11/19/1973

Source: GROUND WATER

BENEFICIAL USE	From		To	Diversion Rate	Diversion Volume
MUNICIPAL	03/15	to	10/15	2.810 cfs	885.3 af
				2.810 cfs	885.3 af

LOCATION OF POINT(S) OF DIVERSION

GROUND WATER	NWSW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 22	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NENE	Sec 23	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NWNW	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 36	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NESE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	SWSE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	L1 (NWNW)	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NWNE	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	NESW	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	L1 (NENE)	Sec 3	Twp 04S	Rge 06E	ELMORE County

PLACE OF USE: MUNICIPAL

			NE				NW				SW				SE				
Twp	Rng	Sec	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	Totals
03S	06E	22																X	
03S	06E	23	X		X	X			X	X	X	X	X	X	X	X	X	X	
03S	06E	24	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	
03S	06E	25	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
03S	06E	26	X	X	X	X	X	X						X	X	X	X	X	
03S	06E	35	X	X	X	X				X					X	X			
03S	06E	36	X	X	X		X	X	X	X		X							
03S	07E	19			X	X							X	X	X	X	X	X	
													L 4						
03S	07E	30		X	X		X	X	X	X	X	X	X						
								L 1	L 2			L 3	L 4						

Transfer No. 78273

WATER RIGHT NO. 61-7172F

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

1. Place of use is within the service area of the City of Mountain Home municipal water supply system as provided for under Idaho Law.

2. A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustrative purposes.

3. The right holder shall accomplish the change authorized by this transfer within five years of the date of this approval.

4. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

5. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

6. Municipal use is limited to municipal type irrigation of 221.0 acres within the authorized place of use in a single irrigation season.

7. Rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 when combined shall not exceed a total diversion rate of 15.93 cfs and an annual diversion volume of 4,305.7 af for the municipal type irrigation of 1,061.2 acres.

8. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 when combined shall not exceed a total diversion rate of 36.42 cfs.

9. This right when combined with all other rights shall provide no more than 0.02 cfs per acre nor more than 4.0 afa per acre at the field headgate for municipal type irrigation within the place of use.

10. The period of use for the municipal type irrigation described in this approval may be extended to an ending date of 11/15 provided that beneficial use of the water can be shown and other elements of the right are not exceeded. The use of water after 10/31 is subordinate to all water rights having no subordinated early or late irrigation use and a priority date earlier than 7/7/2000.

11. Prior to diversion and use of water under this right, the right holder shall install a totalizing measuring device of a type approved by the department on each point of diversion to measure the volume of water diverted. The measuring devices shall be read and recorded on a weekly basis.

12. Starting January 15, 2016, and continuing every January 15 until notified by the department, the right holder shall submit a report annually to the department demonstrating that the water diverted under rights 61-2167, 61-2188, 61-2210, 61-7151, 61-7172F, and 61-7439 is necessary to satisfy demands for municipal type irrigation use during the authorized period of use. The annual report shall include the maximum weekly volume diverted for all purposes during both the irrigation season and the non-irrigation season. The annual report shall also include the total volume diverted for all purposes during both the irrigation season and non-irrigation season. After specific notification by the department, the right holder shall provide to the department any data used to compile the report.

WATER RIGHT NO. 61-7172F

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

13. Every five (5) years, or more or less frequently if deemed necessary by the department, the right holder shall submit an analysis, based on a current aerial photo, of the number of acres irrigated for municipal type irrigation within the authorized place of use that are not already covered by Mountain Home Irrigation District or other surface water rights.

14. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.

15. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 are diverted through points of diversion described above.

16. This right does not grant any right-of-way or easement across the land of another.

WATER RIGHT NO. 61-2072

As Modified by Transfer No. 78273

In accordance with the approval of Transfer No. 78273, Water Right No. 61-2072 is now described as follows:

Right Holder: CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME, ID 83647

Priority Date: 3/13/1931

Source: GROUND WATER

BENEFICIAL USE	From		To	Diversion Rate
MUNICIPAL	01/01	to	12/31	2.000 cfs
				2.000 cfs

LOCATION OF POINT(S) OF DIVERSION

GROUND WATER	NWSW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 22	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NENE	Sec 23	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NWNW	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 36	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NESE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	SWSE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	L1 (NWNW)	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NWNE	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	NESW	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	L1 (NENE)	Sec 3	Twp 04S	Rge 06E	ELMORE County

CONDITIONS OF APPROVAL

1. Place of use is within the service area of the City of Mountain Home municipal water supply system as provided for under Idaho Law.
2. A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustrative purposes.
3. The right holder shall accomplish the change authorized by this transfer within five years of the date of this approval.
4. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

WATER RIGHT NO. 61-2072

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

5. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

6. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 when combined shall not exceed a total diversion rate of 36.42 cfs.

7. Prior to diversion and use of water under this right, the right holder shall install a totalizing measuring device of a type approved by the department on each point of diversion to measure the volume of water diverted. The measuring devices shall be read and recorded on a weekly basis.

8. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.

9. The diversion and use of water described in Transfer 72128, and in previous Transfer 69591 may be subject to additional limitations agreed to by the protestant(s) and the right holder under separate agreement to which the Department is not a party and which may be enforceable by a court of law.

10. All water rights within Basin 61 are from connected sources of water in the Snake River Basin and shall be administered conjunctively.

11. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 are diverted through points of diversion described above.

12. This right does not grant any right-of-way or easement across the land of another.

WATER RIGHT NO. 61-2170

As Modified by Transfer No. 78273

In accordance with the approval of Transfer No. 78273, Water Right No. 61-2170 is now described as follows:

Right Holder: CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME, ID 83647

Priority Date: 5/27/1964

Source: GROUND WATER

BENEFICIAL USE	From		To	Diversion Rate
MUNICIPAL	1/01	to	12/31	9.640 cfs
				9.640 cfs

LOCATION OF POINT(S) OF DIVERSION

GROUND WATER	NWSW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 22	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NENE	Sec 23	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NWNW	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 36	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NESE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	SWSE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	L1 (NWNW)	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NWNE	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	NESW	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	L1 (NENE)	Sec 3	Twp 04S	Rge 06E	ELMORE County

CONDITIONS OF APPROVAL

1. Place of use is within the service area of the City of Mountain Home municipal water supply system as provided for under Idaho Law.
2. A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustrative purposes.
3. The right holder shall accomplish the change authorized by this transfer within five years of the date of this approval.
4. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

WATER RIGHT NO. 61-2170

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

5. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

6. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 when combined shall not exceed a total diversion rate of 36.42 cfs.

7. Prior to diversion and use of water under this right, the right holder shall install a totalizing measuring device of a type approved by the department on each point of diversion to measure the volume of water diverted. The measuring devices shall be read and recorded on a weekly basis.

8. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.

9. The diversion and use of water described in Transfer 72128, and in previous Transfer 69591 may be subject to additional limitations agreed to by the protestant(s) and the right holder under separate agreement to which the Department is not a party and which may be enforceable by a court of law.

10. All water rights within Basin 61 are from connected sources of water in the Snake River Basin and shall be administered conjunctively.

11. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 are diverted through points of diversion described above.

12. This right does not grant any right-of-way or easement across the land of another.

WATER RIGHT NO. 61-7184

As Modified by Transfer No. 78273

In accordance with the approval of Transfer No. 78273, Water Right No. 61-7184 is now described as follows:

Right Holder: CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME, ID 83647

Priority Date: 4/22/1974

Source: GROUND WATER

BENEFICIAL USE	From		To	Diversion Rate
MUNICIPAL	1/01	to	12/31	4.350 cfs
				4.350 cfs

LOCATION OF POINT(S) OF DIVERSION

GROUND WATER	NWSW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESW	Sec 13	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 22	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NENE	Sec 23	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NWNW	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 25	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SENE	Sec 26	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SESE	Sec 27	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	SWNE	Sec 36	Twp 03S	Rge 06E	ELMORE County
GROUND WATER	NESE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	SWSE	Sec 19	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NENW	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	L1 (NWNW)	Sec 30	Twp 03S	Rge 07E	ELMORE County
GROUND WATER	NWNE	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	NESW	Sec 13	Twp 04S	Rge 06E	ELMORE County
GROUND WATER	L1 (NENE)	Sec 3	Twp 04S	Rge 06E	ELMORE County

CONDITIONS OF APPROVAL

1. Place of use is within the service area of the City of Mountain Home municipal water supply system as provided for under Idaho Law.

2. A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustrative purposes.

3. The right holder shall accomplish the change authorized by this transfer within five years of the date of this approval.

4. Failure of the right holder to comply with the conditions of this transfer is cause for the Director to rescind approval of the transfer.

Transfer No. 78273

WATER RIGHT NO. 61-7184

As Modified by Transfer No. 78273

CONDITIONS OF APPROVAL

5. Pursuant to Section 42-1412(6), Idaho Code, this water right is subject to such general provisions necessary for the definition of the rights or for the efficient administration of water rights as may be determined by the Snake River Basin Adjudication court at a point in time no later than the entry of the final unified decree.

6. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 when combined shall not exceed a total diversion rate of 36.42 cfs.

7. Prior to diversion and use of water under this right, the right holder shall install a totalizing measuring device of a type approved by the department on each point of diversion to measure the volume of water diverted. The measuring devices shall be read and recorded on a weekly basis.

8. Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code and applicable Well Construction Rules of the Department.

9. The diversion and use of water described in Transfer 72128, and in previous Transfer 69591 may be subject to additional limitations agreed to by the protestant(s) and the right holder under separate agreement to which the Department is not a party and which may be enforceable by a court of law.

10. All water rights within Basin 61 are from connected sources of water in the Snake River Basin and shall be administered conjunctively.

11. Rights 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339, and 61-7439 are diverted through points of diversion described above.

12. This right does not grant any right-of-way or easement across the land of another.

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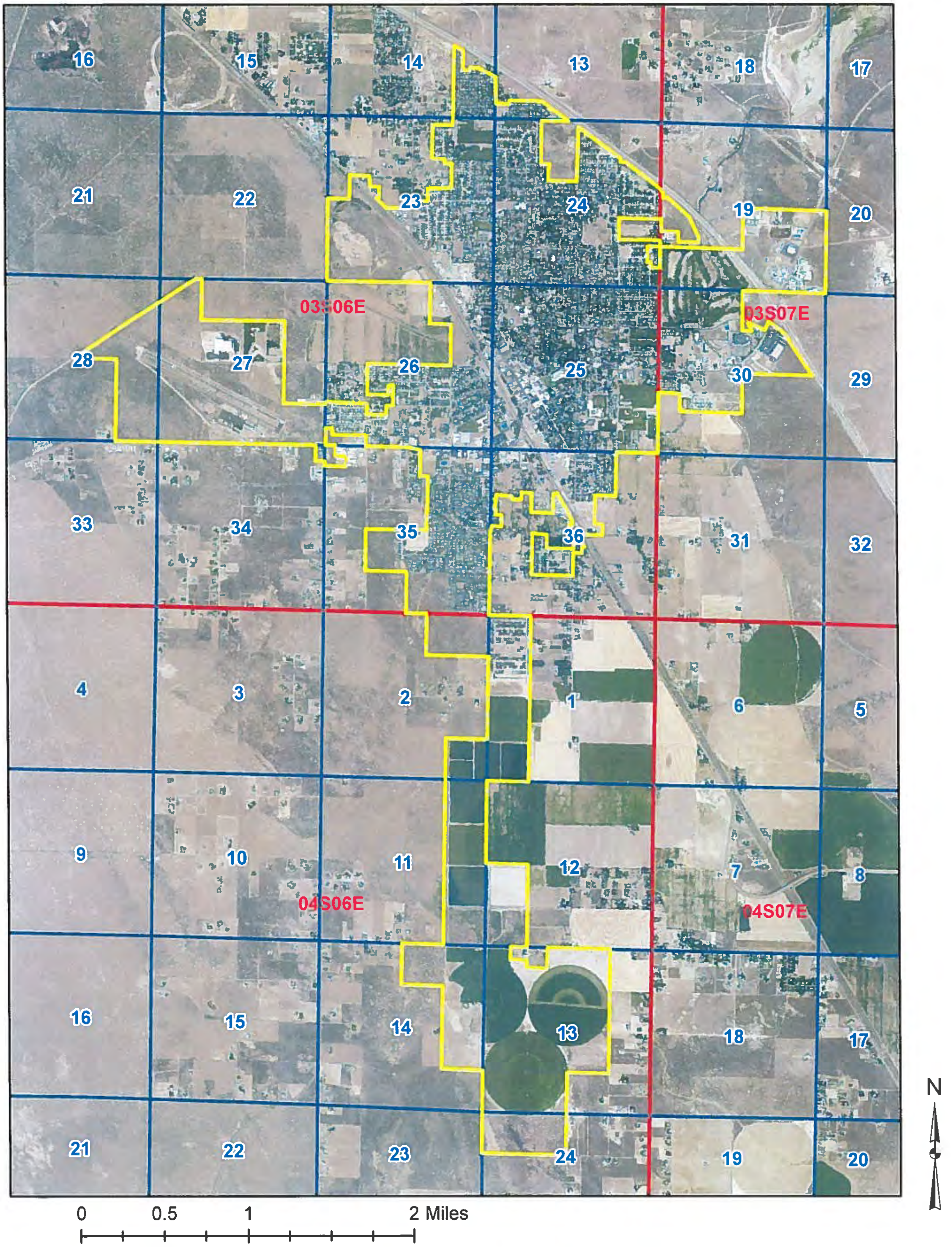
City of Mountain Home Municipal Service Area Transfer 78273



State of Idaho
DEPARTMENT OF WATER RESOURCES
Western Region, 2735 Airport Way • Boise, Idaho 83705-5082
Phone: (208) 334-2190 • Fax: (208) 334-2348 • Web Site: www.idwr.idaho.gov

C. L. "BUTCH" OTTER
Governor
GARY SPACKMAN
Director

September 22, 2014

CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME ID 83647

Re: Transfer No. 78273
Water Right No's: 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F, 61-7184, 61-7339 & 61-7439.

Transfer Approval Notice

Dear Water Right Holders:

The Department of Water Resources has issued the enclosed approved Transfer of Water Right(s). Please be sure to thoroughly review the conditions of approval and remarks listed on the approval document.

The Transfer of Water Right(s) is a PRELIMINARY ORDER issued by the Department pursuant to section 67-5243, Idaho Code. It can and will become a final order without further action by the Department unless the APPLICANT petitions for reconsideration or files an exception and/or brief within fourteen (14) days of the service date as described in the enclosed information sheet.

ANY PERSON aggrieved by any decision, determination, order or action of the Department and who has not previously been afforded an opportunity for a hearing on the matter may request a hearing pursuant to section 42-1701A(3), Idaho Code. A written petition contesting the action of the Department and requesting a hearing shall be filed within fifteen (15) days after receipt of the denial or conditional approval.

If the transfer approval includes a condition requiring measuring and recording devices, such devices shall comply with specifications established by the Department Detailed specifications are available on the Department's home page on the Internet, or you can request a copy by contacting any office of the Department. Please be sure to thoroughly review the specifications to avoid unnecessary costs for reinstallation or modification due to non-conforming or improperly installed devices.

Please note that water right owners are required to report any change of water right ownership and/or mailing address to the Department within 120 days of the change. Failure to report these changes could result in a $100 late filing fee. Contact any office of the Department or visit the Department's homepage on the Internet to obtain the proper forms and instructions.

If you have any questions, please contact me at (208)334-2190.

Sincerely,

Rachel Sommer

Rachel Sommer
Administrative Assistant

Enclosures

CERTIFICATE OF SERVICE

I hereby certify that on September 22, 2014 I mailed a true and correct copy, postage prepaid, of the foregoing TRANSFER APPROVAL to the person(s) listed below:

Re: **Transfer No. 78273**
Water Right No's: 61-2072, 61-2167, 61-2170, 61-2188, 61-2210, 61-7151, 61-7172F , 61-7184, 61-7339 & 61-7439.

CITY OF MOUNTAIN HOME
PO BOX 10
MOUNTAIN HOME ID 83647

JAMES CARRIE
PO BOX 624
MOUNTAIN HOME ID 83647

BROCKWAY ENGINEERING PLLC
C/O CHARLES G BROCKWAY
2016 N WASHINGTON ST STE 4
TWIN FALLS ID 83301

Rachel Sommer

Rachel Sommer
Administrative Assistant

EXPLANATORY INFORMATION TO ACCOMPANY A PRELIMINARY ORDER

(To be used in connection with actions when a hearing was **not** held)

(Required by Rule of Procedure 730.02)

The accompanying order or approved document is a "**Preliminary Order**" issued by the department pursuant to section 67-5243, Idaho Code. **It can and will become a final order without further action of the Department of Water Resources ("department") unless a party petitions for reconsideration, files an exception and brief, or requests a hearing as further described below:**

PETITION FOR RECONSIDERATION

Any party may file a petition for reconsideration of a preliminary order with the department within fourteen (14) days of the service date of this order. **Note: the petition must be received by the department within this fourteen (14) day period.** The department will act on a petition for reconsideration within twenty-one (21) days of its receipt, or the petition will be considered denied by operation of law. See Section 67-5243(3) Idaho Code.

EXCEPTIONS AND BRIEFS

Within fourteen (14) days after: (a) the service date of a preliminary order, (b) the service date of a denial of a petition for reconsideration from this preliminary order, or (c) the failure within twenty-one (21) days to grant or deny a petition for reconsideration from this preliminary order, any party may in writing support or take exceptions to any part of a preliminary order and may file briefs in support of the party's position on any issue in the proceeding with the Director. Otherwise, this preliminary order will become a final order of the agency.

REQUEST FOR HEARING

Unless a right to a hearing before the Department or the Water Resource Board is otherwise provided by statute, any person aggrieved by any final decision, determination, order or action of the Director of the Department and who has not previously been afforded an opportunity for a hearing on the matter may request a hearing pursuant to section 42-1701A(3), Idaho Code. A written petition contesting the action of the Director and requesting a hearing shall be filed within fifteen (15) days after receipt of the denial or conditional approval.

ORAL ARGUMENT

If the Director grants a petition to review the preliminary order, the Director shall allow all parties an opportunity to file briefs in support of or taking exceptions to the preliminary order and may schedule oral argument in the matter before issuing a final order. If oral arguments are to be heard, the Director will within a reasonable time period notify each party of the place, date and hour for the argument of the case. Unless the Director orders otherwise, all oral arguments will be heard in Boise, Idaho.

CERTIFICATE OF SERVICE

All exceptions, briefs, requests for oral argument and any other matters filed with the Director in connection with the preliminary order shall be served on all other parties to the proceedings in accordance with IDAPA Rules 37.01.01302 and 37.01.01303 (Rules of Procedure 302 and 303).

FINAL ORDER

The Director will issue a final order within fifty-six (56) days of receipt of the written briefs, oral argument or response to briefs, whichever is later, unless waived by the parties or for good cause shown. The Director may remand the matter for further evidentiary hearings if further factual development of the record is necessary before issuing a final order. The department will serve a copy of the final order on all parties of record.

Section 67-5246(5), Idaho Code, provides as follows:

> Unless a different date is stated in a final order, the order is effective fourteen (14) days after its service date if a party has not filed a petition for reconsideration. If a party has filed a petition for reconsideration with the agency head, the final order becomes effective when:
>
> (a) The petition for reconsideration is disposed of; or
> (b) The petition is deemed denied because the agency head did not dispose of the petition within twenty-one (21) days.

APPEAL OF FINAL ORDER TO DISTRICT COURT

Pursuant to sections 67-5270 and 67-5272, Idaho Code, if this preliminary order becomes final, any party aggrieved by the final order or orders previously issued in this case may appeal the final order and all previously issued orders in this case to district court by filing a petition in the district court of the county in which:

i. A hearing was held,
ii. The final agency action was taken,
iii. The party seeking review of the order resides, or
iv. The real property or personal property that was the subject of the agency action is located.

The appeal must be filed within twenty-eight (28) days of this preliminary order becoming final. See section 67-5273, Idaho Code. The filing of an appeal to district court does not itself stay the effectiveness or enforcement of the order under appeal.

MEMORANDUM

TO: Transfer No. 78273 File

FROM: Angie Grimm

DATE: September 5, 2014

RE: Final Review

This memo summarizes the final review items addressed after the Evaluation of Sufficiency of Information Submitted memo was written (June 2, 2014).

Water Supply Bank Portions of Rights 61-2188 and 61-7151: The City of Mountain Home (City) submitted a purchase and sales agreement for rights 61-2188 and 61-7151 proposed for transfer. The City is only purchasing the undisputed portions of Mr. Jay Brown's rights (currently numbered 61-2188 and 61-7151) NOT the disputed portions (currently numbered 61-12272 & 61-12273). Water Supply Bank (WSB) information on file for these rights indicates Mr. Jay Brown is currently using a 106.0 acre portion of rights 61-2188 and 61-7151 for irrigation while the remaining 127.2 ac portion of the rights is subject to a WSB rental agreement until 2016. The City and Mr. Jay Brown signed an "Acknowledgement and Agreement" stating the City will only use the 106.0 acre portion of rights 61-2188 and 61-7151 currently not leased into the bank through the 2016 irrigation season provided the WSB rental agreement currently in place is renewed. If the WSB rental agreement is not renewed, the leased portions of these rights will be removed from the bank and become available for the City's use. A condition was placed on Transfer No. 78273 approval for rights 61-2188 and 61-7151 referencing the WSB "Acknowledgement and Agreement".

Use of Portions of Rights 61-2188 and 61-7151: Per WSB documentation, Mr. Jay Brown is still using the un-leased 106.0 acre portion of rights 61-2188 and 61-7151 for irrigation. Once Transfer No. 78273 is approved, the place of use authorized for these rights will change. However, the City's purchase of the rights will not be finalized until the last payment is submitted to Mr. Brown, likely after the irrigation season has concluded per City staff. Therefore, the place of use change for the rights will not be accomplished until ownership of the rights has changed after Mr. Brown has ceased irrigation for the year.

Large POU Shape Provided By Applicant: During final review of the application a few discrepancies were found between the 40 ac-tracts listed on the transfer form versus those shown on the newest map received 5/27/2014. I requested a shapefile from the applicant's consultant (received via email 8/28/14) to verify the service area is recorded as the applicant desires. That shapefile has been used to create the large place of use (POU) shape and corresponding public land survey (PLS) land list in the workflow database.

MEMORANDUM

TO: Transfer No. 78273 File

FROM: Angie Grimm

DATE: March 7, 2014 Amended June 2, 2014

RE: Evaluation of Sufficiency of Information Submitted

The transfer proposes to: change the nature of use for irrigation rights 61-2188, 61-7151, 61-7439, 61-7172F, 61-2167, and 61-2210 to municipal type irrigation use; change/add points of diversion (P/Ds) authorizing up to 20 wells for rights 61-2188, 61-7151, 61-7439, 61-7172F, 67-2167, 61-2210, 61-2072, 61-2170, 61-7184, and 61-7339; and change/update the place of use (P/U) for all the same rights to a municipal service area large place of use of the City of Mountain Home (City).

The site is generally located within and around the current city limits of the City of Mountain Home approximately 45 miles southeast of Boise.

Contact person for the applicant is Chuck G. Brockway of Brockway Engineering, PLLC.

Deviations from Transfer Policy Standards

This application proposes to change the nature of use of several rights from irrigation to municipal and add the rights to the City's municipal service area. Historically, the Department required the applicant submit historic consumptive use information for irrigation right(s) and based the quantity to be changed to the new use on that data, limiting the new use volume to the historic irrigation consumptive volume. Contrarily, this transfer proposes to maintain the historic diversion volume for these rights contingent that the municipal use under these rights be used for municipal type irrigation. The rights with this type of nature of use change will maintain their current irrigation limits (number of acres, season of use, diversion volume), while benefiting from the flexibility of a place of use within the City's municipal service area. This type of nature of use change was approved in a previous transfer (City of Coeur d' Alene Transfer no. 75824 for water right 95-2164) and is approvable in this instance per discussions with State Office allocation staff.

Additionally, the nature of use for minimal stockwater use authorized via right 61-7172F was changed to municipal use without requiring the applicant to provide historic consumptive use as discussed above. The 1.3 af to be changed is too minimal to justify requiring historic consumptive data submittal for the nature of use change. The 1.3 af diversion volume was included with the diversion volume converted from irrigation in the total volume recommended for municipal use via this transfer. To avoid enlargement, use under right 61-7172F for municipal type irrigation was limited to a volume of 884.0 af per irrigation season alone and when used in combination with all the other former irrigation rights within the transfer to a total volume of 4305.7 af per conditions in the draft approval.

Summary of Information Submitted

Authority to File: The applicant is the current owner of record for rights 61-2167, 61-2210, 61-2072, 61-2170, 61-7184, 61-7339, 61-7439 and 61-7172F proposed for transfer. As owner, the applicant has authority to change these rights.

Rights 61-2188 and 61-7151 are currently owned by Jay B. Brown. An Agreement for Sale of Water Rights (submitted with transfer application) between the applicant and Brown states rights purchased after transfer approval. The agreement indicates applicant is authorized to file transfer application. The applicant also holds a security interest for these rights.

The applicant proposes up to nine (9) new P/Ds for the City's municipal system. Of these nine P/Ds, two are existing wells on land owned by the City. The other seven proposed P/Ds are wells not yet constructed. Of those seven proposed P/D sites, all the land is owned by the City except two of the sites. Letters from Mountain Home School District 193 and Victor and Albert Hofer were submitted with the amended application granting access to the City for the "6th S. & 18th E" POD (SE SE Sec 25 3S 6E) and "Smith Rd & Bruneau Hwy" POD [Gov't Lot 1(NE NE) Sec 3 T4S R6E] respectively.

Water Right Validity: Rights presumed to be valid. Rights 61-2072, 61-2170, 61-7184, and 61-7339, decreed in 2001, are municipal use rights within the service area of an active municipality considered valid provided no evidence to the contrary. Approximately 127.2 acres worth of rights 61-2188 and 61-7151 (Brown rights), decreed in 2000, are currently in the water supply bank for an indefinite term and therefore protected from forfeiture per I.C. § 42-223(5). Recent beneficial use of the remaining 106 acres worth of the Brown rights was confirmed via 2013 aerial imagery. Rights 61-7439 and 61-7172F (Farm rights), decreed in 2000, place of use is irrigated primarily via land application of city effluent and supplemented by diversion of some ground water under the Farm rights. These rights are protected from forfeiture and/or partial forfeiture per I.C. § 42-223(3). Land application of city effluent has been occurring on this place of use land since 1989, per conversation with IDEQ staff.

Injury to Other Water Rights: Injury should not occur under this proposal provided use of new City wells and/or increased use of existing City wells does not interfere with nearby existing wells. As ground water rights, use of the P/Ds is subject to reasonable pumping level provisions of I. C. § 42-226. The current and proposed P/Ds are completed within the regional aquifer of the Mountain Home GWMA. Applicant provided drawdown estimate information, based on ground water flow modeling, indicating less than two feet of drawdown around the perimeter of the City and/or the immediate vicinity around the City's southernmost wells should the transfer authorize pumping of the Brown rights from City's wells. Considering the applicant is not proposing to increase diversion beyond authorized limits, it is unlikely authorization of this transfer will significantly impact the ground water supply for other water rights in this area.

Enlargement of Use: The diversion rate, annual diversion volume, and number of acres irrigated will not increase as a result of this transfer. Applicant proposes to change the irrigation rights to municipal use, but limit use of these rights to municipal type irrigation within the municipal service area in order to retain the diversion volume (similar to City of Coeur d' Alene Transfer No. 75824 for right 95-2164). The municipal type irrigation rights will have conditions limiting the number of acres and reporting requirements to demonstrate municipal irrigation within the service area in the future to ensure no enlargement occurs and that the rights are being used for municipal type irrigation only. Also, these rights will be limited to the historic season of use (irrigation season) as opposed to year round use typical of municipal rights.

Local Public Interest: Allowing the applicant to change their rights to municipal (municipal type irrigation) use within a service area and add P/D locations allows for flexibility in the City's planning for current water needs, which serves the local public interest. The transfer application will be subject to public notice and protest allowing for identification of other potential public interest issues.

Beneficial Use/Conservation of Water Resources: The application proposes beneficial use consistent with conservation of water resources in Idaho.

Review of the application finds there is no clear inconsistency with criteria of I. C. § 42-222 preventing processing of the application.

Discussion

Data entry will affect the water records for the rights proposed for transfer. All rights within this transfer were decreed in the SRBA, except 61-7439 which was licensed 11/25/92. The decree records were migrated to water right records prior to processing of this transfer.

The transfer proposes to: change the nature of use for rights 61-2188, 61-7151, 61-2167, 61-2210, 61-7439, and 61-7172F, update the City's municipal service area, and change/add at total of 20 P/Ds for all City's water rights to create a combined system.

Rights 61-12272 and 61-12273 are portions of the Brown rights (61-2188 and 61-7151), which currently have the same P/D. These rights will be a separate system once transfer is processed. Therefore, these rights do not need to be included in this transfer process. There are other privately owned P/Ds within the legal description of City's current and proposed P/Ds. Likely these P/Ds are wells that are not part of the City's municipal system, i.e. are not overlapping P/Ds. All of the City's rights within the current service area are included in this transfer process. The transfer proposes to add four more rights to and expand the large P/U boundary. P/U overlap analysis is not applicable for large P/U transfer processing. There are no other overlapping rights for the existing P/Ds, proposed P/Ds, existing P/Us, or proposed large P/U.

The transfer proposes a total of 20 points of diversion. Per information submitted with the amended transfer application, of these 20 P/Ds, the city actively uses eight wells ("Well 12", "Well 15", "Well 1", "Well 6", "Well13", "Well 11", "Well 14", and "Well 9") for their municipal system and two different wells ("South Farm Well" and "North Farm Well") to supplement municipal effluent irrigation of agriculture fields south of the city. Another two wells ("Well 4" and "Well 5") are currently authorized P/Ds for the municipal system, but are not actively used. The remaining eight P/Ds are proposed as sites for wells to be drilled in the future. Of these eight proposed well sites, one ("Legacy Park") was approved by transfer no. 72128 (in 2006) as a P/D, but a well was never constructed. Transfer no. 72128 received numerous protests taking issue with surface water vs. ground water use for irrigation and the number/location of proposed well sites. Per the protest resolution, all additional proposed P/D sites were dropped from the transfer filing except for the Legacy Park site. This transfer application proposes to add numerous well sites including two well sites ("City shop" in SW NE Sec 36 T3S R6E and "6th S & 18th E" in SE SE Sec 25 T3S R6E) specifically excluded as part of the protest resolution to the previous transfer. Based on the this information, in the interest of the local public, comment letters regarding this transfer will be sent to protestants of the previous Transfer no. 72128 during the advertising process.

Approval of Transfer no. 72128 authorized the City use irrigation rights 61-2167 and 61-2210 within the municipal service area, contrary to I.C. § 42-219(6) authorizing a service area boundary only for surface water irrigation rights. This transfer application proposes to change the nature of use of these rights to municipal use as discussed above to correct this oversight.

Additionally, the previous transfer approval (no. 72128) required the City submit an analysis of the number of acres irrigated within the service area not already covered by surface water rights which includes an aerial photo clearly designating all lands being irrigated (condition #5 on right 61-2167 and 61-2210). Although the applicant submitted information to demonstrate the number of acres currently irrigated (based on the 2004 aerial photo analysis for the previous transfer and the number of acres), the applicant is incompliant with this condition in that the applicant has not submitted an analysis of a recent (last 5 years) aerial photo indicated the irrigated acreage not covered by surface water rights. My letter dated July 30, 2013 specifically requested this information. In response to this request, the applicant provided information demonstrating current irrigation of up to 1219 acres within the proposed municipal service area, 841 acres municipal type irrigation within the current service area plus 378 acres of agricultural land irrigated largely in part with municipal effluent supplemented with ground water (rights 61-7439 and 61-7172F) also considered municipal type irrigation use. Should the transfer be approved as proposed, the number of acres authorized for municipal type irrigation use (under rights 61-2188, 61-7151, 61-2167, 61-2210, 61-7439, and 61-7172F) will total 1061.2. See amended transfer application no. 78273 attachment # 9 for further details. The information supplied demonstrates the amount of water to be authorized for municipal type irrigation (1061.2 acres) will presumably be used for municipal type irrigation only, as any approval would stipulate. Considering any new transfer approval would require similar if not the same reporting, I sent the applicant a second request for the aerial photo analysis per previous transfer conditions via my letter dated December 11, 2013. One February 27, 2014, I received an updated analysis (with a 2013 aerial photograph) following the same basic procedure as the analysis submitted based on the 2004 aerial photograph. This analysis indicated 924 acres of municipal type irrigation occurring within the current service area of the City of Mountain Home. The 924 acres plus the 378 acres of irrigation occurring with municipal effluent to be added to the service area via this transfer totals 1302 acres. Based on current practices, it appears the City currently has over the 1061.2 acres of municipal type irrigation that would be required should this transfer be approved.

The fee submitted for this transfer is based on the total system rate with combined limitations accounted for. Applicant required to submit additional $210.00 with amended application for nature of use change (NOU fee $250, but applicant overpaid $40 with initial application). Fee received with amended application (receipt # W041592).

Summary

Assuming protests are not filed and/or other information does not contradict the above analysis, the application can be approved as reflected by the draft approval.

Condition 046 is applicable since new wells are proposed.

ACKNOWLEDGEMENT AND AGREEMENT

To: Idaho Department of Water Resources (Department)

Subject: The use in connection with Water Right Nos. 61-2188 and 61-7151 once Transfer No. 78273 has been approved by the Department and the disposition of the Water Supply Bank Lease.

On July 20, 2006, portions of Water Right Nos. 61-2188 and 61-7151 were leased into the Water Resources Board's Water Supply Bank (Bank) for an indefinite term.

Transfer No. 78273 proposes to re-locate Water Right Nos. 61-2188 and 61-7151 to the city of Mountain Home's municipal service boundary.

On April 17, 2014, the entire Leased portions of Water Right Nos. 61-2188 and 61-7151 were rented to a third party until December 31, 2016.

Transfer No. 78273 can move towards Departmental approval; however, the city of Mountain Home acknowledges that Water Right Nos. 61-2188 and 61-7151 must adhere to the following schedule during years 2015 and 2016 so long that the rental agreement is renewed for each of those years:

- After the approval of Transfer No. 78273, the exercise of Water Right Nos. 61-2188 during said years shall be limited to 1.21 cfs, 269.6 af, and 60.6 acres.
- After the approval of Transfer No. 78273, the exercise of Water Right No. 61-7151 during said years shall be limited to 0.52 cfs, 182.1 af, and 45.4 acres.
- During 2015 and 2016 Water Right Nos. 61-2188 and 61-7151 will have a combined limit of 1.21 cfs on 106.0 acres pursuant to the water right conditions and Lease Contract.

In the event the renter does not continue their rental agreement in 2015 or 2016 involving Water Right Nos. 61-2188 and 61-7151 the Lease Contract will be released from the Bank and the city may make full use of their water rights by the beginning of the irrigation season.

The city also acknowledges and agrees that the Lease of Water Right Nos. 61-2188 and 61-7151 will be discontinued once the rental concludes at the end of 2016 and the city may make full use of their water rights by the beginning of the irrigation season 2017. If the city wishes to keep the water rights in the Bank, new Lease applications can be filed to bring the Lease in conformance with the modified elements of the water rights.

The city also acknowledges and agrees that the rental payments from the Bank for 2014 shall be paid to the Lessor described in the Lease Contract, Jay Brown. Furthermore, beginning in the calendar year following an acknowledged change in water right ownership, compensation for the rental will go to the city.

CITY OF MOUNTAIN HOME

Tom Rist	Tom Rist, Mayor	7/29/14
Signature	Printed Name and Title	Date

JAY BROWN

Jay Brown	Jay Brown	7-29-14
Signature	Printed Name	Date

Grimm, Angie

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From: Charles G. Brockway [charles.g.brockway@brockwayeng.com]
Sent: Tuesday, May 27, 2014 4:56 PM
To: Grimm, Angie
Cc: Wayne Shepherd
Subject: Mountain Home POD amendment
Attachments: POD supplement - revised 5-27-2014.pdf; PARCEL RPO3S06E229810.tif; PARCEL RPO3S06E270010.tif; FIGURE 2 NEW 2014 (Custom).jpg; FIGURE 1 NEW 2014 (Custom).jpg

Angie,

Attached are the following:

1. A modified POD supplement which shows the "Triangle" well in the SESE22, T3S, R6E on city-owned property, rather than in the NWNW26.
2. Revised Figures 1 and 2 showing the correct well location.
3. Deeds confirming the City owns the specified POD location.

Please consider this an amendment to the pending transfer application for the City of Mountain Home. Let me know if anything further is needed.

Thanks,
Chuck

Charles G. Brockway, Ph.D., P.E.
Brockway Engineering, PLLC
2016 Washington St. North, Suite 4
Twin Falls, ID 83301
(208) 736-8543
charles.g.brockway@brockwayeng.com

All information, calculations, maps, drawings, or other documents transmitted via e-mail are preliminary unless explicitly stated in the e-mail text or in the documents themselves.

UNITED STATES OF AMERICA
GENERAL SERVICES ADMINISTRATION

Region 10
Auburn, Washington 98002

OCT 19 1970

Honorable Frank A. Pearce
Mayor of Mountain Home
Mountain Home, Idaho 83647

Dear Mayor Pearce:

Subject: Mountain Home Quarry Annex
Mountain Home, Idaho
D-Ida-415Y

Transmitted herewith is executed original Quitclaim Deed dated August 17, 1970, whereby the United States of America, acting by and through the Administrator of General Services, conveyed the subject property to the City of Mountain Home in consideration of cash payment of $6, 550. 00.

Sincerely,

R. A. Stuart
for V. L. BARNES
Chief, Real Property Division
Property Management and Disposal Service

Enclosure

QUITCLAIM DEED

The UNITED STATES OF AMERICA, acting by and through the Administrator of General Services under and pursuant to the powers and authority contained in applicable provisions of the Federal Property and Administrative Services Act of 1949, 63 Stat. 377, as amended, and regulations and orders promulgated thereunder, (hereinafter referred to as "Grantor"), for and in consideration of the sum of Ten Dollars and other good and valuable consideration, does hereby remise, release and forever quitclaim to the CITY OF MOUNTAIN HOME, a municipal corporation of the State of Idaho, (hereinafter referred to as "Grantee"), its successors and assigns, all of Grantor's right, title and interest in and to the following described property (hereinafter referred to as "Property") situated in Elmore County, State of Idaho:

> A parcel of land in Section 22, 23 and 27, Township 3 South, Range 6 East of the Boise Meridian, Elmore County, Idaho, described as follows:
>
> Beginning at the northeast corner of said Section 27, said corner being common to Sections 22, 23, 26 and 27; thence South 0° 03' West 252.15 feet along the east line thereof to the northerly right-of-way of Mountain Home Air Force Base Railroad Spur; thence north 66° 41' West 486.73 feet along said railroad right-of-way, to the beginning of a curve to the left with a radius of 1432.69 feet; thence northwesterly along said curve through a central angle of 22° 50', for an arc distance of 610.68 feet to a point of tangency; thence leaving said right-of-way North 77° 18' 30" East 1066.89 feet to a point on the west line of said Section 23, said point being 300.00 feet north from the southwest corner thereof; thence north along the west line of said Section 23 for a distance of 1701.72 feet, to the center of Fourteenth N. Street, as shown on the Official Map of Mountain Home; thence east 1320.80 feet along the centerline of said Fourteenth N. Street to the centerline of Mellen Street, as shown on said Official Map; thence south 657.24 feet along said centerline of Mellen Street to the centerline of Twelfth N. Street; thence east 660.40 feet along said centerline of Twelfth N. Street to the centerline of Bradford Street as shown on the said Official Map; thence south 657.24 feet along said centerline of Bradford Street to the centerline of Eleventh N. Street, as shown on said Official Map; thence east 660.40 feet along the centerline of Eleventh N. Street to the centerline of Jerome Street as shown on said Official Map; thence south along said centerline of Jerome Street 688.12 feet, more or less, to a point on the south line of Tenth N. Street and said Section 23 as shown on said Official Map; thence along said south line North 89° 45' West 2641.60 feet to the point of BEGINNING.

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Containing 96.37 acres, more or less.

SUBJECT TO existing easements for public utilities for railroads and pipelines, and canals, and to rights of the public in the platted but not constructed streets in Jerome's Addition to the City of Mountain Home; and subject to usage right of Mountain Home Irrigation District for irrigation laterals and primary ditch.

TO HAVE AND TO HOLD the Property together with all the privileges and appurtenances thereto belonging, unto Grantee, its successors and assigns, forever.

The Grantee covenants for itself, its heirs, successors, and assigns and every successor in interest to the Property hereby conveyed, or any part thereof, that the said Grantee and such heirs, successors, and assigns shall not discriminate upon the basis of race, color, religion, or national origin in the use, occupancy, sale, or lease of the Property, or in their employment practices conducted thereon. This covenant shall not apply, however, to the lease or rental of a room or rooms within a family dwelling unit; nor shall it apply with respect to religion to premises used primarily for religious purposes. The United States of America shall be deemed a beneficiary of this covenant without regard to whether it remains the owner of any land or interest therein in the locality of the Property hereby conveyed and shall have the sole right to enforce this covenant in any court of competent jurisdiction.

The Property was both duly determined to be surplus to the needs and requirements of the United States of America and assigned to General Services Administration for disposal pursuant to authority contained in the said Federal Property and Administrative Services Act as amended, and applicable orders and regulations promulgated thereunder.

IN WITNESS WHEREOF, Grantor has caused this instrument to be executed as of August 17, 1970.

UNITED STATES OF AMERICA
Acting by and through the
Administrator of General Services

By V L Barnes
Chief, Real Property Division
Property Management and Disposal Service

STATE OF WASHINGTON)
) ss
COUNTY OF KING)

On this 19th day of October, 1970, before the undersigned, a Notary Public in and for the State of Washington, personally appeared V. L. Barnes, to me known to be the - Chief, Real Property Division, Property Management and Disposal Service, General Services Administration, Region 10, and to me known to be the individual described in and who executed the foregoing instrument and who under oath stated that he was duly authorized, empowered and delegated by the Administrator of General Services to execute the said instrument and acknowledged the foregoing instrument to be his free and voluntary act and deed, acting for and on behalf of the Administrator of General Services, acting for and on behalf of the United States of America, for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate above written.

Robert Douglas Green
Notary Public in and for the State of Washington, residing at Federal Way

144136

FILMED

Direct ✓
Reverse ✓
Reception ✓

STATE OF IDAHO, County of Elmore } ss.

I hereby certify that this instrument was filed for record at request of Frank Pearce at 43 minutes past 3:00 o'clock P. M., this 22 day of October A.D., 19 70 in my office, and duly recorded in Book 59 of Deeds at Page 71

W. H. Trail
Ex-Officio Recorder,

By R. Ybarzabal
Deputy.

Fees $ 3.00

Mail to City Mtn. Home

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QUITCLAIM DEED

The UNITED STATES OF AMERICA, acting by and through the Administrator of General Services under and pursuant to the powers and authority contained in applicable provisions of the Federal Property and Administrative Services Act of 1949, 63 Stat. 377, as amended, and regulations and orders promulgated thereunder (hereinafter designated as "Grantor"), for and in consideration of the sum of Ten Dollars and other good and valuable consideration, does hereby remise, release and forever quitclaim to the CITY OF MOUNTAIN HOME, a municipal corporation of the State of Idaho, (hereinafter designated as "Grantee"), and its assigns, all of Grantor's right, title and interest in and to the following described property (hereinafter designated as "Property") situated in Elmore County, State of Idaho:

A tract of land situate in Elmore County, Idaho, in Section 23, Township 3 South, Range 6 East, Boise Beridian, in the Jerome Subdivision, being Lots No. 11, 40 and 43, entire, and so much of Lots 1, 5, 6, 7, 8, 12, 33, 34, 37, 38, 39 and 44 as lie southwest of Union Pacific Railway Right-of-way as shown on the Official City of Mountain Home Map, as drawn by Johnson & Underkofler Consulting Engineers, Mountain Home, Idaho, and on Mountain Home Air Force Base Real Estate Drawing No. 0-33-32.1, sheet 3 of 3, latest revision 11 May 1953, a Corps of Engineers furnished map, together with so much of the adjacent 60 feet wide streets and 15 feet wide alleys as lie between their respective centerlines and the said lots, excepting Tenth North Street as hereinafter delineated, more particularly described as follows:

Beginning at a point in the south line of said Section 23, a line common with Section 26, and lying approximately 3429 feet easterly from the southwest corner of said Section 23, a corner common to Sections 22, 23, 26 and 27 of said township and range, on a bearing of S. 89° 45' E., the same being the intersection of the said southline of Section 23 and the southwesterly property line of said Union Pacific Railway Right-of-way; thence northwesterly on a curvelinear course of unknown properties along the said Right-of-way property line a distance of approximately 3750 feet to the centerline of Fifteenth North Street, as shown on the said Official City of Mountain Home Map, the same being the most northerly point common to government fee lands, situate in the said Section 23 and the Union Pacific Railway Right-of-way; thence due West along the centerline of said Fifteenth North Street a distance of approximately 365 feet to the centerline of a north/south street unnamed on the said Official City Map; thence due South along the centerline of said unnamed street a distance of 657.24 feet to the centerline of Fourteenth North Street as shown on said Official City Map; thence due East along centerline of Fourteenth North Street a distance of 660.4 feet to the centerline of Mellen Street, as shown on said Official City Map; thence due South along said centerline of Mellen Street, a distance of 657.24 feet to the Centerline of Twelfth North Street, as shown on said Official City Map; thence due East along said centerline of Twelfth North Street a distance of 660.4 feet to the Centerline of Bradford Street as shown on said Official City Map; thence due South along said centerline of Bradford Street a distance of 657.24 feet to the centerline of Eleventh North Street, as shown on said Official City Map; thence due East along the said centerline of Eleventh North Street a distance of 660.4 feet

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to the centerline of Jerome Street as shown on said official city map; thence due South along said centerline of Jerome Street a distance of 688.12 feet to the south line of Tenth North Street as shown on said official city map, the same being the said south line of Section 23, at a point 2641.6 feet easterly from the said southwest corner of Section 23 on a bearing of S. 89° 45' E.; thence on the said bearing along the south line of Tenth North Street and the said south line of Section 23 a distance of approximately 787.4 feet to an intersection with the southwesterly property line of said Union Pacific Railway Right-of-way, the same being the Point of Beginning;

SUBJECT TO:

Existing easements for public roads and highways, for public utilities, railroads and pipelines.

Rights of the public in the platted but not constructed streets in Jerome's Addition to the City of Mountain Home.

Usage right of Mountain Home Irrigation District for irrigation laterals and primary ditch.

TO HAVE AND TO HOLD the Property together with all the privileges and appurtenances thereto belonging, unto Grantee and its assigns, forever.

The Property was both duly determined to be surplus to the needs and requirements of the United States of America and assigned to General Services Administration for disposal pursuant to authority contained in the said Federal Property and Administrative Services Act as amended, and applicable orders and regulations promulgated thereunder.

IN WITNESS WHEREOF, Grantor has caused this instrument to be executed as of April 18, 1963.

UNITED STATES OF AMERICA
Acting by and through the
Administrator of General Services

By C. E. Cleland
Chief, Real Property Division
Utilization and Disposal Service

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STATE OF WASHINGTON)
)ss
COUNTY OF KING)

On this 5th day of March, 1964, before the undersigned, a Notary Public in and for the State of Washington, personally appeared C E Ocamb, to me known to be the —— Chief, Real Property Division, Utilization and Disposal Service, General Services Administration, Region 10, and to me known to be the individual described in and who executed the foregoing instrument and who under oath stated that he was duly authorized, empowered and delegated by the Administrator of General Services to execute the said instrument and acknowledged the foregoing instrument to be his free and voluntary act and deed, acting for and on behalf of the Administrator of General Services, acting for and on behalf of the United States of America, for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate above written.

Robert Douglas Green
Notary Public in and for the State of
Washington, residing at Federal Way

120872

STATE OF IDAHO, } ss.
County of Elmore }

I hereby certify that this instrument was filed for record at request of City of Mtn. Home at 25 minutes past 3 o'clock P. M., this 7th day of April A.D., 1964 in my office, and duly recorded in Book 57 of Deeds at Page 10

H. H. Trail
Ex-Officio Recorder,

By ---------- Deputy.

Fees $2.50

City of Mtn Home

Grimm, Angie

From: Grimm, Angie
Sent: Wednesday, May 07, 2014 8:50 AM
To: 'Wayne Shepherd'
Cc: Tom Rist; Charles G. Brockway; James Bledsoe; Westra, John
Subject: RE: Protest on Transfer #78273

Good morning Wayne!

I apologize for the delay in responding to your email, been a hectic few work days. We received Jim Carrie's withdrawal of protest on May 1. The next step is to amend the application per my discussion with Chuck Brockway on 3/24/14.

On 12/11/13 I sent a letter requesting access information for a proposed point of diversion (POD) in the NW NW Sec 26 T3S R6E referred to as the "Triangle N. of #13". On 3/7/14, I spoke with Chuck regarding this information request. He indicated at that time he'd ask you for the information and get back to me. On 3/24/14, I spoke with Chuck again, at which time he indicated an amendment to the transfer application [POD supplement page and map(s)] would be submitted to change the proposed POD from the NW NW Sec 26 T3S R6E to the SE SE Sec 22 T3S R6E [property owned by the City of Mountain Home (City)]. I have not received this amendment. As soon as this issue is addressed I will proceed with processing of the application.

Please let me know if you have any questions. I look forward to your response.

Sincerely,

Angela M. Grimm, P.G.
Water Resources Agent, Sr.
IDWR - Western Region
2735 Airport Way
Boise, ID 83705-5082
(208) 334-2190 phone
(208) 334-2348 fax

From: Wayne Shepherd [mailto:WayneShepherd@mountain-home.us]
Sent: Friday, May 02, 2014 3:16 PM
To: Grimm, Angie
Cc: Tom Rist; Charles G. Brockway; James Bledsoe
Subject: Protest on Transfer #78273

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Angie: We understand that Jim Carrie, who was protesting the Brown Transfer (#78273) delivered a letter to IDWR withdrawing his protest. I have attached a copy of this letter to this email. Is there more that needs to be done regarding this protest? What is the next step in our transfer application process assuming that the protest has now been resolved? Thanks,

L. Wayne Shepherd, P.E.

Director of Public Works
City of Mountain Home
Office: (208)587-2108

Cell: (208)599-0487

wshepherd@mountain-home.us

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BROCKWAY
ENGINEERING
P.L.L.C.
Hydraulics
Hydrology
Water Resources

February 25, 2014

Angela M. Grimm
Idaho Department of Water Resources
2735 Airport Way
Boise, ID 83705-5082

Re: City of Mountain Home irrigated area analysis

Dear Ms. Grimm:

This letter is being submitted pursuant to Condition No. 5 on Transfer No. 72128, which requires an analysis of irrigation within the City of Mountain Home from the potable water system.

The methodology approved for Transfer No. 72128 was utilized for this analysis. Residential lots within the City were divided into three categories of lot types and sizes. A representative sample of parcels was selected from each category, and the irrigated area delineated for the samples using the 2013 FSA aerial photo. The average irrigated area per lot was calculated from the samples. This average was then applied to the total number of parcels in each category.

In addition to the sampling approach described above, irrigation on large parcels was delineated using the 2013 photo. All of these lots were delineated individually; i.e. no sampling was done.

The attached aerial map shows, in yellow, the large parcels individually delineated and the sampling of residential lots in the three size categories. The attached spreadsheet shows the results of this analysis. Current irrigation was calculated to be 924 acres. Irrigation with build-out of current platted lots was calculated to be 980 acres.

Please let me know if any additional information is needed to satisfy this requirement.

Cordially,

Charles G. Brockway, P.E.

Enc. Map and spreadsheet
Cc: Wayne Shepherd

Charles E. Brockway, Ph.D., P.E.
Charles G. Brockway, Ph.D., P.E.
2016 North Washington Street • Suite 4
Twin Falls, Idaho 83301
208•736•8543
fax: 736•8506

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City of Mountain Home Irrigated Area Estimation

Sampling procedure as per 2005 transfer approval, using 2013 photo
Brockway Engineering, PLLC
ALR - FEB. 25. 2014

	No. of Samples	No. of Lots	Average irrig / lot	Total irrg (ac)
Old city lots irrigated (25 x 100 typ.)	14	861	0.09	77.5
Average size lot irrigated (75 x 115 typ.)	20	3696	0.15	554.4
Large lot size irrigated (140 x 140 typ.)	5	181	0.38	68.8
Old city lots unirrigated	14	0	0.09	0.0
Average size lot unirrigated	20	334	0.15	50.1
Large lot unirrigated	5	15	0.38	5.7

Irrigated open lots (1)	97.0
Irrigated parks, schools, etc. (2)	126.5

CURRENT IRRIGATION 2013

Residential	700.7
Large parcel	223.5
Grand total	924.2

IRRIGATION WITH FULL BUILD-OUT OF CURRENT LOTS

Residential	756.5
Large parcel	223.5
Grand total	980.0

(1) Includes miscellaneous larger private lots irrigated without homes
(2) Generally, City-owned large parcels

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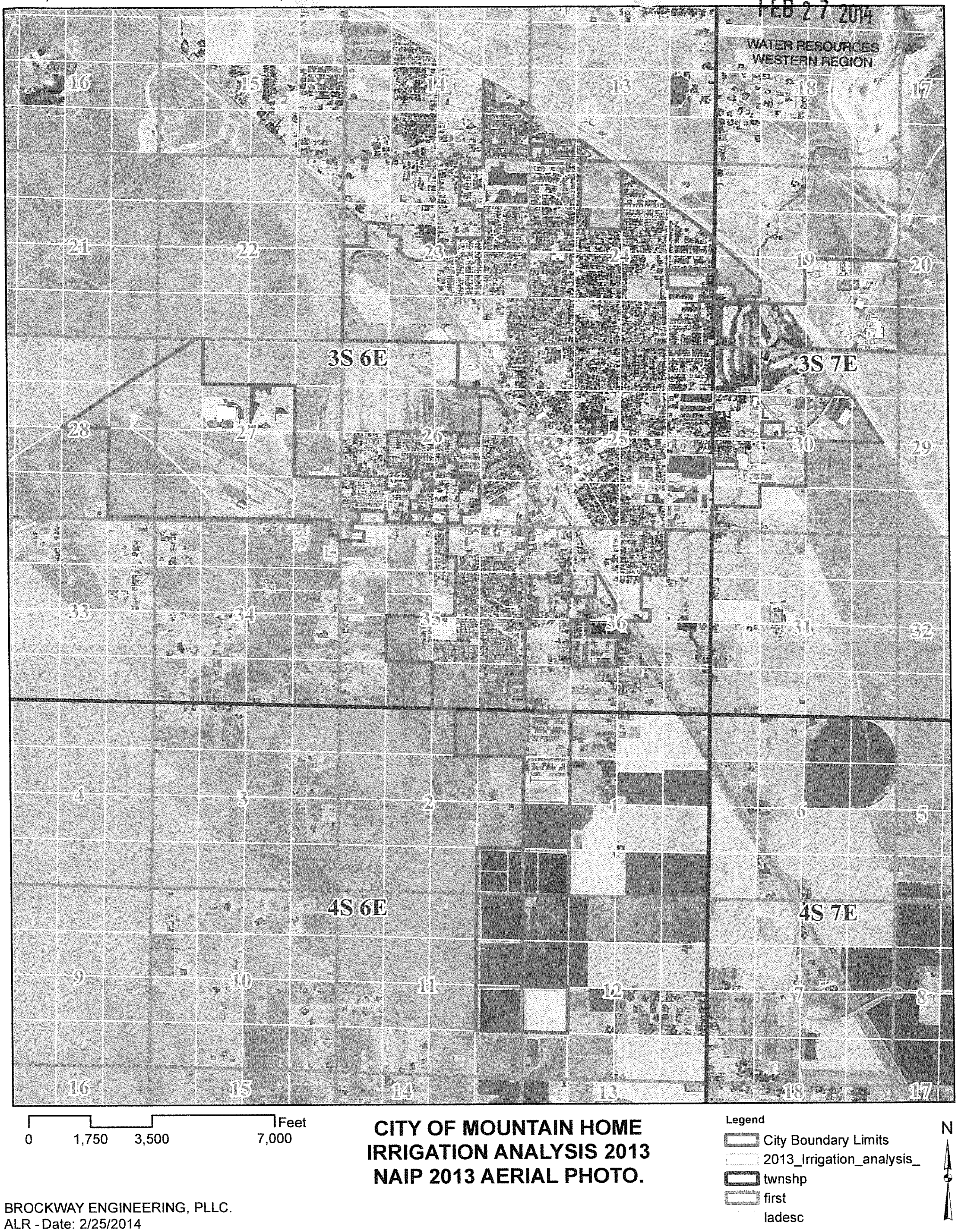
Path: F:\Projects\Mountain Home - Brown transfer\Arcview Maps\ igation anlaysis 2013.mxd



CITY OF MOUNTAIN HOME IRRIGATION ANALYSIS 2013 NAIP 2013 AERIAL PHOTO.

BROCKWAY ENGINEERING, PLLC.
ALR - Date: 2/25/2014

MEMORANDUM

Type: **In Office Conversation**
Telephone
Meeting Notes

Follow-up
Log of Events
Other__________

To: Transfer. 78273 MtN Home
From: J. Westra, Western Reg.
Date: 2/4/14

RE: Contested Application

2/4/14 Wayne Shepard, Engineer City of MtN Home
Will negotiate with protestant directly. When exhausted Mr. Shepard will contact the Department to schedule a pre-hearing conference.
Response OK.

Attachment D

Cost Information

KELLER ASSOCIATES

City of Mountain Home
Water Master Plan
Forecast of Revenues and Expenses

	Actual	Actual	Actual	Anticipated	Baseline/Budget	Forecast	Forecast	Forecast	Forecast	Forecast
	FY 15-16	**FY 16-17**	**FY 17-18**	**FY 18-19**	**FY 19-20**	**FY 20-21**	**FY 21-22**	**FY 22-23**	**FY 23-24**	**FY 24-25**
User Rate % Annual Increase					10.0%	10.0%	5.0%	5.0%	5.0%	5.0%
Typical User Rate	**$30.02**	**$30.02**	**$30.02**	**$30.02**	**$33.02**	**$36.32**	**$38.14**	**$40.05**	**$42.05**	**$44.15**
Revenues										
Metered Sales[1]	2,504,159.54	2,574,072.40	2,643,018.86	$ 2,650,000	$ 2,915,000	$ 3,206,500	$ 3,366,825	$ 3,535,166	$ 3,711,925	$ 3,897,521
Other Charges [2]	168,750.42	181,498.46	187,150.41	$ 154,340	$ 186,683	$ 192,283	$ 198,052	$ 203,993	$ 210,113	$ 216,416
Service Availability Fee[3]	118,580	51,450	89,670	$ 25,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000
Total Revenues	**$ 2,791,490**	**$ 2,807,021**	**$ 2,919,839**	**$ 2,829,340**	**$ 3,186,683**	**$ 3,483,783**	**$ 3,649,877**	**$ 3,824,159**	**$ 4,007,038**	**$ 4,198,937**
Total Operating Revenues				**$ 2,675,000**	**$ 3,000,000**	**$ 3,291,500**	**$ 3,451,825**	**$ 3,620,166**	**$ 3,796,925**	**$ 3,982,521**
Expenditures										
Operations[4]	671,159.87	640,297.35	801,517.93	$ 842,657	$ 856,315	$ 882,004	$ 908,465	$ 935,719	$ 963,790	$ 992,704
Salaries and Benefits[4]	691,729.22	670,002.57	736,141.61	$ 810,803	$ 895,126	$ 921,980	$ 949,639	$ 978,128	$ 1,007,472	$ 1,037,696
Capital Improvements[4,5]	472,555.42	880,742.14	327,016.01	$ 472,700	$ 676,800	$ 1,326,228	$ 1,463,936	$ 1,398,363	$ 1,120,331	$ 1,663,095
Replacements[4,6]	137,358.73	58,583.72	208,011.54	$ 181,603	$ 100,000	$ 103,000	$ 106,090	$ 109,273	$ 112,551	$ 115,927
Debt Repayment - Long Term[7]	300,615.90	302,712.06	297,852.31	$ 297,946	$ 120,634	$ 120,634	$ 120,634	$ 120,634	$ 120,634	$ 120,634
Total Expenditures	**$ 2,273,419**	**$ 2,552,338**	**$ 2,370,539**	**$ 2,605,708**	**$ 2,648,875**	**$ 3,353,846**	**$ 3,548,764**	**$ 3,542,116**	**$ 3,324,779**	**$ 3,930,056**
Net Change in Fund Balance				**$ 223,631**	**$ 537,808**	**$ 129,937**	**$ 101,113**	**$ 282,043**	**$ 682,259**	**$ 268,881**
Initial Fund Balance				$ 1,886,951						
Ending Fund Balance				**$ 2,110,582**	**$ 2,648,390**	**$ 2,778,327**	**$ 2,879,440**	**$ 3,161,483**	**$ 3,843,742**	**$ 4,112,623**

Notes:

1. Assumes increase in revenue comes solely from existing accounts; conservatively excludes minor additional revenue from new growth
2. Includes late charges, water turn on fees, meter sales, interest earnings, and other operating revenues
3. Assumed an average value from servive avaiability fees for years 2015-2018
4. 3% % annual inflation of costs assumed.
5. Capital Improvements based off the 6-Year recommended CIP project schedule, adjusted for inflation
6. Used recommended replacement budgets, which are higher than current depreciation expenses. Target annual replacement budget is approximately $788,000. However, because approximatley 60% of the above CIP budget is replacement oriented, an annual buget of $100,000 was assumed for the first six years (adjusted for 3% inflation). This should be sufficient to address the Priority 1 condition improvements identified in the master plan. In the future, efforts should be taken to increase the annual replacement budget to the target of $788,000.
7. Includes payments for DEQ Loans #1, #2, #4, and #5. History of payments used for DEQ Loans #1, #2, and #4. DEQ Loan #5 annual payment calculated assuming a $2,700,000 principal over 20 years with a 2.75% interest

City of Mountain Home
Water Rate Study - Existing Rates

Minumum Rate (includes 5000 gallons) =	19.25	per EDU		Tier (gal/mo)
Cost per gallon (over 5000 gallons) =	0.00108	per gallon		5000
Cost per gallon (over 45,000 gallons) =	0.00133	per gallon		45000
Calibration Factor =	1.0020			

*Note - without modeling distribution of water users, revenue projections for tiered rates above 30,000/month will be slightly off

Number of EDU's -- Water

Business	Church	City Property	Construction	Daycare	Multiple Rental	Outside City	Residential	School	Sprinklers	Trailer Court	Total	
850	61	46	9	6	1009	5	4562	94	49	194	6885	(taken from 2018 a

Number of customers

Business	Church	City Property	Construction	Daycare	Multiple Rental	Outside City	Residential	School	Sprinklers	Trailer Court	Total
312	33	44	6	5	341	4	4558	24	49	13	5389

EDUs/Account

Business	Church	City Property	Construction	Daycare	Multiple Rental	Outside City	Residential	School	Sprinklers	Trailer Court
2.72	1.85	1.05	1.50	1.20	2.96	1.25	1.00	3.92	1.00	14.92

Gallons used monthly (Nov 2015 - Oct 2016)

	Business	Church	City Property	Construction	Daycare	Multiple Rental	Outside City	Residential	School	Sprinklers	Trailer Court	Total
Oct-17	9,405,500	919,400	6,506,400	2,400	38,700	10,234,700	579,800	70,818,800	1,844,400	6,532,400	1,820,900	108,703,400
Nov-17	8,043,800	330,400	13,015,200	2,600	135,300	6,114,500	173,300	32,861,680	586,500	1,343,300	1,963,500	64,570,080
Dec-17	4,881,300	63,200	176,400	2,500	71,600	4,255,900	10,200	18,495,000	605,700	47,300	2,090,500	30,699,600
Jan-18	4,197,400	92,600	66,200	12,000	31,000	3,228,800	2,700	16,100,600	446,600	48,200	625,500	24,851,600
Feb-18	5,334,900	74,400	84,600	8,800	47,300	3,604,900	4,900	17,930,600	543,000	5,300	563,000	28,201,700
Mar-18	4,150,200	46,600	67,000	7,200	45,100	2,643,100	9,100	13,647,501	482,700	3,200	497,800	21,599,501
Apr-18	5,382,600	52,900	3,344,500	22,400	56,200	3,352,600	29,400	17,851,700	528,300	32,400	1,645,800	32,298,800
May-18	6,416,400	306,600	10,615,300	31,900	81,500	4,233,100	6,500	36,978,400	697,900	1,396,300	1,626,700	62,390,600
Jun-18	11,254,700	1,050,800	15,148,000	36,300	149,000	10,675,600	4,200	106,992,200	1,446,500	8,595,100	767,400	156,119,800
Jul-18	10,943,700	1,181,900	25,054,900	101,600	95,700	11,396,900	45,400	123,392,500	1,054,000	9,812,700	850,100	183,929,400
Aug-18	15,546,600	1,583,200	32,059,500	17,200	68,900	15,363,100	170,700	170,761,000	1,393,200	15,752,400	1,203,200	253,919,000
Sep-18	16,134,000	1,811,300	24,928,700	4,100	82,300	16,309,200	177,600	174,403,600	1,953,000	15,014,200	1,242,600	252,060,600
	101,691,100	7,513,300	131,066,700	249,000	902,600	91,412,400	1,213,800	800,233,581	11,581,800	58,582,800	14,897,000	1,219,344,081
	8.3%	0.6%	10.7%	0.0%	0.1%	7.5%	0.1%	65.6%	0.9%	4.8%	1.2%	

Gallons used monthly per account

	Business	Church	City Property	Construction	Daycare	Multiple Rental	Outside City	Residential	School	Sprinklers	Trailer Court
Oct-17	30,146	27,861	147,873	400	7,740	30,014	144,950	15,537	76,850	133,314	140,069
Nov-17	25,781	10,012	295,800	433	27,060	17,931	43,325	7,210	24,438	27,414	151,038
Dec-17	15,645	1,915	4,009	417	14,320	12,481	2,550	4,058	25,238	965	160,808
Jan-18	13,453	2,806	1,505	2,000	6,200	9,469	675	3,532	18,608	984	48,115
Feb-18	17,099	2,255	1,923	1,467	9,460	10,572	1,225	3,934	22,625	108	43,308
Mar-18	13,302	1,412	1,523	1,200	9,020	7,751	2,275	2,994	20,113	65	38,292
Apr-18	17,252	1,603	76,011	3,733	11,240	9,832	7,350	3,917	22,013	661	126,600
May-18	20,565	9,291	241,257	5,317	16,300	12,414	1,625	8,113	29,079	28,496	125,131
Jun-18	36,073	31,842	344,273	6,050	29,800	31,307	1,050	23,473	60,271	175,410	59,031
Jul-18	35,076	35,815	569,430	16,933	19,140	33,422	11,350	27,072	43,917	200,259	65,392
Aug-18	49,829	47,976	728,625	2,867	13,780	45,053	42,675	37,464	58,050	321,478	92,554
Sep-18	51,712	54,888	566,561	683	16,460	47,828	44,400	38,263	81,375	306,412	95,585
Average	27,161	18,973	248,232	3,458	15,043	22,339	25,288	14,631	40,215	99,631	95,494

Average Calculated Revenue per Account

	Business	Church	City Property	Construction	Daycare	Multiple Rental	Outside City	Residential	School	Sprinklers	Trailer Court
Oct-17	$ 80	$ 60	$ 201	$ 29	$ 26	$ 84	$ 201	$ 31	$ 161	$ 180	$ 458
Nov-17	$ 75	$ 41	$ 398	$ 29	$ 47	$ 71	$ 66	$ 22	$ 97	$ 44	$ 472
Dec-17	$ 64	$ 36	$ 20	$ 29	$ 33	$ 65	$ 24	$ 19	$ 97	$ 19	$ 485
Jan-18	$ 62	$ 36	$ 20	$ 29	$ 24	$ 62	$ 24	$ 19	$ 90	$ 19	$ 335
Feb-18	$ 66	$ 36	$ 20	$ 29	$ 28	$ 63	$ 24	$ 19	$ 95	$ 19	$ 329
Mar-18	$ 62	$ 36	$ 20	$ 29	$ 27	$ 60	$ 24	$ 19	$ 92	$ 19	$ 324
Apr-18	$ 66	$ 36	$ 105	$ 29	$ 30	$ 62	$ 27	$ 19	$ 94	$ 19	$ 440
May-18	$ 69	$ 40	$ 325	$ 29	$ 35	$ 65	$ 24	$ 23	$ 102	$ 45	$ 438
Jun-18	$ 86	$ 65	$ 462	$ 30	$ 50	$ 86	$ 24	$ 39	$ 139	$ 236	$ 350
Jul-18	$ 85	$ 69	$ 762	$ 42	$ 38	$ 88	$ 31	$ 43	$ 118	$ 269	$ 358
Aug-18	$ 102	$ 83	$ 974	$ 29	$ 33	$ 100	$ 65	$ 54	$ 136	$ 431	$ 395
Sep-18	$ 105	$ 92	$ 759	$ 29	$ 36	$ 104	$ 67	$ 55	$ 167	$ 411	$ 399
								$ 30.32			

Calculated Revenue

	Business	Church	City Property	Construction	Daycare	Multiple Rental	Outside City	Residential	School	Sprinklers	Trailer Court	Total	
Oct-17	$ 24,885	$ 1,993	$ 8,824	$ 174	$ 131	$ 28,693	$ 802	$ 139,969	$ 3,871	$ 8,833	$ 5,952	$ 224,126	
Nov-17	$ 23,412	$ 1,356	$ 17,498	$ 174	$ 235	$ 24,234	$ 262	$ 98,893	$ 2,318	$ 2,134	$ 6,142	$ 176,657	
Dec-17	$ 19,989	$ 1,177	$ 887	$ 174	$ 166	$ 22,223	$ 96	$ 87,994	$ 2,339	$ 945	$ 6,311	$ 142,301	
Jan-18	$ 19,249	$ 1,177	$ 887	$ 174	$ 122	$ 21,111	$ 96	$ 87,994	$ 2,167	$ 945	$ 4,359	$ 138,281	
Feb-18	$ 20,480	$ 1,177	$ 887	$ 174	$ 140	$ 21,518	$ 96	$ 87,994	$ 2,271	$ 945	$ 4,281	$ 139,963	
Mar-18	$ 19,198	$ 1,177	$ 887	$ 174	$ 137	$ 20,477	$ 96	$ 87,994	$ 2,206	$ 945	$ 4,210	$ 137,502	
Apr-18	$ 20,532	$ 1,177	$ 4,610	$ 174	$ 149	$ 21,245	$ 107	$ 87,994	$ 2,255	$ 945	$ 5,718	$ 144,906	
May-18	$ 21,651	$ 1,330	$ 14,300	$ 176	$ 177	$ 22,198	$ 96	$ 103,348	$ 2,438	$ 2,191	$ 5,693	$ 173,598	
Jun-18	$ 26,886	$ 2,135	$ 20,340	$ 180	$ 250	$ 29,170	$ 96	$ 179,114	$ 3,340	$ 11,582	$ 4,548	$ 277,643	
Jul-18	$ 26,550	$ 2,277	$ 33,543	$ 251	$ 192	$ 29,950	$ 124	$ 196,862	$ 2,824	$ 13,205	$ 4,658	$ 310,436	
Aug-18	$ 31,908	$ 2,736	$ 42,878	$ 174	$ 163	$ 34,247	$ 260	$ 248,122	$ 3,269	$ 21,120	$ 5,129	$ 390,006	
Sep-18	$ 32,691	$ 3,040	$ 33,375	$ 174	$ 178	$ 35,508	$ 267	$ 252,064	$ 4,015	$ 20,136	$ 5,181	$ 386,629	FY 2018 Total
												$ 2,642,048	$ 2,643,019

City of Mountain Home
Water Rate Study - Water Maintenance Fund Revenues

Account	Account Title	2013-14 Actual	2014-15 Actual	2015-16 Actual	2016-17 Actual	2017-18 Actual	Budget **2018-19**	Budget projections **2019-20**	Baseline 2019-2020
25-346-10-00	Metered Sales	2,209,254.96	2,343,029.71	2,504,159.54	2,574,072.40	2,643,018.86	2,650,000.00	2,782,500.00	
25-346-20-00	Late Charges	79,382.46	81,957.52	86,892.95	97,009.54	94,493.55	100,000.00	100,000.00	87,947
25-346-30-00	Water Turn On Fee	5,420.00	4,211.06	3,707.91	2,976.45	2,289.46	7,500.00	7,500.00	3,721
25-346-60-00	Water Meter Sales	20,911.70	13,617.12	17,820.88	9,520.28	9,832.15	20,000.00	20,000.00	14,340
25-346-90-00	Other Oper. Revenue	33,667.63	33,518.08	34,044.00	49,387.51	29,816.55	50,000.00	35,000.00	36,087
25-346-90-10	Water rights fee					28,280.00	62,000.00	62,000.00	20,000
25-371-00-00	Interest Earnings	1,133.60	1,387.61	4,121.55	9,337.46	19,122.87	15,000.00	15,000.00	7,021
25-373-00-00	Refunds & Reimb	13,824.14	6,983.29	22,163.13	13,267.22	3,315.83	15,000.00	15,000.00	11,911
25-373-10-10	Misc. Grants						45,000.00	45,000.00	
47-350-00-00	Service Availability Fees			118,580.00	51,450.00	89,670.00	25,000.00	85,000.00	
25-373-50-00	DEQ 5 Loan					3,000,000.00	2,700,000.00		
		2,363,594.49	2,484,704.39	2,791,489.96	2,807,020.86	5,919,839.27	5,689,500.00	3,167,000.00	
	Other Charges	154,339.53	141,674.68	168,750.42	181,498.46	187,150.41	269,500.00	254,500.00	186,682.70

City of Mountain Home
Water Rate Study - Water Maintenance Fund Expenditures

WATER 25-434	Account Title	2015-16 Actual	2016-17 Actual	2017-18 Actual	Over/Under Budget Lines Last Year	To date 2018-19 Actual	Anticipated 2018-19	Current Budget 2018-19	Average 2015-19	Next years Budget Request Changed lines only 2019-20	Baseline 2019-20
10-00-	Salaries - Water Dept.	481,326	471,974	510,472	60,082	424,220	565,627	575,271	507,350	600,756	600,756
20-00	Fringe - City Portion	210,403	198,029	225,670	42,491	183,882	245,176	299,141	219,819	294,370	294,370
31-10	Billing-Postage-Meter Expense	14,641	19,195	16,640	(140)	13,273	16,766	16,500	16,811	16,500	16,500
32-00	Drug Testing	249	135	90	410	98	124	1,000	149	1,000	1,000
33-00	Gas & Oil	11,162	14,887	17,247	2,753	11,926	15,065	20,000	14,590	20,000	20,000
34-00	Telephone/Internet	6,042	5,297	6,709	1,291	5,775	7,295	8,900	6,336	8,900	8,900
35-00	Utilities	418,020	382,826	395,286	74,714	194,088	425,000	470,000	405,283	470,000	450,000
36-00	Repairs & Maint - Equipment	5,538	10,561	9,703	(4,703)	7,044	8,897	8,000	8,675	12,000	12,000
36-10	Copier & Printer Lease	1,487	1,198	928	1,072	777	982	2,000	1,149	2,000	2,000
37-00	Repairs & Maint-Trucks	3,158	6,375	9,746	(2,746)	2,872	3,628	7,000	5,727	7,000	7,000
39-10	Repairs & Maint - Fire Hydrant	2,845	28	820	7,180	6,436	8,129	8,000	2,956	8,000	8,000
39-20	Street Cuts	1,203	314	-	5,500	-	-	5,500	379	5,500	5,500
40-00	Repairs- Bldg. & Grnds	6,073	8,006	20,569	(5,569)	14,685	18,549	15,000	13,299	21,000	21,000
40-30	Janitorial Services	2,940	3,234	2,965	290	2,156	2,723	3,254	2,965	3,624	3,624
41-00	Professional Fees	17,036	23,508	35,282	40,019	11,982	15,135	23,500	22,740	97,500	50,000
42-00	Insurance(ICRMP)	21,582	22,014	23,114	1	24,238	30,616	24,238	24,332	25,935	25,935
43-00	Computer Maintenance	2,272	167	1,280	1,720	475	599	3,000	1,079	3,000	3,000
43-10	Computer Software	2,486	2,953	8,367	(1,776)	6,666	8,421	5,000	5,556	8,300	8,300
43-20	Computer Support	7,985	6,435	6,435	(495)	4,950	6,253	7,000	6,777	14,000	14,000
43-25	IT Contract	7,301	6,739	9,266	(2,566)	-	-	3,888	5,827	20,000	20,000
43-30	SCADA Monthly Support	6,262	7,187	6,790	710	5,408	6,831	7,500	6,768	7,500	7,500
43-35	SCADA Maint./Software	2,792	1,711	2,303	7,697	1,930	2,439	10,000	2,311	10,000	10,000
48-00	Concrete	7,648	3,018	4,916	84	514	649	5,000	4,058	5,000	5,000
52-00	Supplies	2,683	4,606	3,084	1,916	2,622	3,313	5,000	3,421	5,000	5,000
53-00	Uniform/Safety clothing items	2,002	3,179	3,954	(954)	2,869	3,624	5,500	3,190	5,500	5,500
55-00	Printing and Publications	500	529	660	(160)	-	-	500	422	500	500
56-00	Meetings Schools & Dues	1,543	5,659	7,525	475	7,039	8,891	8,000	5,904	11,000	11,000
59-00	Repairs & Maint - Radios	-	156	57	843	-	-	500	53	500	500
71-00	Shares/Assessments	17,040	20,343	20,627	(3,127)	2,519	20,500	20,500	19,627	20,500	20,500
72-00	Tools	4,123	2,775	6,303	(2,303)	4,433	5,600	4,000	4,700	6,000	6,000
73-00	Reimbursements	118	154	13	87	10	13	100	75	100	100
74-00	Chlorine	32,834	17,038	27,070	8,930	24,955	31,522	36,000	27,116	36,000	36,000
75-00	Line Repair-Meter & Hardware	15,186	4,739	139,366	(14,366)	61,253	77,372	350,000	59,166	25,000	25,000
75-05	Meter Replacement Program	113,255	39,384	45,194	79,806	61,396	77,552	75,000	68,846	75,000	75,000
76-30	Backflow Maintenance	-	5,777	8,949	(3,949)	3,999	5,052	5,000	4,945	10,000	10,000
77-00	Water Tank Repair	-	6,270	2,006	(6)	-	-	2,000	2,069	2,000	2,000
83-15	Idaho Bond Bank-DEQ #1&2	183,670	185,766	180,906	94	27,309	181,000	181,000	182,836	181,000	181,000
83-20	DEQ Loan #4	116,946	116,946	116,946	2	116,946	116,946	116,948	116,946	116,948	116,948
83-50	DEQ Loan #5						-		-	36,000	(177,314)
84-00	Water Samples	10,437	6,503	8,015	9,985	3,102	3,918	18,000	7,218	18,000	18,000
85-00	Miscellaneous	222	231	44	456	107	136	500	158	500	500
85-10	Dig-Line Excavation	566	634	576	424	591	747	1,000	631	1,000	1,000
89-00	Safety Equipment	356	127	1,113	387	220	278	1,500	469	1,500	1,500
91-00	Well Preventative Maintenance	46,704	41,761	141,529	48,471	66,005	83,375	190,000	78,342	50,000	50,000
92-00	Reserve for future projects	447,612	209,062	1,320	1,602,339	-	-	935,255	164,499	1,439,126	-
93-10	Grant-Master Plan Update					17,613	22,248	45,000	22,248	-	-
93-25	Grant-Match					69,043	87,212	85,000	87,212	-	-
99-00	Capital Outlay - Over $5000	24,943	671,680	58,278	(20,778)	-	-	281,500	188,725	383,000	-
99-10	Equip Inventory-$500 to $5000	3,677	4,294	4,104	3,396	784	990	7,500	3,266	9,500	9,500
99-15	Water Storage Tank			267,419		2,567,373	472,700	2,700,000	370,059	-	-
99-16	Water Storage Tank						-	45,000	-	560,000	-
99-30	Leases	8,552	8,935	10,884	(248)	10,937	13,816	10,656	10,547	10,956	10,956
	Water Dept. w/o Salary	1,581,690	1,882,335	1,634,398	1,837,164	3,366,419	1,794,906	5,785,239		4,666,515	
	Total	*2,273,419*	*2,552,338*	*2,370,539*	*1,939,737*	*3,974,521*	*2,605,708*	*6,659,651*	*2,717,626*	*4,666,515*	*2,003,575*

	2015-16	2016-17	2017-18	Anticipated 2018-19	Current Budget 2018-19	Next years Budget Request 2019-20	Baseline 2019-20
Total Salary Expenditures	691,729.22	670,002.57	736,141.61	810,802.61	874,412.00	895,126.00	895,126.00
Total Operating Expenditures	671,159.87	640,297.35	801,517.93	842,656.83	1,075,036.00	923,815.00	856,315.00
Total Replacement Expenditures	137,358.73	58,583.72	208,011.54	181,602.69	450,500.00	131,500.00	131,500.00
Total Debt Expenditures	300,615.90	302,712.06	297,852.31	297,946.00	297,948.00	333,948.00	120,634.00
Total Capital Expansion Expenditures	472,555.42	880,742.14	327,016.01	472,700.00	3,961,755.00	2,382,126.00	-
Total	2,273,419.14	2,552,337.84	2,370,539.40	2,605,708.13	6,659,651.00	4,666,515.00	2,003,575.00
Check	2,273,419.14	2,552,337.84	2,370,539.40	2,605,708.13	6,659,651.00	4,666,515.00	2,003,575.00

City of Mountain Home

Water Rate Study - Water Availability Fee Analysis

Water Availability Expense 47-434	Account Title	2015-16 Actual	2016-17 Actual	2017-18 Actual	Last Years Budget 2017-18	Over/Under Budget Lines Last Year	Current Budget 2018-19	Next year Budget Request Changed lines only 2019-20
52-00	Supplies	-	-	1,642.68	-	(1,642.68)	25,000.00	25,000.00
99-00	Construction	-	-	66,534.99	471,000.00	404,465.01	446,000.00	446,000.00
99-20	DEQ#4 Restricted	-	-	-	116,948.00	116,948.00	116,948.00	116,948.00
99-30	Bond Bank-Loand Restrictted	-	-	-	185,800.00	185,800.00	185,800.00	185,800.00
99-98	Downtown rehad							142,500.00
	Total	-	-	68,177.67	773,748.00	705,570.33	773,748.00	916,248.00

Water Availability Revenue 47.00	Account Title	2015-16 Actual	2016-17 Actual	2017-18 Actual	Last Years Budget 2017-18	Over/Under Budget Lines Last Year	Current Budget 2018-19	Next year Budget Request Changed lines only 2019-20
350-00	Service Availablity Fees	118,580.00	51,450.00	89,670.00	112,000.00	22,330.00	25,000.00	85,000.00
371-00	Interest Earnings	2,052.75	4,607.32	8,928.43	1,500.00	(7,428.43)	446,000.00	2,500.00
399-00	Cash Carry Over	311,500.00	385,500.00	385,500.00	385,500.00	385,500.00	116,948.00	526,000.00
399-10	Loan Reserve Restricted	420,000.00	302,748.00	302,748.00	302,748.00	302,748.00	185,800.00	302,748.00
	Total	852,132.75	744,305.32	786,846.43	801,748.00	703,149.57	773,748.00	799,300.00

City of Mountain Home Long Term Debt

Date Paid	Due Date	Leased Project	Dept	Payment Amount	Bank	Term Years	%	Date Started	Date Paid Off	Total Principal To Term	Total Interest To Term	Total Prin/Int To Term	Payments Left to Term	Comments
12/10/2018	Jan-19	DEQ Loan #4 - Water	Water	58,473.00	IDHW	20	1.75%	1/1/2014	7/1/2033	1,966,039.00	372,919.38	2,338,958.38	1,637,281.42	DEQ #4 Water Loan
6/24/2019	Jul-19			58,473.00										*$116,948.00 in
														Reserve Account
2/11/2019	Feb-19	DEQ Loan #3 - Wastewater	Wastewater	209,852.95	IDHW	20	3.50%	2/28/2010	8/28/2029	6,000,000.00	2,392,766.83	8,392,766.83	4,405,560.78	DEQ #3 Wastewater Loan
	Aug-19			209,852.95										*$420,000.00 in
														Reserve Account
1/28/2019	Mar-19	Water Revenue Refunding Bonds	Water	27,500.00	ID Bond	15	Various	9/15/2012	9/15/2027	1,915,000.00	720,954.17	2,635,954.17	1,490,300.00	Cert of Participation
	Sep-19	(payment amounts change each year)		157,500.00	Bank									*$185,800.00 in
		(was DEQ Loans #1 & #2 both water/Refinanced)												Reserve Account
1/28/2019	Mar-19	Police Bldg Bonds (Refinanced)	Police	28,525.00	ID Bond	20	Various	2/9/2012	9/15/2031	1,695,000.00	935,595.00	2,630,595.00	1,825,900.00	Cert of Participation
	Sep-19	(payment amounts change each year)		98,525.00	Bank									*$167,768.00 in
														Reserve Account
										11,576,039.00	**4,422,235.38**	**15,998,274.38**	**9,359,042.20**	**Total Long Term**
													11,173,539.42	**TOTAL DEBT**

DEQ Loan Water #5 - Water Payment

$177,313.67 - anticipated payment

Water System Capital Improvement Plan - Priority Improvements			
Project ID#	Project Description	Est. Cost (2019 Dollars)	
	Priority 1 Improvements (Year 1 - 5)		
1.1	Well 17 and Transmission Pipeline	$	3,219,000
1.2	Replace Transite Pipeline on S 12th E, S 13th E, E 6th S	$	923,000
1.3	Upgrade Pipeline on West 2nd N, near West Elementary	$	449,000
1.4	Commercial Fire Upgrades, near DeMeyer	$	252,000
1.5	Replace Transite Pipeline on Chesnut St and W 3rd N	$	584,000
1.6	Medium Pressure Zone Service Area Expansion	$	33,000
1.7	Replace Well 12	$	1,594,000
	Total Priority 1 Improvments	**$**	**7,054,000**
	Priority 2 Improvements (Years 5 - 15)		
2.1	W 5th N, Water Main Upgrade	$	215,000
2.2	Transmission Pipeline Upgrades on Elmcrest and West 5th North	$	830,000
2.3	Old State Highway 30 Pipeline	$	380,000
2.4	NE Pearl St and W 17th N Pipelines	$	776,000
2.5	Queen's Court Pipeline	$	85,000
2.6	Upgrade Transmission Pipeline on N 3rd E and E 15th N	$	1,542,000
2.7	Connect Well 9 to Medium Pressure Zone	$	610,000
2.8	E 4th N and E 5th N Pipelines	$	237,000
2.9	N 2nd E Pipeline	$	82,000
2.10	Airbase Road Pipeline	$	939,000
2.11	Upgrade Pipelines along W 7th S	$	264,000
	Total Priority 2 Improvments	**$**	**5,960,000**
	Priority 3 Improvements (Year 15+ or growth dependent)		
3.1	N Haskett St Pipeline Upgrades	$	562,000
3.2	Well 18 - SW Mountain Home	$	2,426,000
3.3	West Airbase Road and Elmcrest St Upgrades	$	1,568,000
3.4	Connecting to Lateral North of S Haskett St LDS church	$	180,000
3.5	Well 19 - New Industrial Well	$	2,060,000
3.6	City-wide Pipesize Upsizing	$	1,669,000
	Total Priority 3 Improvments	**$**	**8,465,000**
	TOTAL	***$***	***21,479,000***

Notes*

1) Timing depends on when growth occurs. Development participation anticipated.
2) Above table excludes general annual replacement budgets, except those specific projects identified above.
3) The cost estimate herein is based on our perception of current conditions at the project location.This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. KellerAssociates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids or actual construction costs will not vary from the costs presented herein.

City of Mountain Home
Water Master Plan
6-Year CIP

		Annual Costs in 2019 Dollars					
Priority 1 Projects	**Total Cost**	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24	FY 24-25
1.1: Well 17 and Transmission Pipeline	$ 3,219,000	$ 643,800	$ 1,287,600	$ 1,287,600			
1.2: Replace Transite Pipeline on S 12th E, S 13th E, E 6th S	$ 923,000			$ 92,300	$ 830,700		
1.3: Upgrade Pipeline on West 2nd N, near West Elementary	$ 449,000				$ 449,000		
1.4: Commercial Fire Upgrades, near DeMeyer	$ 252,000					$ 252,000	
1.5: Replace Transite Pipeline on Chesnut St and W 3rd N	$ 584,000					$ 584,000	
1.6: Medium Pressure Zone Service Area Expansion	$ 33,000	$ 33,000					
1.7: Replace Well 12	$ 1,594,000					$ 159,400	$ 1,434,600
Sub-Total	$ 7,054,000	$ 676,800	$ 1,287,600	$ 1,379,900	$ 1,279,700	$ 995,400	$ 1,434,600
*Annual Replace - Pipe, FH, Meter, Well/Booster, Storage**	*$ 600,000*	*$ 100,000*	*$ 100,000*	*$ 100,000*	*$ 100,000*	*$ 100,000*	*$ 100,000*
Total CIP + Replacement Budgets	**$ 7,654,000**	**$ 776,800**	**$ 1,387,600**	**$ 1,479,900**	**$ 1,379,700**	**$ 1,095,400**	**$ 1,534,600**

**Target annual replacement budget is approximately $788,000. However, because approximatley 60% of the above CIP budget is replacement oriented, an annual buget of $100,000 was assumed for the first six years. This should be sufficient to address the Priority 1 condition improvements identified in the master plan.*

Estimate		5/28/2019
By:	MJS	

Unit Items	Unit	Unit Price (2019)
PVC Pipe		
6-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	LF	$ 70
8-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	LF	$ 80
10-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	LF	$ 95
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	LF	$ 110
16-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	LF	$ 139
10-inch Upsize Cost	LF	$ 15
12-inch Upsize Cost	LF	$ 30
16-inch Upsize Cost	LF	$ 59
Connect to Existing Water Main (10" & 12")	EA	$ 6,500
Connect to Existing Water Main (6" & 8")	EA	$ 4,000
PRV w Vault	EA	$ 35,000
Rock Excavation	LF	$ 55
8" gate valves - Includes installation	EA	$ 2,200
Individual Pressure Regulators	EA	$ 300
Demolition, single story building	LS	$ 15,000
Surface Repair		
1/2 Lane (7') Pavement Repair	LF	$ 25
Full lane (14') Pavement Repair	LF	$ 50
Control Density Backfill - additional cost (half lane)	LF	$ 73
HWY Repair - full lane	LF	$ 75
Gravel Road Repair (Trench Width - 4')	LF	$ 5
Misc.		
Soil Stabilization	LF	$ 1.50
Traffic Control w/o Flaggers	LF	$ 4
Traffic Control w/ Flaggers	LF	$ 6.50
Existing Utility Protection & Coordination	LF	$ 2
Reconnect Services	EA	$ 500
Special Crossings: (includes casing & installation of carrier pipe)		
Canal Crossing	EA	$ 25,000
Boring, construction & repairs (24 in and smaller casing)	LF	$ 400
Railroad Easement & Safety Coord	LF	$ 10
Mobilization, Bonding & Insurance - Percent of Item Cost Sum	%	10%
Contingency	%	30%
Engineering and CMS - % of total construction costs	%	20%
Engineering and CMS, small projects - % of total construction costs	%	32%
New Well (500 HP)		
Well Hole	LS	$ 300,000
Building (Roll-away capable)	LS	$ 138,840
Generator	LS	$ 102,071
Yard Piping	LS	$ 64,801
Site	LS	$ 15,758
Mechanical	LS	$ 108,978
HVAC	LS	$ 25,928
Electrical	LS	$ 112,294
Pump (500 HP)	LS	$ 116,532
Mobilization	LS	$ 1,156
	New Well sum	$ 986,360

Water Master Plan Improvements
Summary
Capital Improvement Cost Estimate

Site	Recommended Improvement	Recommended Completion Time	2018 Costs Priority 1	2018 Costs Priority 2	2018 Costs Priority 3
Well No. 1	Replace the pump shaft packing to reduce leakage	1-5 Years	$ 1,200		
	Add well water level measurement system	1-10 Years		$ 11,000	
	Add video monitoring	5-15 Years		$ 21,000	
		Subtotal	$ 1,200	$ 32,000	$ -
		Contingency (30%)	$ 360	$ 9,600	$ -
		Engineering (20%)	$ 312	$ 8,320	$ -
		Administration (2%)	$ 31	$ 832	$ -
		Total	$ 1,903	$ 50,752	$ -

Site	Recommended Improvement	Recommended Completion Time	2018 Costs Priority 1	2018 Costs Priority 2	2018 Costs Priority 3
Well No. 6	Replace Wooden Louver	5-15 Years	$ 3,800		
	Add video monitoring	5-15 Years			
		Subtotal	$ 3,800	$ -	$ -
		Contingency (30%)	$ 1,140	$ -	$ -
		Engineering (20%)	$ 988	$ -	$ -
		Administration (2%)	$ 99	$ -	$ -
		Total	$ 6,027	$ -	$ -

Site	Recommended Improvement	Recommended Completion Time	2018 Costs Priority 1	2018 Costs Priority 2	2018 Costs Priority 3
Well No. 9	Make roof repairs	1-5 Years	$ 5,200		
	Add video monitoring	5-15 Years		$ 21,000	
	Replace the entire building, salvage and reuse well, mechanical, electrical	10-15 Years			$ 145,000
		Subtotal	$ 5,200	$ 21,000	$ 145,000
		Contingency (30%)	$ 1,560	$ 6,300	$ 43,500
		Engineering (20%)	$ 1,352	$ 5,460	$ 37,700
		Administration (2%)	$ 135	$ 546	$ 3,770
		Total	$ 8,247	$ 33,306	$ 229,970

Site	Recommended Improvement	Recommended Completion Time	2018 Costs Priority 1	2018 Costs Priority 2	2018 Costs Priority 3
Well No. 11	Replace the motor conductor conduit	1-2 Years	$ 3,800		
	Add antenna ground wire	1-2 Years	$ 200		
	Replace the front door	5-15 Years		$ 1,200	
	Replace the wood siding	5-15 Years		$ 3,600	
	Replace the ventilation fan with AC	5-15 Years	$ 18,000		
	Add video monitoring	5-15 Years		$ 21,000	
		Subtotal	$ 22,000	$ 25,800	$ -
		Contingency (30%)	$ 6,600	$ 7,740	$ -
		Engineering (20%)	$ 5,720	$ 6,708	$ -
		Administration (2%)	$ 572	$ 671	$ -
		Total	$ 34,892	$ 40,919	$ -

Site	Recommended Improvement	Recommended Completion Time	2018 Costs Priority 1	2018 Costs Priority 2	2018 Costs Priority 3
Well No. 12	Replace the well facility with new facilities	1-10 Years			
		Subtotal	$ -	$ -	$ -
		Contingency (30%)	$ -	$ -	$ -
		Engineering (20%)	$ -	$ -	$ -
		Administration (2%)	$ -	$ -	$ -
		Total	$ -	$ -	$ -

Site	Recommended Improvement	Recommended Completion Time	2018 Costs Priority 1	2018 Costs Priority 2	2018 Costs Priority 3
Well No. 13	Install improved ventilation system including AC	1-5 Years	$ 18,000		
	Replace the main door	1-5 Years	$ 1,200		
	Replace motor drive with a soft start drive	5-15 Years		$ 200,000	
	Add video monitoring	5-15 Years		$ 21,000	
		Subtotal	$ 19,200	$ 221,000	$ -
		Contingency (30%)	$ 5,760	$ 66,300	$ -
		Engineering (20%)	$ 4,992	$ 57,460	$ -
		Administration (2%)	$ 499	$ 5,746	$ -
		Total	$ 30,451	$ 350,506	$ -

Site	Recommended Improvement	Recommended Completion Time	2018 Costs		
			Priority 1	Priority 2	Priority 3
Well No. 14	Modify movable building equipment	1-10 Years	$ 8,500		
	Extend concrete slab	1-10 Years	$ 4,800		
	Add video monitoring	5-15 Years	$ 21,000		
		Subtotal	$ 34,300	$ -	$ -
		Contingency (30%)	$ 10,290	$ -	$ -
		Engineering (20%)	$ 8,918	$ -	$ -
		Administration (2%)	$ 892	$ -	$ -
		Total	**$ 54,400**	**$ -**	**$ -**

Site	Recommended Improvement	Recommended Completion Time	2018 Costs		
			Priority 1	Priority 2	Priority 3
Well No. 15	Add video monitoring	5-15 Years		$ 14,000	
		Subtotal	$ -	$ 14,000	$ -
		Contingency (30%)	$ -	$ 4,200	$ -
		Engineering (20%)	$ -	$ 3,640	$ -
		Administration (2%)	$ -	$ 364	$ -
		Total	**$ -**	**$ 22,204**	**$ -**

Site	Recommended Improvement	Recommended Completion Time	2018 Costs		
			Priority 1	Priority 2	Priority 3
Well No. 16	Add video monitoring	5-15 Years		$ 21,000	
	Maintain the building roller system	10-20 Years			$ 2,400
		Subtotal	$ -	$ 21,000	$ 2,400
		Contingency (30%)	$ -	$ 6,300	$ 720
		Engineering (20%)	$ -	$ 5,460	$ 624
		Administration (2%)	$ -	$ 546	$ 62
		Total	**$ -**	**$ 33,306**	**$ 3,806**

Site	Recommended Improvement	Recommended Completion Time	2018 Costs		
			Priority 1	Priority 2	Priority 3
Pilot Booster Station	Maintenance of building entrance	1-5 Years	$ 1,400		
	Install portable hoist for equipment maintenance	2-5 Years	$ 3,600		
	Add video monitoring	5-15 Years		$ 21,000	
		Subtotal	$ 5,000	$ 21,000	$ -
		Contingency (30%)	$ 1,500	$ 6,300	$ -
		Engineering (20%)	$ 1,300	$ 5,460	$ -
		Administration (2%)	$ 130	$ 546	$ -
		Total	**$ 7,930**	**$ 33,306**	**$ -**

Site	Recommended Improvement	Recommended Completion Time	2018 Costs		
			Priority 1	Priority 2	Priority 3
3rd Street Booster Station	Add air conditioning equipment	2-5 Years	$ 3,000		
	Replace the motors with high efficiency motors	5-10 Years		$ 9,500	
	Add video monitoring	5-15 Years		$ 21,000	
		Subtotal	$ 3,000	$ 30,500	$ -
		Contingency (30%)	$ 900	$ 9,150	$ -
		Engineering (20%)	$ 780	$ 7,930	$ -
		Administration (2%)	$ 78	$ 793	$ -
		Total	**$ 4,758**	**$ 48,373**	**$ -**

Site	Recommended Improvement	Recommended Completion Time	2018 Costs		
			Priority 1	Priority 2	Priority 3
Storage Tank 2	Coat interior of tank	5-10 Years	$ 195,000		
	Add video monitoring	5-15 Years		$ 23,000	
	Coat exterior of tank	10-15 Years		$ 125,000	
		Subtotal	$ 195,000	$ 148,000	$ -
		Contingency (30%)	$ 58,500	$ 44,400	$ -
		Engineering (20%)	$ 50,700	$ 38,480	$ -
		Administration (2%)	$ 5,070	$ 3,848	$ -
		Total	**$ 309,270**	**$ 234,728**	**$ -**

Site	Recommended Improvement	Recommended Completion Time	2018 Costs		
			Priority 1	Priority 2	Priority 3
Storage Tank 3	Add video monitoring	5-15 Years		$ 23,000	
	Coat exterior of tank	10-15 Years		$ 160,000	
	Re-evaluate interior tank	10-15 Years	$ 5,500		
		Subtotal	$ 5,500	$ 183,000	$ -
		Contingency (30%)	$ 1,650	$ 54,900	$ -
		Engineering (20%)	$ 1,430	$ 47,580	$ -
		Administration (2%)	$ 143	$ 4,758	$ -
		Total	**$ 8,723**	**$ 290,238**	**$ -**

		Priority 1	Priority 2	Priority 3
Total 2018 Costs for All System Improvements		**$ 467,000**	**$ 1,138,000**	**$ 234,000**
5-Year Priority 1 Costs	Well	$ 27,200		
	Boosters	$ 2,600		
	Tank	$ 63,600		
First 5-Year Total	**Total**	**$ 93,400**		

Distribution Project Title:	Location:
Well 17 and Transmission Pipeline	**Near City Shop Site (Intersection of E 12th S and E 12th S), Main St, E 12th S, S 14th E, E 6th S**

Project Identifier:

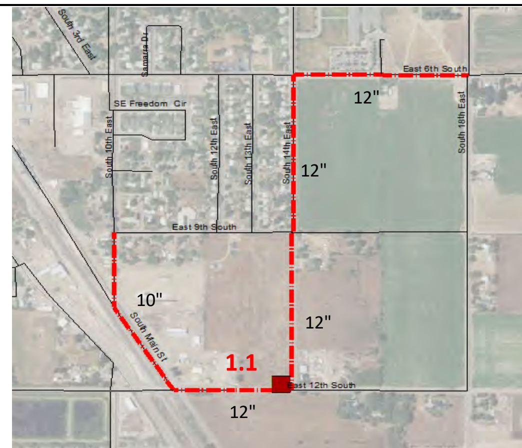
1.1

Objective:

Increase the City's firm water supply capacity to meet growing water demands.

Design Considerations:

- Provide standby power for increased system redundancy and resiliancy.
- Coordinate with Project 1.2 for replacement of transite pipe.
- Consider test well to mitigate risks of prodution well capacity and water quality.
- Coodinate with stormwater improvements planned for region.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
Well Hole	1	LS	$ 300,000	$300,000	
Building (Roll-away capable)	1	LS	$ 138,840	$138,840	
Generator	1	LS	$ 102,071	$102,071	
Yard Piping	1	LS	$ 64,801	$64,801	
Site	1	LS	$ 15,758	$15,758	
Mechanical	1	LS	$ 108,978	$108,978	
HVAC	1	LS	$ 25,928	$25,928	
Electrical	1	LS	$ 112,294	$112,294	
Pump (500 HP)	1	LS	$ 116,532	$116,532	
Well Subtotal					$985,204
Connect to Existing Water Main (10" & 12")	6	EA	$ 6,500	$39,000	
Reconnect Services	20	EA	$ 500	$10,000	
10-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,450	LF	$ 95	$137,750	
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	4,830	LF	$ 110	$531,300	
1/2 Lane (7') Pavement Repair	6,280	LF	$ 25	$157,000	
Rock Excavation	0	LF	$ 55	$0	
Existing Utility Protection & Coordination	6,280	LF	$ 2	$12,560	
Traffic Control w/o Flaggers	6,280	LF	$ 4	$25,120	
Pipeline Subtotal					*$912,730*
Well + Pipeline Subtotal					*$1,897,934*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$ 189,793	
Contingency			30%	$ 569,380	
Total Construction Costs					*$2,657,108*
Permitting	1		$ 30,000	$ 30,000	
Engineering and CMS - % of total construction costs			20%	$ 531,422	
Total Project Costs (rounded)					**$3,219,000**

The cost estimate herein is based on our perception of current conditions at the project location. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. Keller Associates has no control over variances in the cost of labor, materials, equipment, services provided by others, contractor's methods of determining prices, competitive bidding or market conditions, practices or bidding strategies. Keller Associates cannot and does not warrant or guarantee that proposals, bids, or actual construction costs will not vary from the cost presented herein.

Distribution Project Title:

Replace Transite Pipeline on S 12th E, S 13th E, E 6th S

Location:

South 12th E, South 13th E, East 6th S

Project Identifier:

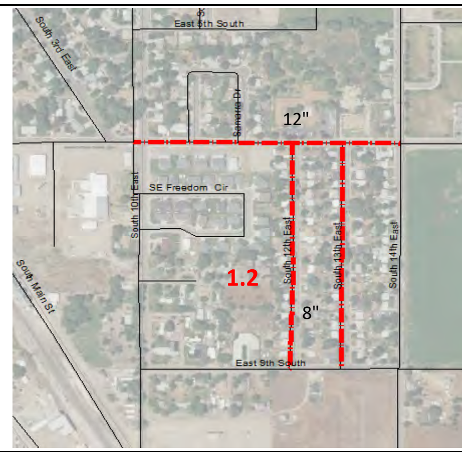
1.2

Objective:

Replace difficult-to-maintain transite pipe.

Design Considerations:

- Maintain services during construction.
- Coordinate with project 1.1.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
8-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	2,650	LF	$80	$212,761	
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,390	LF	$110	$152,900	
Connect to Existing Water Main (6" & 8")	2	EA	$4,000	$8,000	
Rock Excavation	0	LF	$55	$0	
1/2 Lane (7') Pavement Repair	4,040	LF	$25	$101,000	
Traffic Control w/o Flaggers	4,040	LF	$4	$16,160	
Existing Utility Protection & Coordination	4,040	LF	$2	$8,080	
Connect to Existing Water Main (10" & 12")	2	EA	$6,500	$13,000	
Reconnect Services	75	EA	$500	$37,500	
Subtotal					*$549,401*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$54,940	
Contingency			30%	$164,820	
Total Construction Costs					*$769,161*
Engineering and CMS - % of total construction costs			20%	$153,832	
Total Project Costs (rounded)					**$923,000**

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Distribution Project Title:

Upgrade Pipeline on West 2nd N, near West Elementary

Location:

West 2nd N, around West Elementary

Project Identifier:

1.3

Objective:

Provide fire protection to West Elementary school and improve transmission in the system.

Design Considerations:

- Construction of new pipe north of the school, complete when school is out.
- Coordinate with project 1.5
- Maintain services during construction

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,730	LF	$110	$190,300	
Connect to Existing Water Main (10" & 12")	2	EA	$6,500	$13,000	
Rock Excavation	0	LF	$55	$0	
1/2 Lane (7') Pavement Repair	1,730	LF	$25	$43,250	
Traffic Control w/o Flaggers	1,730	LF	$4	$6,920	
Existing Utility Protection & Coordination	1,730	LF	$2	$3,460	
Reconnect Services	20	EA	$500	$10,000	
Subtotal					*$266,930*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$26,693	
Contingency			30%	$80,079	
Total Construction Costs					*$373,702*
Engineering and CMS - % of total construction costs			20%	$74,740	
Total Project Costs (rounded)					**$449,000**

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Distribution Project Title:	Location:
Commercial Fire Upgrades, near DeMeyer	**New pipes north of DeMeyer furniture, connect to Airbase Rd**

Project Identifier:

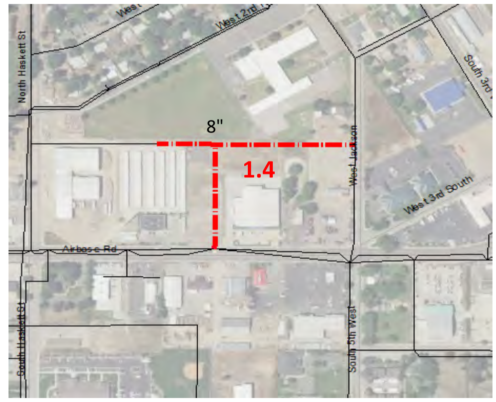
1.4

Objective:

Provide improved fire flow to commercial area.

Design Considerations:

- Aquiring easements to construct new pipeline.
- Maintaining services to the surrounding neighborhood/nearby commercial entities.
- Pipe routing to coordinate with private property users.
- Potential work in ITD Right-of-Way for connection of Air Base Road.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
8-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,300	LF	$80	$104,373	
16-inch Upsize Cost	3	LF	$59	$177	
Rock Excavation	0	LF	$55	$0	
1/2 Lane (7') Pavement Repair	1,300	LF	$25	$32,500	
Easements (Assume Donated)	3	EA	$0	$0	
Traffic Control w/o Flaggers	1,300	LF	$4	$5,200	
Existing Utility Protection & Coordination	1,300	LF	$2	$2,600	
Subtotal					*$144,850*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$14,485	
Contingency			30%	$43,455	
Total Construction Costs					*$202,790*
Easement / Permitting Support	1		$ 8,000	$8,000	
Engineering and CMS - % of total construction costs			20%	$40,558	
Total Project Costs (rounded)					**$252,000**

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Distribution Project Title:

Replace Transite Pipeline on Chesnut St and W 3rd N

Location:

Chestnut St, West 3rd N

Project Identifier:

1.5

Objective:

Replace difficult-to-maintain transite pipe.

Design Considerations:

- Maintaining services to surrounding neighborhood.
- Connections to existing system.
- Coordinate with project 1.3 for potential cost savings.

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
8-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	2,640	LF	$80	$211,960	
Connect to Existing Water Main (6" & 8")	4	EA	$4,000	$16,000	
Rock Excavation	0	LF	$55	$0	
1/2 Lane (7') Pavement Repair	2,640	LF	$25	$66,000	
Traffic Control w/o Flaggers	2,640	LF	$4	$10,560	
Existing Utility Protection & Coordination	2,640	LF	$2	$5,280	
Reconnect Services	75	EA	$500	$37,500	
Subtotal					*$347,300*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$34,730	
Contingency			30%	$104,190	
Total Construction Costs					*$486,220*
Engineering and CMS - % of total construction costs			20%	$97,244	
Total Project Costs (rounded)					**$584,000**

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Distribution Project Title:

Medium Pressure Zone Service Area Expansion

Location:

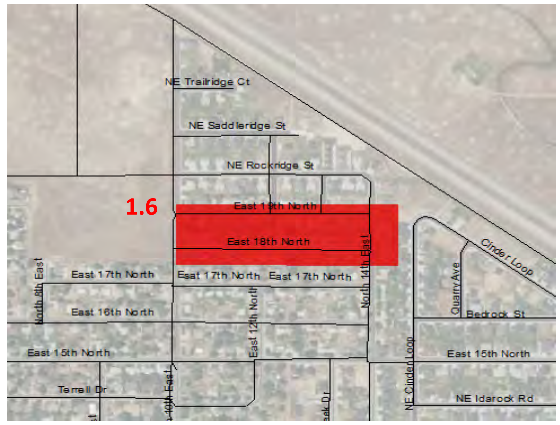
N 10th E and N 14th E between E 17th N and E 19th N

Project Identifier:

1.6

Objective:
Alter middle pressure zone to remove areas of low pressure in the Lower Pressure Zone

Design Considerations:
- Maintain service to the surrounding neighborhood.
- Properly owner coordination.
- Increased pressures above 80 psi require individual pressure regulators.
- City to self-perform work as potential cost savings.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
8" gate valves - Includes installation	2	EA	$2,200	$4,400	
Individual Pressure Regulators	25	EA	$300	$7,500	
Asphalt Repair	1	LS	$4,000	$4,000	
Traffic Control	1	LF	$1,500	$1,500	
Subtotal					*$17,400*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$1,740	
Contingency			30%	$5,220	
Total Construction Costs					*$24,360*
Engineering and CMS, small projects - % of total construction costs			35%	$8,526	
Total Project Costs (rounded)					**$33,000**

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Distribution Project Title:	Location:
Replace Well 12	**Existing Well 12 Site, North of**

Project Identifier:

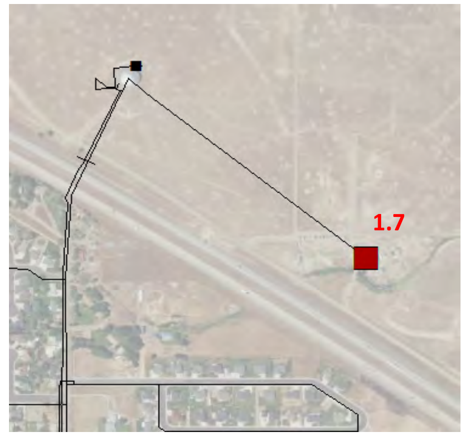
1.7

Objective:

Replace antiquated Well 12

Design Considerations:

- Coordinate upgrades with existing adjacent property owner
- Consider similar feature incorporated into nearby Well 16 (VFD control, level monitoring, roll away building, etc.)
- Relocated well hole and facilities.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
Well Hole	1	LS	$ 300,000	$300,000	
Building (Roll-away capable)	1	LS	$ 138,840	$138,850	
Generator	1	LS	$ 102,071	$102,080	
Yard Piping	1	LS	$ 64,801	$64,810	
Site	1	LS	$ 15,758	$15,760	
Mechanical	1	LS	$ 108,978	$108,980	
HVAC	1	LS	$ 25,928	$25,930	
Electrical	1	LS	$ 112,294	$112,300	
Pump (500 HP)	1	LS	$ 116,532	$116,540	
Mobilization	1	LS	$ 1,156	$1,160	
Well Subtotal					*$986,410*
Connect to Existing discharge pipe	1	LS	$ 20,000	$20,000	
Demolition, single story building	1	LS	$ 15,000	$15,000	
Subtotal					*$35,000*
Well + Pipeline Subtotal					*$1,021,410*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$102,141	
Contingency			20%	$204,282	
Total Construction Costs					*$1,327,833*
Engineering and CMS - % of total construction costs			20%	$265,567	
Total Project Costs (rounded)					**$1,594,000**

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Distribution Project Title:

W 5th N, Water Main Upgrade

Location:

West 5th N

Project Identifier:

2.1

Objective:
- Improve transmission near Well 6

Design Considerations:
- Maintaining services
- Connections to existing system
- Potentially coordinate work along W 5th N with development

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	750	LF	$ 110	$82,500	
1/2 Lane (7') Pavement Repair	750	LF	$ 25	$18,750	
Connect to Existing Water Main (10" & 12")	3	EA	$ 6,500	$19,500	
Rock Excavation	0	LF	$ 55	$0	
Existing Utility Protection & Coordination	750	LF	$ 2	$1,500	
Traffic Control w/o Flaggers	750	LF	$ 4	$3,000	
Reconnect Services	5	EA	$ 500	$2,500	
Subtotal					*$127,750*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$12,775	
Contingency			30%	$38,325	
Total Construction Costs					*$178,850*
Engineering and CMS - % of total construction costs			20%	$35,770	
Total Project Costs (rounded)					**$215,000**

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Distribution Project Title:

Transmission Pipeline Upgrades on Elmcrest and West 5th North

Location:

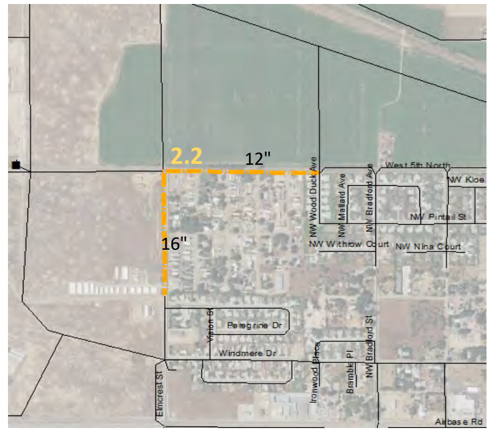
West 5th North St and Elmcrest St

Project Identifier:

2.2

Objective:
- Improve transmission near Wells 11 and 13

Design Considerations:
- Rock excavation
- Coordination with nearby water users association
- Maintaining traffic to Industrial area (Marathon Way)
- Pontentially coordinate work along W 5th North with development



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,270	LF	$ 110	$139,700	
16-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,470	LF	$ 139	$204,474	
1/2 Lane (7') Pavement Repair	2,740	LF	$ 25	$68,500	
Connect to Existing Water Main (10" & 12")	3	EA	$ 6,500	$19,500	
Rock Excavation	700	LF	$ 55	$38,500	
Existing Utility Protection & Coordination	2,740	LF	$ 2	$5,480	
Traffic Control w/ Flaggers	2,740	LF	$ 7	$17,810	
Subtotal					*$493,964*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$49,396	
Contingency			30%	$148,189	
Total Construction Costs					*$691,550*
Engineering and CMS - % of total construction costs			20%	$138,310	
Total Project Costs (rounded)					**$830,000**

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Distribution Project Title:

Old State Highway 30 Pipeline

Location:

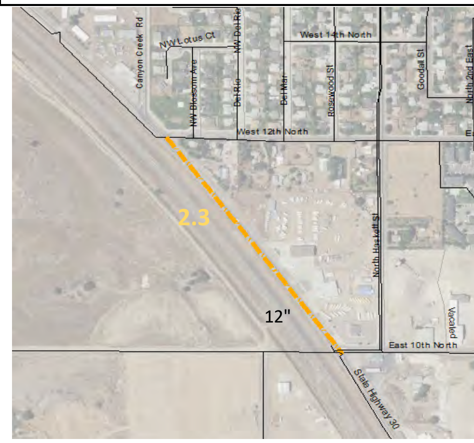
Old State Highway 30 between E 12th N and E 10th N

Project Identifier:

2.3

Objective:
- Increase fire flow to commerical entitires along Old U.S. 30 and improve transmission

Design Considerations:
- Connections to system.
- Highway permitting.
- Potentially coordinate work with development.
- Budget assumes majority of pipeline can be located outside of roadway prism.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,680	LF	$ 110	$184,800	
HWY Repair - full lane	200	LF	$ 75	$15,000	
Connect to Existing Water Main (10" & 12")	2	EA	$ 6,500	$13,000	
Rock Excavation	0	LF	$ 55	$0	
Traffic Control w/ Flaggers	1,680	LF	$ 7	$10,920	
Existing Utility Protection & Coordination	200	LF	$ 2	$400	
Subtotal					*$224,120*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$22,412	
Contingency			30%	$67,236	
Total Construction Costs					*$313,768*
Permitting			$ 2,500	$2,500	
Engineering and CMS - % of total construction costs			20%	$62,754	
Total Project Costs (rounded)					**$380,000**

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Distribution Project Title:

NE Pearl St and W 17th N Pipelines

Location:

NE Pearl St and W 17th N to State Highway 30

Project Identifier:

2.4

Objective:

- Increase fire flow to commercial entities along Old Highway 30 and improve transmission.

Design Considerations:

- Maintaining services.
- Aquiring easements.
- Connections to system.
- Highway crossings/permitting.
- Coordinate with future development for pipeline route within future roadway extensions.

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	3,210	LF	$ 110	$353,100	
1/2 Lane (7') Pavement Repair	1,310	LF	$ 25	$32,750	
Soil Stabilization	1,900	LF	$ 2	$2,850	
Rock Excavation	600	LF	$ 55	$33,000	
Connect to Existing Water Main (6" & 8")	2	EA	$ 4,000	$8,000	
Existing Utility Protection & Coordination	3,210	LF	$ 2	$6,420	
Traffic Control w/o Flaggers	1,310	LF	$ 4	$5,240	
Easement	1	LS	$ 20,000	$20,000	
Subtotal					*$461,360*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$46,136	
Contingency			30%	$138,408	
Total Construction Costs					*$645,904*
Engineering and CMS - % of total construction costs			20%	$129,181	
Total Project Costs (rounded)					**$776,000**

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Distribution Project Title:

Queen's Court Pipeline

Location:

Queen's Court

Project Identifier:

2.5

Objective:
- Replace deficient 4-inch water main with an 8-inch water main to improve available residential fire flows.

Design Considerations:
- Maintaining services.
- Connections to existing system.
- Note - improvement previously designed 10+ years ago.

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
8-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	390	LF	$ 80	$31,312	
1/2 Lane (7') Pavement Repair	390	LF	$ 25	$9,750	
Connect to Existing Water Main (6" & 8")	1	EA	$ 4,000	$4,000	
Rock Excavation	0	LF	$ 55	$0	
Traffic Control w/o Flaggers	390	LF	$ 4	$1,560	
Reconnect Services	10	EA	$ 500	$5,000	
Existing Utility Protection & Coordination	390	LF	$ 2	$780	
Subtotal					*$52,402*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$5,240	
Contingency			30%	$15,721	
Total Construction Costs					*$73,363*
Engineering - Previously Designed, CMS - % of total construction costs			15%	$11,004	
Total Project Costs (rounded)					**$85,000**

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Distribution Project Title:

Upgrade Transmission Pipeline on N 3rd E and E 15th N

Location:

N 3rd E and E 15th N

Project Identifier:

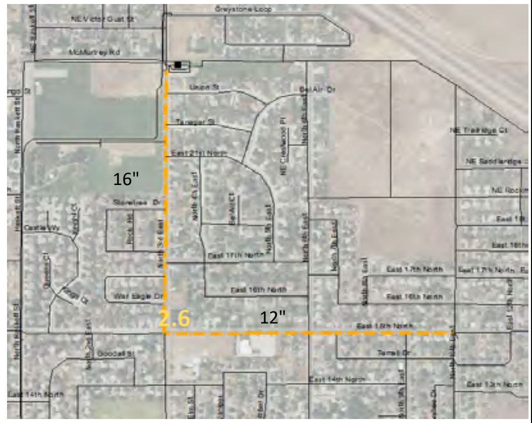
2.6

Objective:

- Improve transmission and pressures in northern portion of Lower Pressure Zone

Design Considerations:

- Maintaining services
- Connections to system



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	2,640	LF	$ 110	$290,400	
16-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	2,540	LF	$ 139	$353,309	
1/2 Lane (7') Pavement Repair	5,180	LF	$ 25	$129,500	
Connect to Existing Water Main (10" & 12")	12	EA	$ 6,500	$78,000	
Rock Excavation	0	LF	$ 55	$0	
Traffic Control w/o Flaggers	5,180	LF	$ 4	$20,720	
Reconnect Services	70	EA	$ 500	$35,000	
Existing Utility Protection & Coordination	5,180	LF	$ 2	$10,360	
Subtotal					*$917,289*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$91,729	
Contingency			30%	$275,187	
Total Construction Costs					*$1,284,204*
Engineering and CMS - % of total construction costs			20%	$256,841	
Total Project Costs (rounded)					**$1,542,000**

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Distribution Project Title:

Connect Well 9 to Medium Pressure Zone

Location:

North 18th E St

Project Identifier:

2.7

Objective:
- Add a water source to Middle Pressure Zone.
- Pressure reducing valve for emergency water to Lower Zone and maintain minimum pressures.

Design Considerations:
- Added pressures will affect Well 9 pump output which should be reviewed as part of this project.
- Pipe routing along golf course for potential cost savings

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,570	LF	$ 110	$172,700	
1/2 Lane (7') Pavement Repair	1,570	LF	$ 25	$39,250	
Connect to Existing Water Main (6" & 8")	2	EA	$ 4,000	$8,000	
Rock Excavation	1,600	LF	$ 55	$88,000	
Traffic Control w/ Flaggers	1,570	LF	$ 7	$10,205	
Reconnect Services	0	EA	$ 500	$0	
Connect to Existing Water Main (10" & 12")	1	EA	$ 6,500	$6,500	
PRV w Vault	1	EA	$ 35,000	$35,000	
Existing Utility Protection & Coordination	1,570	LF	$ 2	$3,140	
Subtotal					*$362,795*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$36,280	
Contingency			30%	$108,839	
Total Construction Costs					*$507,913*
Engineering and CMS - % of total construction costs			20%	$101,583	
Total Project Costs (rounded)					**$610,000**

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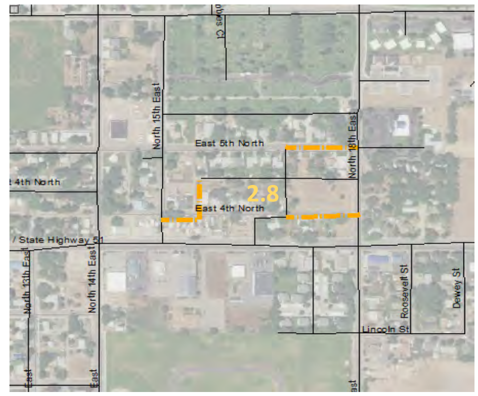
Distribution Project Title:	Location:
E 4th N and E 5th N Pipelines	**E 4th N and E 5th N**

Project Identifier:

2.8

Objective:
- Increase available fire flow to residential areas and provide looping

Design Considerations:
- Maintaining services.
- Pipe Routing.
- Easements.
- Connection to existing service.
- Note - improvement designed previously 10+ years ago.



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
8-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,180	LF	$ 80	$94,738	
1/2 Lane (7') Pavement Repair	830	LF	$ 25	$20,750	
Soil Stabilization	350	LF	$ 1.50	$525	
Connect to Existing Water Main (6" & 8")	5	EA	$ 4,000	$20,000	
Rock Excavation	0	LF	$ 55	$0	
Traffic Control w/o Flaggers	830	LF	$ 4	$3,320	
Reconnect Services	10	EA	$ 500	$5,000	
Existing Utility Protection & Coordination	1,180	LF	$ 2	$2,360	
Subtotal					*$146,693*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$14,669	
Contingency			30%	$44,008	
Total Construction Costs					*$205,371*
Engineering - Previously Designed, CMS - % of total construction costs			15%	$30,806	
Total Project Costs (rounded)					**$237,000**

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Distribution Project Title:

N 2nd E Pipeline

Location:

N 2nd E

Project Identifier:

2.9

Objective:
- Increase available fire flow to commercial areas

Design Considerations:
- Connections to existing system
- Coordinate with local property owener(s)

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
8-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	307	LF	$ 80	$24,648	
1/2 Lane (7') Pavement Repair	307	LF	$ 25	$7,675	
Connect to Existing Water Main (6" & 8")	2	EA	$ 4,000	$8,000	
Rock Excavation	0	LF	$ 55	$0	
Traffic Control w/o Flaggers	307	LF	$ 4	$1,228	
Reconnect Services	0	EA	$ 500	$0	
Existing Utility Protection & Coordination	307	LF	$ 2	$614	
Subtotal					*$42,165*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$4,217	
Contingency			30%	$12,650	
Total Construction Costs					*$59,031*
Permitting/ Easements	1	LS	$ 4,500	$4,500	
Engineering and CMS - % of total construction costs			30%	$17,709	
Total Project Costs (rounded)					**$82,000**

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Distribution Project Title:

Airbase Road Pipeline

Location:

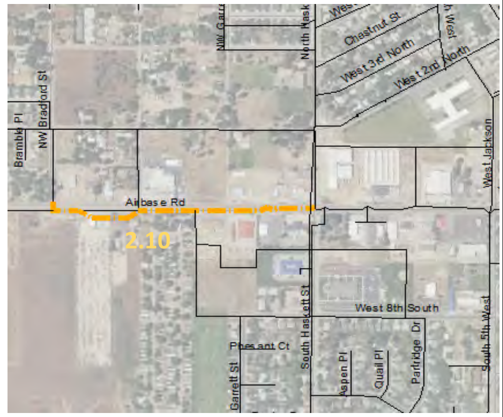
Airbase Road

Project Identifier:

2.10

Objective:
- Increase transmission and available fire flow

Design Considerations:
- Maintaining services and minimizing disruptions to business
- Permitting with ITD for work in Highway
- Connections to system
- Coordinate with highway work for significant potential cost savings



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	2,030	LF	$ 110	$223,300	
HWY Repair - full lane	2,030	LF	$ 75	$152,250	
Connect to Existing Water Main (6" & 8")	2	EA	$ 4,000	$8,000	
Rock Excavation	0	LF	$ 55	$0	
Traffic Control w/ Flaggers	2,030	LF	$ 7	$13,195	
Reconnect Services	15	EA	$ 500	$7,500	
Control Density Backfill - additional cost (half lane)	2,030	LF	$ 73	$148,190	
Existing Utility Protection & Coordination	2,030	LF	$ 2	$4,060	
Subtotal					*$556,495*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$55,650	
Contingency			30%	$166,949	
Total Construction Costs					*$779,093*
Permitting	1		$ 3,500	$3,500	
Engineering and CMS - % of total construction costs			20%	$155,819	
Total Project Costs (rounded)					**$939,000**

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Distribution Project Title:

Upgrade Pipelines along W 7th S

Location:

W 7th S

Project Identifier:

2.11

Objective:

- Increase available fire flow to commercial areas.

Design Considerations:

- Maintaining services
- Connections to system

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
8-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,220	LF	$ 80	$97,950	
1/2 Lane (7') Pavement Repair	1,220	LF	$ 25	$30,500	
Connect to Existing Water Main (6" & 8")	4	EA	$ 4,000	$16,000	
Rock Excavation	0	LF	$ 55	$0	
Traffic Control w/o Flaggers	1,220	LF	$ 4	$4,880	
Reconnect Services	10	EA	$ 500	$5,000	
Existing Utility Protection & Coordination	1,220	LF	$ 2	$2,440	
Subtotal					*$156,770*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$15,677	
Contingency			30%	$47,031	
Total Construction Costs					*$219,478*
Legal			0%	$0	
Engineering and CMS - % of total construction costs			20%	$43,896	
Total Project Costs (rounded)					**$264,000**

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Distribution Project Title:

N Haskett St Pipeline Upgrades

Location:

N Haskett St

Project Identifier:

3.1

Objective:
- Provide improved transmission.

Design Considerations:
- Maintaining services
- Connections to existing system
- Consider completing part of this project with adjacent Priority 1 pipeline improvements.
- Potential disruption to nearby school.

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,910	LF	$ 110	$210,100	
1/2 Lane (7') Pavement Repair	1,910	LF	$ 25	$47,750	
Traffic Control w/o Flaggers	1,910	LF	$ 4	$7,640	
Rock Excavation	0	LF	$ 55	$0	
Connect to Existing Water Main (10" & 12")	10	EA	$ 6,500	$65,000	
Existing Utility Protection & Coordination	1,910	LF	$ 2	$3,820	
Subtotal					*$334,310*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$33,431	
Contingency			30%	$100,293	
Total Construction Costs					*$468,034*
Engineering and CMS - % of total construction costs			20%	$93,607	
Total Project Costs (rounded)					**$562,000**

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Distribution Project Title:	Location:
Well 18 - SW Mountain Home	**SW Smith Road**

Project Identifier:

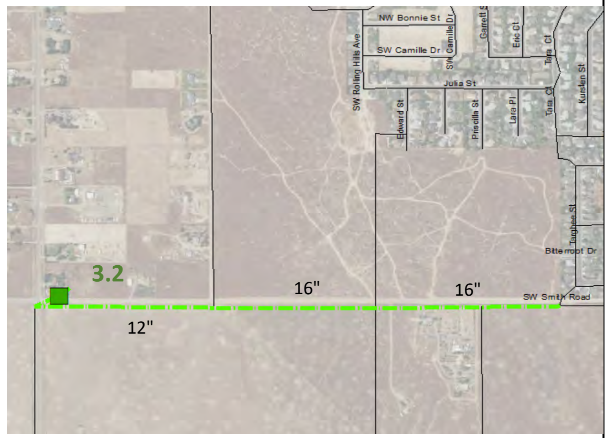
3.2

Objective:

Increase the City's firm capacity to meet 2040 requirements, dependent on residential growth

Design Considerations:

- Meet City's need for standby power
- Provide ability to meet demands of new developments and also provide large flows to supplement City supply



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
Well Hole	1	LS	$ 300,000	$300,000	
Building (Roll-away capable)	1	LS	$ 138,840	$138,900	
Generator	1	LS	$ 102,071	$102,100	
Yard Piping	1	LS	$ 64,801	$64,900	
Site	1	LS	$ 15,758	$15,800	
Mechanical	1	LS	$ 108,978	$109,000	
HVAC	1	LS	$ 25,928	$26,000	
Electrical	1	LS	$ 112,294	$112,300	
Pump (500 HP)	1	LS	$ 116,532	$116,600	
Mobilization	1	LS	$ 1,156	$1,200	
Well Subtotal					$986,800
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,360	LF	$ 110	$149,600	
16-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	2,637	LF	$ 139	$366,900	
Gravel Road Repair (Trench Width - 4')	3,997	LF	$ 5	$20,000	
Connect to Existing Water Main (10" & 12")	1	EA	$ 6,500	$6,500	
Rock Excavation	3,000	LF	$ 55	$165,000	
Traffic Control w/o Flaggers	3,997	LF	$ 4	$16,000	
Pipeline Subtotal					*$724,000*
Well + Pipeline Subtotal					*$1,710,800*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$ 72,400	
Contingency			30%	$ 217,200	
Total Construction Costs					*$2,000,400*
Permitting				$ 25,000	
Engineering and CMS - % of total construction costs			20%	$ 400,080	
Total Project Costs (rounded)					**$2,426,000**

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Distribution Project Title:

West Airbase Road and Elmcrest St Upgrades

Location:

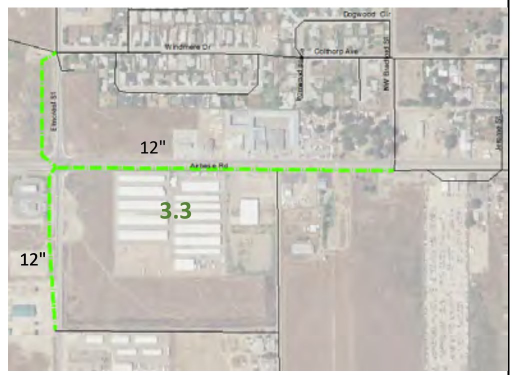
Elmcrest St and Airbase Road

Project Identifier:

3.3

Objective:
- Provide distribution for future commercial growth and improve transmission for system.

Design Considerations:
- Maintaining services
- Connections to existing system
- Work within ITD Right-of-Way
- Budget assumes pipeline routed outside of roadway prism on Elmcrest and Bruncan Hwy.
- Potentially coordinate with future ITD project or development for project savings



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	3,680	LF	$ 110	$404,800	
HWY Repair - full lane	2,010	LF	$ 75	$150,750	
Gravel Road Repair (Trench Width - 4')	1,670	LF	$ 5	$8,350	
Traffic Control w/ Flaggers	2,010	LF	$ 6.50	$13,065	
Traffic Control w/o Flaggers	1,670	LF	$ 4.00	$6,680	
Rock Excavation	2,200	LF	$ 55	$121,000	
Control Density Backfill - additional cost (half lane)	2,010	LF	$ 73	$146,730	
Connect to Existing Water Main (10" & 12")	2	EA	$ 6,500	$13,000	
Highway Bore	90	LF	$ 650	$58,500	
Existing Utility Protection & Coordination	3,680	LF	$ 2	$7,360	
Subtotal					*$930,235*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$93,024	
Contingency			30%	$279,071	
Total Construction Costs					*$1,302,329*
Permitting	1	LS	$ 4,500	$4,500	
Engineering and CMS - % of total construction costs			20%	$260,466	
Total Project Costs (rounded)					**$1,568,000**

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Distribution Project Title:

Connecting to Lateral North of S Haskett St LDS church

Location:

North of LDS church on S Haskett St

Project Identifier:

3.4

Objective:
- Provide fire flow for commercial areas

Design Considerations:
- Maintaining services
- Connections to existing system
- Easements
- Coordinate with private property owner(s) and potential future redevelopment of adjacent parcels.

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
8-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	709	LF	$ 80	$56,923	
Soil Stabilization	355	LF	$ 2	$532	
1/2 Lane (7') Pavement Repair	355	LF	$ 25	$8,863	
Traffic Control w/o Flaggers	1	LS	$ 1,500	$1,500	
Rock Excavation	400	LF	$ 55	$22,000	
Connect to Existing Water Main (6" & 8")	2	EA	$ 4,000	$8,000	
Subtotal					*$97,818*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$9,782	
Contingency			30%	$29,345	
Total Construction Costs					*$136,945*
Easement	1		$ 15,000	$15,000	
Engineering and CMS - % of total construction costs			20%	$27,389	
Total Project Costs (rounded)					**$180,000**

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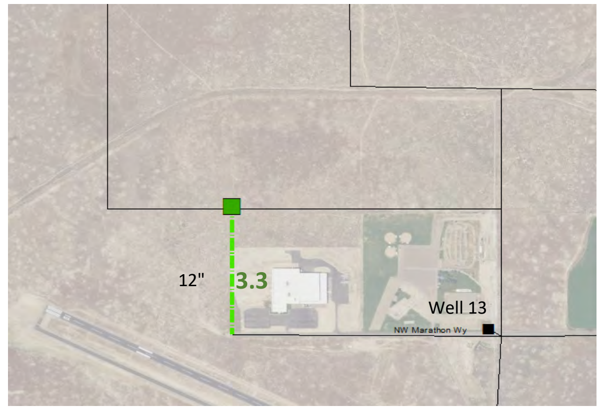
Distribution Project Title:
Well 19 - New Industrial Well

Location:
North of NW Marathon Way

Project Identifier:
3.5

Objective:
Increase the City's firm capacity to meet 2040 requirements, dependent on industrial growth

Design Considerations:
- Meet City's need for standby power
- Provide ability to meet demands of new developments and also provide large flows to supplement City supply



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
Well Hole	1	LS	$ 300,000	$300,000	
Building (Roll-away capable)	1	LS	$ 138,840	$138,900	
Generator	1	LS	$ 102,071	$102,100	
Yard Piping	1	LS	$ 64,801	$64,900	
Site	1	LS	$ 15,758	$15,800	
Mechanical	1	LS	$ 108,978	$109,000	
HVAC	1	LS	$ 25,928	$26,000	
Electrical	1	LS	$ 112,294	$112,300	
Pump (500 HP)	1	LS	$ 116,532	$116,600	
Mobilization	1	LS	$ 1,156	$1,200	
Well Subtotal					$986,800
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydrants	1,370	LF	$ 110	$150,700	
Rock Excavation	1,400	LF	$ 55	$77,000	
Connect to Existing Water Main (10" & 12")	1	EA	$ 6,500	$6,500	
Soil Stabilization	1,370	LF	$ 1.50	$2,100	
Existing Utility Protection & Coordination	1,370	LF	$ 2	$2,800	
Pipeline Subtotal					*$239,100*
Well + Pipeline Subtotal					*$1,225,900*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$ 122,590	
Contingency			30%	$ 367,770	
Total Construction Costs					*$1,716,260*
Engineering and CMS - % of total construction costs			20%	$ 343,252	
Total Project Costs (rounded)					**$2,060,000**

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Distribution Project Title:

City-wide Pipesize Upsizing

Location:

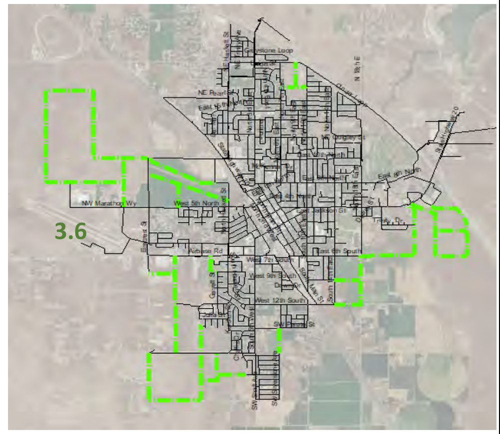
City-wide

Project Identifier:

3.6

Objective:
- Provide distribution for future growth.

Design Considerations:
- Maintaining services
- Connections to existing system
- Expansion of City limits and service areas



General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
10-inch Upsize Cost	21,070	LF	$ 15	$310,007	
12-inch Upsize Cost	35,160	LF	$ 30	$1,044,716	
16-inch Upsize Cost	5,330	LF	$ 59	$313,464	
Total Project Costs (rounded)					**$1,669,000**

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City of Mountain Home

Water Master Plan

Annual Replacement Budgets

Replacement Based on Pipeline Materials

Component	Annual Budget		Comments
Pipelines	$	351,000	All cast iron/steel, 4-inches and smaller replaced over 20 years
Fire Hydrants	$	86,000	2% of system per year
Meters	$	102,000	Based on current budget for accelerated meter conversion; can be reduced once fully converted.
Well Facilities	$	174,000	Includes well facility and periodic well hole rehab
Booster Facilities	$	30,000	includes booster facility components
Storage	$	45,000	Includes minor repairs, cleaning and inspection
Total	**$**	**788,000**	

City of Mountain Home
Water Master Plan
Annual Pipeline Replacement Budget

Pipe Diameter [in]	Pipe Material Lengths [ft]						Total by Diameter [ft]
	Steel	CI	DI	PVC	Transite	Unkown	
Unknown				243			243
1"		1007		1227			2,234
2"	1001		412	691		18	2,122
3"				54			54
4"		246	2,108	23,137			25,491
6"			4,775	174,249	8,408	24	187,456
8"		1,413	7,627	173,481			182,521
10"		1,712	4,286	32,679			38,677
12"			4,201	33,832			38,033
14"		2947	59	22,678			25,684
16"				15,935			15,935
24"				2,806			2,806
Total by Material [ft]	1,001	7,325	23,468	481,012	8,408	42	516,603

Pipeline Replacement Costs		**Feet/year**	
Steel		50	
Cast Iron (replace all)		366	
Transite (replace all)		420	
Ductile Iron (4-inches and smaller)		126	
PVC 4-inch and smaller		1,268	
Total		2,230	
% of System		0.4%	
Project Cost / Foot	$	157	includes valves, pavement, fittings, engineering, etc. assumes most pipe is 8-inches
Cost/year (rounded)	**$**	**351,000**	

Fire Hydrant Replacement		
City Hydrants		886
Typical Life (yrs)		50
# Hydrants per year		17.72
Cost /Hydrant	$	4,859
Cost/year (rounded)	**$**	**86,000**

City of Mountain Home
Water Master Plan
Well Facility Improvements

Well Number	Pressure Zone	Pump Type[a] and Capacity (gpm)	Backup Power
1	Lower	CS (700)	No
6	Lower	CS (2,000)	Yes
9	Lower	VFD (900)	No
11	Lower	CS (2,100)	No
12	Lower	CS (1,200)	No
13	Lower	CS (1,950)	No
14	Lower	CS (1,200)	Yes
15	Lower	VFD (1,100)	No
16	Lower	VFD (850)	Yes

[a]CS - constant speed; VFD - variable frequency drive.

200 ± HP Pump and Motors (Wells 1, 9, 14, 16)			
Typical Replacement Activities	Frequency (years)	Unit Cost	Cost/year
Roof replacement	25	$ 25,000	$ 1,000
Electrical	20	$ 35,000	$ 1,750
Pump and motor	15	$ 60,000	$ 4,000
Door, HVAC, Siding	30	$ 50,000	$ 1,667
SCADA	15	$ 20,000	$ 1,333
Building	50	$ 120,000	$ 2,400
Site paving, fencing, etc.	30	$ 30,000	$ 1,000
Chlorination / treatment	20	$ 20,000	$ 1,000
Valves / meter /piping	30	$ 30,000	$ 1,000
Total per Facility			$ 15,150
# Wells On line			4
Recommended Annual Budget (rounded)			**$ 61,000**

500 ± HP Pump and Motors (Wells 6, 11, 12, 13, 15)			
Typical Replacement Activities	Frequency (years)	Unit Cost	Cost/year
Roof replacement	25	$ 25,000	$ 1,000
Electrical	20	$ 75,000	$ 3,750
Pump and motor	15	$ 100,000	$ 6,667
Door, HVAC, Siding	30	$ 50,000	$ 1,667
SCADA	15	$ 20,000	$ 1,333
Building	50	$ 120,000	$ 2,400
Site paving, fencing, etc.	30	$ 30,000	$ 1,000
Chlorination / treatment	20	$ 20,000	$ 1,000
Valves / meter /piping	30	$ 40,000	$ 1,333
Total per Facility			$ 20,150
# Wells On line			5
Recommended Annual Budget (rounded)			**$ 101,000**

Well Hole Rehabilitation	15	$ 20,000	$ 1,333
# Wells			9
Recommended Annual Budget (rouned)			**$ 12,000**

Grand Total	**$ 174,000**

City of Mountain Home
Water Master Plan
Booster Facility Improvements

Booster Station	Location	Zonal Direction	Pumps	Installed Capacity (gpm)	Backup Power?
3rd Street	Intersection of N 3rd E St, McMurtrey Rd	Lower to Medium	15-HP	850	No
3rd Street Fire	Intersection of N 3rd E St, McMurtrey Rd	Lower to Medium	40-HP	1,450	No
Pilot	Near Pilot Station	Tank 2 to Upper	30-HP	900	No
Pilot	Near Pilot Station	Tank 2 to Upper	30-HP	900	No
Pilot	Near Pilot Station	Tank 2 to Lower	15-HP	900	No

3rd Street Booster

Typical Replacement Activities	Frequency (years)	Unit Cost	Cost/year
Roof replacement	25	$ 25,000	$ 1,000
Electrical	20	$ 45,000	$ 2,250
Door, HVAC, Siding	30	$ 50,000	$ 1,667
Pump and motor	20	$ 57,000	$ 2,850
SCADA	15	$ 20,000	$ 1,333
Building	50	$ 120,000	$ 2,400
Site paving, fencing, etc.	30	$ 30,000	$ 1,000
Valves / meter	30	$ 40,000	$ 1,333
Total per Facility			$ 13,833

Pilot Booster Station

Typical Replacement Activities	Frequency (years)	Unit Cost	Cost/year
Roof replacement	25	$ 25,000	$ 1,000
Electrical	20	$ 55,000	$ 2,750
Door, HVAC, Siding	30	$ 50,000	$ 1,667
Pump and motor	20	$ 85,000	$ 4,250
SCADA	15	$ 20,000	$ 1,333
Building	50	$ 120,000	$ 2,400
Site paving, fencing, etc.	30	$ 30,000	$ 1,000
Valves / meter	30	$ 55,000	$ 1,833
Total per Facility			$ 16,233

Recommended Annual Budget (rounded) **$ 30,000**

City of Mountain Home
Water Master Plan
Storage Tanks -- Anticipated Expenses During Planning Period

Tank 1A 2 MG Tank (assumes City invests for major paint and rehab work)

Typical Replacement Activities	Frequency (years)	Unit Cost	Cost/year
New Hatch	25	$ 9,800	$ 392
New Vent	25	$ 8,000	$ 320
New Ladder	25	$ 12,000	$ 640
Site paving, fencing, etc.	30	$ 30,000	$ 1,000
Inspection	7	$ 5,000	$ 714
Paint/Coating	25	$ 60,000	$ 2,400
Clean	7	$ 9,500	$ 1,357
Annual Cost (rounded)			$ 6,800

Tank 1B 2 MG Tank

Typical Replacement Activities	Frequency (years)	Unit Cost	Cost/year
New Hatch	25	$ 9,800	$ 392
New Vent	25	$ 8,000	$ 320
New Ladder	25	$ 16,000	$ 640
Site paving, fencing, etc.	30	$ 30,000	$ 1,000
Inspection	7	$ 5,000	$ 714
Clean	7	$ 9,500	$ 1,357
Annual Cost (rounded)			$ 4,400

Tank 2: 0.5 MG Tank

Typical Replacement Activities	Frequency (years)	Unit Cost	Cost/year
New Hatch	25	$ 9,800	$ 392
New Vent	25	$ 8,000	$ 320
New Ladder	25	$ 16,000	$ 480
Site paving, fencing, etc.	30	$ 30,000	$ 1,000
Inspection	7	$ 3,400	$ 486
Paint/Coating	25	$ 300,000	$ 12,000
Clean	7	$ 7,500	$ 1,071
Annual Cost (rounded)			$ 15,700

Tank 3: 0.6 MG Tank

Typical Replacement Activities	Frequency (years)	Unit Cost	Cost/year
New Hatch	25	$ 9,800	$ 392
New Vent	25	$ 8,000	$ 320
New Ladder	25	$ 16,000	$ 480
Site paving, fencing, etc.	30	$ 30,000	$ 1,000
Inspection	7	$ 3,400	$ 486
Paint/Coating	25	$ 350,000	$ 14,000
Clean	7	$ 7,500	$ 1,071
Annual Cost (rounded)			$ 17,700

Total Annual Tank Costs (rounded) **$ 45,000**

City of Mountain Home
Water Master Plan
Meter Replacement Budget

# Meters		8140
Typical life (years)		20
# replace/year		407
Typical cost/meter	$	250
Annual budget (rounded)	**$**	**102,000**

ATTACHMENT E

Mountain Home CCR Reports

KELLER
ASSOCIATES

City of Mountain Home 2015 CCR

Spanish (Espanol)

Este informe contiene informacion muy importante sobre la calidad de su agua beber. Traduscalo o hable con alguien que lo entienda bien.

Is my water safe?

We are pleased to present this year's Annual Water Quality Report (Consumer Confidence Report) as required by the Safe Drinking Water Act (SDWA). This report is designed to provide details about where your water comes from, what it contains, and how it compares to standards set by regulatory agencies. This report is a snapshot of last year's water quality. We are committed to providing you with information because informed customers are our best allies. Last year, we conducted tests for over 80 contaminants. We only detected 9 of those contaminants, and found only 1 at a level higher than the EPA allows. As we informed you at the time, our water temporarily exceeded drinking water standards. (For more information see the section labeled Violations at the end of the report.)

Do I need to take special precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Water Drinking Hotline (800-426-4791).

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microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife; inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial, or domestic wastewater discharges, oil and gas production, mining, or farming; pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses; organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems; and radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities. In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

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- Use a water-efficient showerhead. They're inexpensive, easy to install, and can save you up to 750 gallons a month.
- Run your clothes washer and dishwasher only when they are full. You can save up to 1,000 gallons a month.
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Water Quality Data Table

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Contaminants	MCLG or MRDLG	MCL, TT, or MRDL	Your Water	Range		Sample Date	Violation	Typical Source
				Low	High			
Inorganic Contaminants								
Arsenic (ppb)	0	10	.004	NA	.004	2015	No	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Chromium (ppb)	100	100	.004	NA	4	2013	No	Discharge from steel and pulp mills; Erosion of natural deposits
Fluoride (ppm)	4	4	.44	NA	.44	2015	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate [measured as Nitrogen] (ppm)	10	10	NA	NA	1.9	2015	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Microbiological Contaminants								
Total Coliform (positive samples/month)	0	1	2	NA		2015	Yes	Naturally present in the environment
Radioactive Contaminants								
Radium (combined 226/228) (pCi/L)	0	5	.8	NA	.8	2012	No	Erosion of natural deposits
Uranium (ug/L)	0	30	1	NA	1	2012	No	Erosion of natural deposits

Contaminants	MCLG	AL	Your Water	Sample Date	# Samples Exceeding AL	Exceeds AL	Typical Source
Inorganic Contaminants							
Copper - action level at consumer taps (ppm)	1.3	1.3	.02	2015		No	Corrosion of household plumbing systems; Erosion of natural deposits
Inorganic Contaminants							
Lead - action level at consumer taps (ppb)	0	15	0	2015		No	Corrosion of household plumbing systems; Erosion of natural deposits

Violations and Exceedances
Total Coliform Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. On June 11 2015 And lasted on day. We tested weekly with no further results.

Unit Descriptions

Term	Definition
ug/L	ug/L : Number of micrograms of substance in one liter of water
ppm	ppm: parts per million, or milligrams per liter (mg/L)
ppb	ppb: parts per billion, or micrograms per liter (µg/L)
pCi/L	pCi/L: picocuries per liter (a measure of radioactivity)
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MRDLG	MRDLG: Maximum residual disinfection level goal. 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.
MRDL	MRDL: Maximum residual disinfectant level. 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.
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Monitoring and reporting of compliance data violations

We needed to test the SOCS twice but only tested once. There is nothing wrong with the water we just missed the second sample.

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Fluoride (ppm)	4	4	NA	NA	.46	2016	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Microbiological Contaminants								
Total Coliform (TCR) (positive samples/month)	0	1	1	NA	NA	2016	No	Naturally present in the environment. We tested weekly after that for the month with no further results. No E Coli was ever present.
Radioactive Contaminants								
Radium (combined 226/228) (pCi/L)	0	5	NA	NA	.8	2016	No	Erosion of natural deposits

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Cross Connection Control Survey

The purpose of this survey is to determine whether a cross-connection may exist at your home or business. A cross connection is an unprotected or improper connection to a public water distribution system that may cause contamination or pollution to enter the system. We are responsible for enforcing cross-connection control regulations and insuring that no contaminants can, under any flow conditions, enter the distribution system. If you have any of the devices listed below please contact us so that we can discuss the issue, and if needed, survey your connection and assist you in isolating it if that is necessary.

- Boiler/ Radiant heater (water heaters not included)
- Underground lawn sprinkler system
- Pool or hot tub (whirlpool tubs not included)
- Additional source(s) of water on the property
- Decorative pond
- Watering trough

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While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Water Quality Data Table

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of contaminants in water provided by public water systems. The table below lists all of the drinking water contaminants that we detected during the calendar year of this report. Although many more contaminants were tested, only those substances listed below were found in your water. All sources of drinking water contain some naturally occurring contaminants. At low levels, these substances are generally not harmful in our drinking water. Removing all contaminants would be extremely expensive, and in most cases, would not provide increased protection of public health. A few naturally occurring minerals may actually improve the taste of drinking water and have nutritional value at low levels. Unless otherwise noted, the data presented in this table is from testing done in the calendar year of the report. The EPA or the State requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not vary significantly from year to year, or the system is not considered vulnerable to this type of contamination. As such, some of our data, though representative, may be more than one year old. In this table you will find terms and abbreviations that might not be familiar to you. To help you better understand these terms, we have provided the definitions below the table.

Contaminants	MCLG or MRDLG	MCL, TT, or MRDL	Detect In Your Water	Range		Sample Date	Violation	Typical Source
				Low	High			
Inorganic Contaminants								
Fluoride (ppm)	4	4	.51	NA	.51	2016	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Arsenic	0	10	.0004	.0004	4.0	2016	No	Erosion of natural deposits ;Runoff from orchards; run off from glass and electronics production waste
Chromium	0.1	0.1	.0003	.0003	3.0	2016	No	Naturally found in rocks, plants and soil
Gross alpha	0	15PCI/L	9.450	9.450	21.800	2015	No	Erosion of natural deposits.
Nitrate	10	10	.8	.7	2.2	2017	No	Runoff from fertilizer use, Leaching from septic tanks sewage Erosion of natural deposits
Radium 228	0	5PCI/L	.35	.350	.420	2013	No	Erosion of natural deposits
Lead	0	.015/AL	0	0	0	2015	No	Corrosion of plumbing system, corrosion of natural deposits

Contaminants	MCLG or MRDLG	MCL, TT, or MRDL	Detect In Your Water	Range		Sample Date	Violation	Typical Source
				Low	High			
Copper	1.3	1.3AL	.020	0	0.20	2015	No	Corrosion of plumbing system, corrosion of natural deposits
Tthms	n/a	.08	.002	.001	3.6	2016	No	Byproduct of drinking water disinfection
HAA5	n/a	.06	.002	.002	2.3	2016	No	Byproduct of drinking water disinfection.

Undetected Contaminants

The following contaminants were monitored for, but not detected, in your water.

Unit Descriptions	
Term	**Definition**
ppm	ppm: parts per million, or milligrams per liter (mg/L)
ppb	ppb: parts per billion, or micrograms per liter (µg/L)
NA	NA: not applicable
ND	ND: Not detected
NR	NR: Monitoring not required, but recommended.

Important Drinking Water Definitions	
Term	**Definition**
MCLG	MCLG: Maximum Contaminant Level Goal: 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.
MCL	MCL: Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
TT	TT: Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.
AL	AL: Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
Variances and Exemptions	Variances and Exemptions: State or EPA permission not to meet an MCL or a treatment technique under certain conditions.
MRDLG	MRDLG: Maximum residual disinfection level goal. 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.

Important Drinking Water Definitions	
MRDL	MRDL: Maximum residual disinfectant level. 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.
MNR	MNR: Monitored Not Regulated
MPL	MPL: State Assigned Maximum Permissible Level

For more information please contact:

Contact Name: David Sonnentag
Address: PO Box 10
Mountain Home, Id 83647
Phone: 2085872108

ATTACHMENT F

Sanitary Survey

DocuSign Envelope ID: 1DD36D19-77D0-4780-B72C-98AC28C4B145

Enhanced Sanitary Survey
Preliminary Inspection Findings Form

System Name: City of Mountain Home PWS #: ID4200032

Inspection Date: 4/20/18 Time Closing Conference Begins: 3:48 Time Closing Conference Ends: 3:57

Inspector: Michael Stambulis (Print Name) Phone #: (208) 373-0123

Inspector: [signature] (Signature) Email: michael.stambulis@deq.idaho.gov

Facility Representative: David Sonnentag (Print Name) Title: Water superintendent

Facility Representative: [signature] (Signature) Email: dsonnentag@mountain-home.us

Note: *Your signature indicates you have received this document, but does not imply agreement with the findings.*

Significant Deficiencies noted during inspection:
In accordance with IDAPA 58.01.08.008.02., the health hazards identified below must be mitigated as required by the Department and corrected within a time schedule established by the Department.

	Correction Time Frame: Urgent Action Required	Correction Time Frame: Specify in Corrective Action Plan
1. Open port to Well #9 well casing.	☐ ____ days/hrs.	☒
2. Tank #3 - overflow screen damaged	☐ ____ days/hrs.	☒
3. Pilot Booster Station - screens on air/vac discharge	☐ ____ days/hrs.	☒
4.	☐ ____ days/hrs.	☐
5.	☐ ____ days/hrs.	☐
6.	☐ ____ days/hrs.	☐

☐ Additional items attached

Potential Violations Pending Review:

1. Cracks around base of well #11 pedestal
2. Please provide pictures of: vents/manholes on each storage tank;
3. Screen on overflow of tank #2; screen on pump-to-waste discharge
4. well #16 // Well #13 valves - check valve & air-vac valve

☐ Additional items attached

Free Technical Assistance (Third Party Service Provider): Yes ☐ No ☐

- ☐ Financial: a) rate reviews, b) budgeting, c) finding loans and grants, d) capital improvement planning
- ☐ Training: a) operator, b) board/council, c) asset management, d) developing policies and procedures
- ☐ Technical Assistance: a) leak detection, b) line location, c) distribution, d) treatment, e) other
- ☐ System Operation: a) best practices guidance, b) emergency response, c) vulnerability assessment
- ☐ Source Water Protection: a) planning b) implementation

PWS Contact Name: ____________ Phone #: ____________

Original - Inspector for registration in TRIM Copy - Public Water System Owner/Operator

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1445 North Orchard • Boise, ID 83706 • (208) 373-0550
www.deq.idaho.gov

C. L. "Butch" Otter, Governor
John H. Tippets, Director

May 23, 2018

City of Mountain Home
ID4200032
Attn: David Sonnentag
PO Box 10
Mountain Home, Idaho 83647

Subject: Sanitary Survey Conducted on April 20, 2018

Dear David Sonnentag:

We recently conducted a Sanitary Survey for the City of Mountain Home. I am enclosing a list of findings for your system.

If any Significant Deficiencies were identified, your water system is required to address them. Please consult with me at the Department of Environmental Quality (DEQ) within 30 days regarding any significant deficiencies identified in this written notification, as required by IDAPA 58.01.08.

All modifications to existing public water systems must be approved by DEQ to ensure that engineering requirements are being met. A preliminary engineering report (IDAPA 58.01.08.503.01) followed by plans and specifications (IDAPA 58.01.08.504) are both required and must be approved PRIOR to any work.

Thank you for your help in completing the sanitary survey. Please contact me at (208) 373-0457 or via e-mail at Richard.lee@deq.idaho.gov.

Sincerely,

Richard Lee

Richard Lee
Drinking Water Analyst, Boise Region

RL:tg

Enclosures: Required and recommended improvements

ec: TRIM: 2018ACA4244

City of Mountain Home
ID4200032

RE: Enhanced Sanitary Survey Conducted on April 20, 2018

You will find a list of the significant deficiencies, deficiencies and recommended improvements for your system summarized below. Your water system is required to address all significant deficiencies. Please follow the process steps listed below.

Step 1:

Within 30 days of receiving this written notification, submit to me a "Planned Completion Date" for each item.

Step 2:

Complete the planned action(s) before the "Planned Completion Date".

Step 3:

After completing each planned action, enter an "Actual Completion Date", your initials, and write the "Corrective action taken".

Step 4:

Sign your name at the bottom certifying that each corrective action has been corrected by the agreed upon date and that your public water system has completed the Sanitary Survey response requirements pursuant to IDAPA 58.01.08. Send me a copy of the signed paperwork.

Significant Deficiencies

Pumping:

- Please install secondary containment around all fuel tanks associated with backup generator power. Spill containment structures sized to contain at least 110% of the fuel tank volume are required. A concrete curb is one option.

Planned Completion Date: 10/31/18.
Actual Completion Date: 10/22/18, *Initials* DS.
Corrective action taken:
Built containment structures for Both fuel tanks

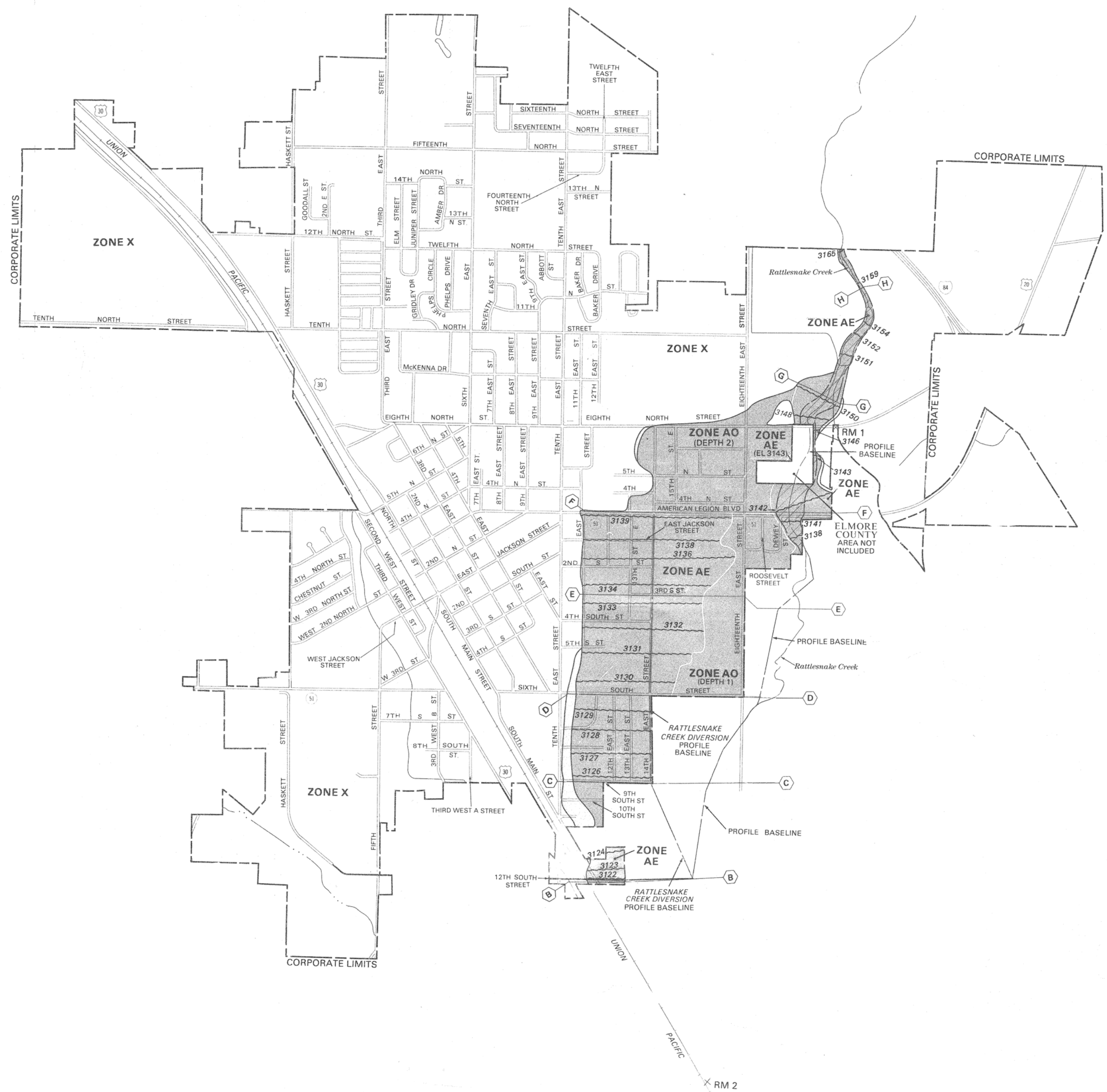
I certify, to the best of my knowledge that all significant deficiencies have been corrected by the agreed upon date and that the corrective action meets the requirements pursuant to IDAPA 58.01.08.

Signature: [signature] **Date:** 10/25/18

ATTACHMENT G

Environmental Information

KELLER
ASSOCIATES



action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year flood plain.

ZONE D Areas in which flood hazards are undetermined.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 Base Flood Elevation Line; Elevation in Feet*

D—D Cross Section Line

(EL 987) Base Flood Elevation in Feet Where Uniform Within Zone*

RM7 x Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Areas of special flood hazard (100-year flood) include Zones A, A1-30, AE, AH, AO, A99, V, V1-30 AND VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Coastal base flood elevations apply only landward of the shoreline.

Elevations reference marks are described in the Flood Insurance Study Report.

MAP REPOSITORY
City Hall
160 South Third East St.
Mountain Home, ID 83647
(Maps available for reference only, not for distribution.)

INITIAL IDENTIFICATION:
JUNE 7, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
JULY 11, 1975

FLOOD INSURANCE RATE MAP EFFECTIVE:
SEPTEMBER 30, 1988

FLOOD INSURANCE RATE MAP REVISIONS:
Map revised **MARCH 15, 1994** to update corporate limits, to add base flood elevations, to change special flood hazard areas, and to change zone designation.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
MOUNTAIN HOME,
IDAHO
ELMORE COUNTY

ONLY PANEL PRINTED

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI	Farmland Classification
21	Buko fine sandy loam, 1 to 4 percent slopes	574	4.30%	Yes
23	Chardoton silt loam, 0 to 4 percent slopes	254.2	1.90%	Yes
27	Chilcott-Elijah silt loams, 0 to 12 percent slopes	124.3	0.90%	Yes
28	Chilcott-Kunaton-Chardoton complex, 2 to 12 percent slopes	1,465.40	11.00%	No
29	Chilcott-Power complex, 0 to 8 percent slopes	2,176.00	16.30%	Yes
32	Colthorp-Chilcott silt loams, 0 to 8 percent slopes	204	1.50%	No
33	Colthorp-Kunaton complex, 0 to 8 percent slopes	1,829.40	13.70%	No
35	Colthorp-Minveno silt loams, 0 to 8 percent slopes, stony	116.6	0.90%	No
36	Colthorp-Rock outcrop complex, 4 to 20 percent slopes	16.7	0.10%	No
54	Elijah silt loam, 0 to 4 percent slopes	77.8	0.60%	Yes
116	Power silt loam, 1 to 4 percent slopes	2,657.50	20.00%	Yes
117	Power-Chardoton complex, 0 to 4 percent slopes	895.7	6.70%	Yes
120	Purdam silt loam, 0 to 4 percent slopes	539.5	4.10%	Yes
166	Urban land	2,368.10	17.80%	No
175	Water	13.3	0.10%	No
Totals for Area of		**13,312.60**	**100.00%**	

ATTACHMENT H

Facilities Evaluation

KELLER ASSOCIATES

City of Mountain Home
Water Facility Evaluations
Performed by: David Kinzer, PE

This facility evaluation is based on observations made during a site visit on **November 27, 2018,** and subsequent input from City staff. Included in this evaluation are conditions assessments based on visual observations of the City's wells, booster stations, and storage tanks. Interior conditions of the storage tanks relied upon tank inspection reports.

While specific projects have been identified as part of this effort, it should be noted that other project issues will manifest over time through the normal operations of the facilities. A short-lived asset replacement program is recommended to routinely assess and upgrade system components to ensure a high level of service is maintained.

Well No. 1

Location: Well No. 1 is located in the old City shop building.

General Description: The well is a vertical turbine, 200 horsepower pump and uses a water lube pump. This is one of the few pumps in the system using water lubrication. The meter is a magnetic flowmeter. The well water level measuring system is not connected to the SCADA so ongoing water level measurement on a continuous bases is not possible. At the time of the site visit, the roof inside is currently being redone. A new roof on the outside was recently completed. The chlorination system uses calcium hypochlorite tablets. The pipe system has a pump control valve that pumps to waste outside the building into a gravity drain. No standby power is available at this well. SCADA system and an antenna provide remote monitoring.

Facility Conditions: The building is very old but with ongoing maintenance it is a usable condition. The building does not have air conditioning, but City staff report that the pump runs during the summer without overheating. The electrical system is functional but the condition of conductors and connections is unknown until a thermal image test is complete.

The pump shaft seal is leaking more than expected for the type of seal used.

Recommendations:

The following summarizes the current recommendations for Well No. 1.

- Add a well water level measurement system suitable for use with the SCADA system and connect it to the SCADA system to monitor the well water level (Year 1-10, coordinate with next pump maintenance).

- Replace the pump shaft packing to reduce leakage at the shaft seal (Year 1-5).
- Do a thermal imaging test of the electrical system to identify potential electrical connection or equipment problems (Year 1-5).

Well No. 6
Location: W 5th N St.

General Description: The well is a vertical turbine 500 horsepower pump with a disc check valve, valves, electrical equipment and chlorination system using calcium hypochlorite tablets. The pump is oil lubricated. The pipe system has a pump control valve that pumps to waste outside the building into a ditch. The meter is located in a meter pit outside the building. Standby generator is located in a fenced area nearby. An additional secondary containment curb has been added to the aboveground fuel tank since the double wall fuel tank was installed years ago. The pump and motor assembly was under repair at the time of the evaluation. The motor was scheduled to be reinstalled soon. The roof section over the pump was removed and covered with a tarp. The roof is removal for pump maintenance. The roof will be replaced after the pump repair is complete.

Facility Conditions: The roof has been replaced with metal roofing and is in good condition. The masonry building has been painted on the outside is in good condition. The inside is scheduled to be painted when the pump repair work is complete. The louver is very old and is in poor condition but well covered with coats of paint.

The electrical supply and motor drive have been replaced in recent years are in good condition.

The chlorinator is a tablet type similar the others in the system and is good condition.

There are no reported overheating problems at the building during the summer pumping season. The rooftop cooling fan is in good condition. The fan is on the part of the roof that is permanent construction.

Drainage around the building is onto the soil surrounding the well building. There are no signs of drainage problems.

Recommendations:

The following summarizes the current recommendations for Well No. 6.

- Replace the louver (year 5 to 15).
- Add video monitoring (year 5 to 15).

<u>Well No. 9</u>

Location: This is also referred to as the Golf Course Well since it is located at the Golf Course

General Description: The well is a vertical turbine, 200 horsepower pump and is the process of being renovated. The electrical equipment was installed new in 2012. At the time of the site visit, work was still in process for redoing the removable wall at the well head and completing the tablet chlorinator room wall. The building is old and had many changes and modifications over the years. Due to the removable roof and wall section for well access, the building is subject to increased deterioration from weather and water intrusion.

Because of declining production and water quality (air entrapment), the City uses a VFD to maintain minimum water levels and uses the well only during critical summer months. It is operated as one of the last pumps to be called on and first to be called off in order to not over tax the limited groundwater supply.

Facility Conditions: The roof and wood wall are in poor condition. The masonry part of the building is in fair condition. The electrical system is mostly new after replacement in 2012. The wall on the north and east are being remodeled. The rooftop fan is adequate for cooling if the door is open to allow additional air flow.

Recommendations:

The following summarizes the current recommendations for Well No. 9.

- Making any additions and modifications to the building is not recommended. The entire building should be replaced with a new building. Most of the well, mechanical and electrical can be salvaged and used in the new building. (Year 5-10)
- The ventilation system is working; continue to use the ventilation system as is until the building is replaced (Year 1-5).
- Make necessary roof repairs as required to prevent interior water damage to equipment (Year 1-5)

Well No. 11

Location: Elmcrest St.

General Description: The well is a vertical turbine 500 horsepower pump with oil lubrication. It also has check valve, magnetic meter, valves, electrical equipment and chlorination system using calcium hypochlorite tablets. The pump motor bearing have recently been replace but it is old and should be replaced. The SCADA system has an antenna on the roof to communicate with the control system. The pump is cooled with a roof fan and louvers. The louvers are boarded up during the winter. No standby power at this well. The site is fenced. The pump waste discharge flow out onto the ground.

Facility Conditions: The metal roof and masonry are in good condition. The wood part of the building is removable and is deteriorating due to weather and time.

The door has an intake louver that is deteriorating and causes a security weakness. The antenna mounting is in good condition but has no ground wire. The interior building electrical is old and deteriorating. The conduit for the motor conductors is broken.

Cooling fan is inadequate for summer cooling.

There are no signs of drainage problems near the building but the drainage inside the building is poor.

Recommendations:

The following summarizes the current recommendations for Well No. 11.

- Replace the door (year 5 to 15).
- Replace the wood siding (year 5 to 15).
- Replace the motor conductor conduit (year 2 to 5).
- Add antenna ground wire (year 2 to 5).
- Thermo Test the electrical system (year 2 to 5)
- Replace the ventilation fan with an air conditioner to reduce dust in the building and improve cooling (year 5 to 15).
- Paint inside of building (year 2 to 5).
- Add video monitoring (year 5 to 15).

Well No. 12

Location: North of Intestate I84

General Description: The well is a vertical turbine, 200 horsepower pump with minimal mechanical equipment to operate the well. The well is chlorinated using a tablet chlorinator.

Facility Conditions: Everything at this well is in poor condition. Redoing parts of the facility is not recommended do to the age and numerous issues with operation, maintenance and access.

Recommendations:

The following summarizes the current recommendations for Well No. 12.

- Replace the well facilities with new facilities (year 1 to 10).

Well No. 13

Location: North 23rd W Street and NW Marathon Way

General Description: The well is a vertical turbine 500 horsepower pump with a hydraulic check valve, magnetic meter, valves, electrical equipment and chlorination system using calcium hypochlorite tablets. The pipe system has a pump control valve that pumps to waste outside the building into a gravity drain. No standby power is available at this well. The site is fenced with a gate at the road. Power is overhead from a power pole near the road. SCADA system and an antenna on pole next to the roof provide remote monitoring.

Facility Conditions: The roof is metal and is in good condition. Aside from the door and trim, the masonry building is in good condition and should not require any significant maintenance for 10 to 15 years. The door should be replaced to add better security to the building.

There are no reported problems with the electrical supply or motor drive; however, the motor drive should be replaced with a new soft start drive system to improve reliability.

Controlling overheating in the summer requires using a supplemental fan on the motor. The main building fan is on the roof and pulls air up from the motor. The system as is keeps the motor cool. The ventilation system should be replaced so the cooling in summer is automatic and reliable. The new system should include supply air and a much higher rate of air movement over the motor; alternatively, the City could add a cooling system. Because the existing operation works for cooling, a "ventilation only" solution may be adequate without adding air conditioning. The unused exhaust fan could be replaced with a supply fan and ductwork through the old chlorine room combined with a new exhaust fan.

Drainage around the building is onto a gravel covered soil surrounding the well building. There are no signs of drainage problems. The outside pump to waste sump is damaged but past repairs are adequate for current operation.

Recommendations:

The following summarizes the current recommendations for Well No. 13.

- Install an improved ventilation system for motor cooling during summer (year 1-5).
- Replace the main door (year 1-5).
- Replace the motor drive with a new soft start drive (year 5 to 15).
- Add video monitoring (year 5 to 15).

<u>Well No. 14</u>

Location: On Highway 20 northeast of Mountain Home.

General Description: Well 14 was constructed a number of years ago and uses the first roller movable building in the Mountain Home System. The well is a vertical turbine 200 horsepower pump that pumps to the transmission pipeline located adjacent to Tank No. 2. Because Tank 2 water surface elevations can sometimes be below the well discharge piping, an electrically operated valve located near Tank 2 is used to keep the pipe full. This valve is controlled by the pump start/stop sequence of the well. The well is also equipped with a VFD and controls that will slow the production rate if the drawdown in the well hole become excessive.

The facility has a check valve, magnetic meter, valves and a chlorination system using calcium hypochlorite tablets. The electrical equipment is mounted free standing to allow movement of the building. The pipe system has a pump control valve that pumps to waste outside the building into drain pond. This site has a standby power generator. The site is fenced with a gate at the road. Power is underground from a power pole near the road. SCADA system and an antenna provide remote monitoring.

Facility Conditions: There are no reported problems with the electrical supply or motor drive. The original construction used a propeller meter. Recently, the propeller meter was replaced with a magnetic flow meter for reduced maintenance and consistency with other meters in the system.

The original construction installed a double wall fuel containment tank for the generator. A concrete wall fuel secondary containment has been added to the fuel tank foundation for added fuel containment precautions.

The pressure transducer used to measure the water level in the well was replaced with an air bubbler system due to the reported maintenance required with the transducers.

The movable building has caused insects and dust to enter the building through the base frame. The movable building used at Well No. 14 is the first of this type to be used in the system. Some modifications have been made to the layout at this well when constructing movable buildings at other wells. The modifications have improved the movable building concept used at newer wells.

There are no signs of drainage problems or ground settlement issues.

Recommendations:

The following summarizes the current recommendations for Well No. 14.

- Modify the movable building to reduce the insects and dust in the building and make moving the building easier. The building modifications should be made following the new movable building at Well No. 16 that has worked without the problems occurring at Well No. 14. These include using cable ties for building hold downs instead of bolted angles. Also extend the electrical power cords so they don't require unplugging when moving the building. (Year 1-5).
- Add a concrete slab on the east side to reduce dust entering the building. The slab should extend full length of building and be four feet wide. Regrading along the east side will also be required. (Year 1-5).

Add video monitoring (year 5 to 15).

<u>Well No. 15</u>

Location: At Richard Aguirre Park

General Description: Well 15 was competed in recent years to add well capacity to the central area of Mountain Home. The well is a vertical turbine, 500 horsepower pump with a sand separator system. It also has the necessary functional equipment including check valve, magnetic meter, valves, electrical equipment and chlorination system using calcium hypochlorite tablets. The pump has a variable frequency drive to control the pump discharge. The flow rate varies to maintain a target system pressure. The building is cooled with an air conditioner system. No standby power at this well although provisions to install a generator in the future have been included in the building. The site is not fenced. One side of the building has a covered concrete slab for use by the public. Power is underground to the building. SCADA system and an antenna on the roof provide remote monitoring. Waste discharge at start up discharges to a tank located inside the building before being conveyed to as drainage bed in the Park area.

Facility Conditions: The metal roof and masonry are in good condition. The original construction included graffiti coating of the block. Since the building is new, maintenance on the building is not required for many years.

There are no reported problems with the electrical supply or motor drive. The sand separator is reducing sand being pumped into the distribution system to very low levels. The separator is a hydraulic device with no moving parts to maintain. Draining or flushing the collected sand is the only maintenance required. The system at this well has an automatic valve to flush out the sand accumulations.

The sand discharge from the sand separator flows outside on the ground near the building. Due to sand accumulation, the sand discharge has been moved further from the building. The sand discharge is adequate for now but will require change in the future.

There are no signs of drainage problems near the building.

Recommendations:

The following summarizes the current recommendations for Well No. 15.

- Regrade and resod the area currently being used for sand disposal to form a sand capture swale that allows cleaning of sand when needed (year 10 to 15).
- Add video monitoring (year 5 to 15).

<u>Well No. 16</u>

Location: Well 16 is near Tank No.1 located north of Interstate I84.

General Description: This is the City's newest well, completed in 2017. The well is a vertical turbine, 200 horsepower pump using a chlorination system utilizes calcium hypochlorite tablets. The pipe system has a pump control valve that pumps to waste outside the building into a gravity drain. Generator standby power was installed at this well during construction. The site is fenced with a gate at the road. Power is underground from a nearby power pole. SCADA system and an antenna on pole provide remote monitoring. The building is a metal building constructed on rollers so the building can be moved if work on the well is required. The building roller system works without problems. Because nearby tank water surface elevations can sometimes be below the well discharge piping, an electrically operated valve located near Tank 1A/1B is used to keep the pipe full. This valve is controlled by the pump start/stop sequence of the well, similar to how Well 14 is operated.

Facility Conditions: The facility is new and in good condition. Maintenance work on the building will not be required for a number of years. The building roller system is subject to damage and may require maintenance if moved often. Maintenance on the building rollers may be required periodically to be reliable when needed.

There are no reported problems with the electrical supply or pump/motor.

There were minor issues with air release valves at start up but have been resolved.

Drainage around the building is onto a gravel covered soil surrounding the well building. There are no signs of drainage problems. The ground around the Well 16 slopes down toward the Interstate providing for good drainage. A culvert improvement under the access road is anticipated to be completed soon.

Recommendations:

The following summarizes the current recommendations for Well No. 16.

- Maintain the building roller system so it is functional when needed (year 5 to 15).
- Add video monitoring (year 5 to 15).

Pilot Booster

Location: Highway 20 at the Pilot Travel Center.

General Description: The Pilot Booster has three new vertical booster pumps with disc check valves and butterfly isolation valves. The discharge manifold has hydraulic pressure control valves to control the discharge pressure in the system.

Facility Conditions: The building is old but the mechanical equipment is new and in good condition. The motors a new high efficient motors except for Pump 3 that has a used motor . Pump 3 is on the west side. Cooling for the inside and pump motors uses a new air conditioning system consisting of a ductless interior air handler.

A chlorine residual monitor is being installed.

There is no good means to lift equipment for maintenance.

There are no reported problems with the electrical supply.

Drainage outside the building is generally down the existing slope toward the Interstate Highway. The tank nearby is slightly higher at the base than the booster but the ground doesn't show any signs of drainage problems.

Recommendations:

The following summarizes the current recommendations for Pilot Booster.

- Maintenance on the building exterior including trim and door.
- Add video monitoring (year 5 to 15).
- Install a portable hoist for equipment maintenance (year 2 to 5)
- Complete chlorine residual monitor installation.

3rd St Booster

Location: N 3rd St. East

General Description: The 3rd Street Booster has two booster pumps and one pressure regulating valve. The booster pumps are vertical shaft in line pumps. The pressure regulating valves is a hydraulic operated valve. The building has a chorine analyzer mounted on the wall but isn't being used. Tests are done manual.

Facility Conditions: The electrical system is old enough to require thermo testing to assure continued use. There are no reported problems with the electrical supply or motors drive.

The building has siding and shingle roof. The building is in fair condition inside and out. The louvers allow dust to enter the building causing maintenance problems.

The building doesn't overheat in the summer but the VFD drives for the motors get hot.

There are no signs of drainage problems or ground settlements.

Recommendations:

The following summarizes the current recommendations for 3rd St Booster

- Repair the chlorine residual monitor (year 2 to 5)
- Thermo test the electrical equipment (year 2 to 5)
- Add air condition cooling equipment on both VFD enclosures. (year 2 to 5).
- Replace the motors withy new high efficient motors (year 5 to 10).
- Add video monitoring (year 5 to 15).

Storage Tanks

Facility Conditions: The storage tanks are in good condition on the outside. There is no sign of settlement. Drainage problems. The exterior of the tanks show signs of beginning of deterioration but will be many years before any maintenance is necessary. Some form of security monitoring should be added. The water supply is an important asset and is more subject to security problems than other water facilities.

Recommendations:

Storage Tank 2

- Coat interior of tank (year 5 to 10).
- Coat exterior of tank (year 10 to 15).
- Add video monitoring (year 5 to 15).

Storage Tank 3

- Coat exterior of tank (year 10 to 15).
- Add video monitoring (year 5 to 15).


TRESPASSING

Mountain Home Water System
2018 Water System Evaluation Update
Well Level Monitors Recommendation
Performed by: David Kinzer, PE
Date: March 27, 2019

The City desires to install well level monitors in a number the wells in the City system. Currently the well level is monitored with air pressure in a small tube running down the well to below the water level. The air pressure measuring method has been used for decades but requires numerous pieces of equipment and maintenance. The City wants to use modern electronic pressure transducers instead of the air system. The electronic pressure transducers use a sealed sensor that generates an electric current in proportion to the pressure applied. The units are sealed a can be submerged.

The problem with the electronic pressure transducers is installation in existing wells. The device is about ¾ inch to 1-1/8 inch in diameter and 3 inches to 4 inches long with a small diameter cable attached. The diameter of the transducer is much greater than the air tube currently being used. The problem arises when trying find a location on the well head or pump head to insert the sensor.

When a pump is removed from the well for maintenance, the pressure transducer device can be either attached to the pump column or lowered in a separate tube to accomplish the installation. Removing all the pumps to install pressure transducers is a major project costing thousands of dollars. During the water system evaluation, it was noted that the majority of the well heads could be fitted with a pressure transducer without removing the pump from the well.

The preferred method is to install the pressure transducer in a separate tube inside the well casing. This provides protection and allows removal and replacement. Most of the existing well heads don't have the space available at the surface to drill in a separate transducer tube. To install a transducer in a separate tube requires a well casing larger than the base of the pump head. The large pumps being used have large pump head bases preventing the use of separate tubes for the transducer.

A number of well heads have adequate space to drill in an access hole near the well vent. The hole would be drilled through the concrete and steel if required to intersect the well casing. After the hole is drilled the transducer can be lowered into the well. It is possible the transducer may not make it all the way down to the water level due to interference from the pump column of the well hole. The wells in Mountain Home are typically several hundred feet deep requiring a long trip down for a transducer. The transducers are not costly so if one is damaged or lost it can be easily replaced.

ATTACHMENT I

Hydrogeologic Considerations

KELLER
ASSOCIATES

Update to Hydrogeologic Assessment of Potential Well Sites for the City of Mountain Home

PROFESSIONAL ENGINEER
REGISTERED
9195
2/20/2019
STATE OF IDAHO
CHARLES G. BROCKWAY

Brockway Engineering, PLLC / February 20, 2019
Charles G. Brockway, Ph.D., P.E.

The City of Mountain Home is planning for a new water supply well to be located at one of several authorized points of diversion within the city limits. Previous analyses dated May 8, 2008 and November 1, 2015 included an evaluation of hydrogeologic conditions utilizing available well drilling records, an analysis of aquifer level conditions and trends, and an analysis of existing pumping trends for the City's existing wells. The previous studies included a hydrogeologic evaluation of the sites and an assessment of the likelihood of developing a productive water supply at each location.

The purpose of the present memo is to update the earlier studies with additional data for city pumping, observation wells, and new wells drilled in the past 5 years which may have applicable test data. Special attention is paid to the well site near the city shop, which is a favorable location for non-hydrogeologic reasons.

For completeness, some of the earlier narratives will be included in this document so that it may stand alone.

A. Hydrogeologic Analysis

Hydrogeologic conditions within the Mountain Home basin are complex and heterogeneous, leading to large uncertainties when evaluating potential well yields. One major feature of the area is an apparent fault aligning approximately with the interstate, such that wells in the north area indicate much higher water tables in the regional aquifer as compared with those in the southern areas. On both sides of the fault, water table elevations and well yields are highly variable.

In general, insufficient site-specific data exists to make conclusive determinations at each potential well site. The best available information is derived from drilling records and from known performance of larger wells. It has been shown (refer to the May 8, 2008) memo, that reported lithologic conditions in the Mountain Home area often bear little relationship with the yield of a large well. Therefore, it is problematic to estimate aquifer hydraulic conductivity (K) from lithology alone; instead it should be estimated using reported test data on the drilling records, limited to wells with relatively large pumping rates (>100 gpm) and wells which draw only from the regional aquifer system (a number of high-producing wells were completed in or draw from the upper system, which is not representative of the aquifer in which the City would complete a new well).

No new large wells with pumping test information have been drilled since 2015, according to information in the IDWR database. However, by searching the IDWR backfiles for water rights in the vicinity of the city shop, one additional well was identified in the NENE Section 6, T4S, R7E.

Hydraulic conductivity was estimated using a procedure developed by Bradbury and Rothschild (1985), which is based on the Theis procedure but includes a correction for partial penetration of a well which significantly increases the accuracy of the estimate. The estimated K values are shown on the attached spreadsheet, and range from 0.2 to 1358 ft/day, confirming the extreme heterogeneity in aquifer productivity.

Figure 1 shows the locations of the analyzed wells along with the existing municipal well locations and the potential new well sites. The well discharge and resulting estimate of hydraulic conductivity is also depicted.

B. City Well Production and Water Levels

Daily production data for all existing municipal wells from 2008 through August 2018 was provided by the City. The data was reviewed and adjustments or corrections made where appropriate. Adjustments included correction of clearly erroneous readings such as those resulting in negative daily flow. In a number of cases readings were not taken for one or more days; in these instances, the total volume over the missed period was distributed evenly to each day in order to avoid an erroneously high daily flow.

Figure 2 shows the monthly total volume pumped for 2008-2018. The figure is an area graph which allows comparison of the relative contribution of each well over time. All wells except Well #1 follow a seasonal pattern driven by irrigation demand, with peak supply typically occurring in August. Well 1 is used primarily in the off-season. This analysis indicates that the City's total peak production has remained essentially stable since 2008. Well 9 was used heavily in 2011 and 2012 but has not been heavily used since. Well 15 has provided a significant fraction of the total pumping since 2010. Well 16 has supplied a significant fraction since 2017.

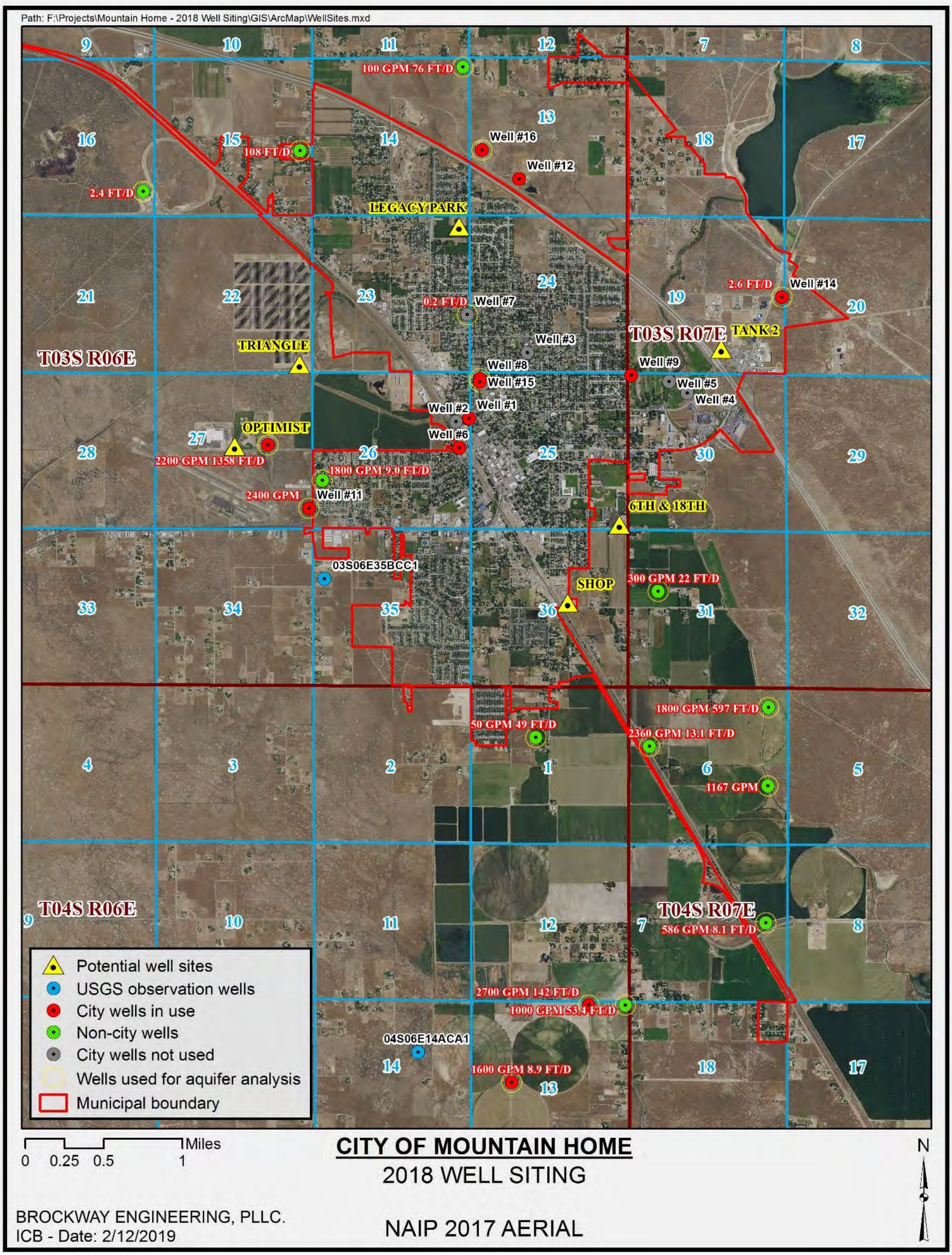


Figure 1. Existing wells and potential new well locations.

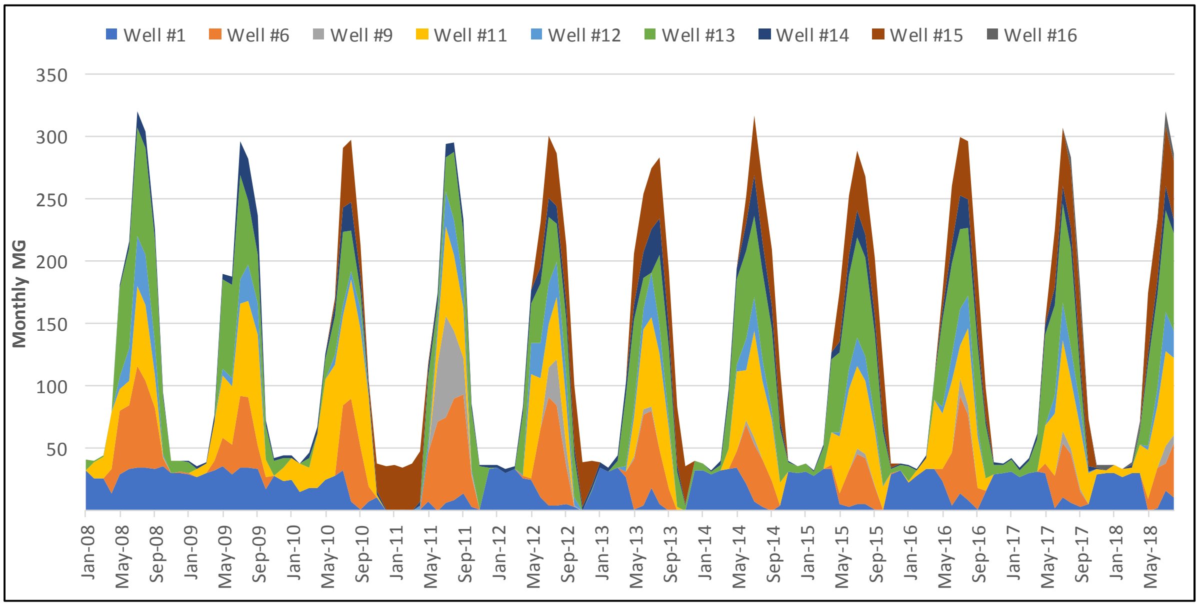


Figure 2. Monthly well pumping, 2008-2018.

Changes over time in peak instantaneous yield from each well could be an indicator of aquifer yield changes due to declining water levels; however, insufficient reliable data exists from the City's data collection system to make this analysis.

Water levels at each well during non-pumping periods in the wintertime could be used to assess aquifer stability over time. The City collects water level data using air lines and bubbler systems. The City provided this data for the past 5 years, but the data was not usable for this purpose due to missing or anomalous data. A summary of deficiencies found in the water level data is as follows:

Well 1	Flatline, no data
Well 6	Some good data, but several flatlines, 2018 data is erroneous
Well 9	Flatline, no data
Well 11	Some good data but record ends in February 2014
Well 12	Flatline sections including all of 2018, false ceiling at 148' – probably the upper range limit of transducer
Well 13	Not flatlined, but also probably not correct as the data does not seem to follow pumping patterns
Well 14	Some good data but all 2018 data is erroneous, false ceiling at 438' – probably the upper range limit of transducer
Well 15	Numerous flatline sections
Well 16	Mostly good, but possible false ceiling at 120'

It is recommended that the City remedy the apparent equipment malfunctions and instigate a quality control program to include manual water level checks on a monthly basis, with appropriate calibration adjustments.

C. Observation Well Trends

Since at least the 1960s, declining water levels have been recorded in the western area of the City's well field. Depth to water for the two wells with long-term records in this area are shown in Figure 3 (see Figure 1 for well locations). The observational record at the well closest to the City (about 0.6 miles south of Well 11) ended in 2008, but the record at the other well (near the City's wastewater reuse site) has continued. The data generally indicates continued declines, but recent data could suggest a stabilization of levels since 2012. Both records suggest overall declines of 1.3 to 1.8 ft per year.

Due to the high productivity of the aquifer, well yield in the western area near Wells 11 and 13 is likely not highly sensitive to water level (however, the declines appear to be affecting well yields to a modest degree; see above). Over a 30-year planning horizon, however, a further decline of 40 to 50 feet would be a significant fraction of the aquifer saturated depth and yields would likely be affected. Corresponding increases in pumping costs would be incurred.

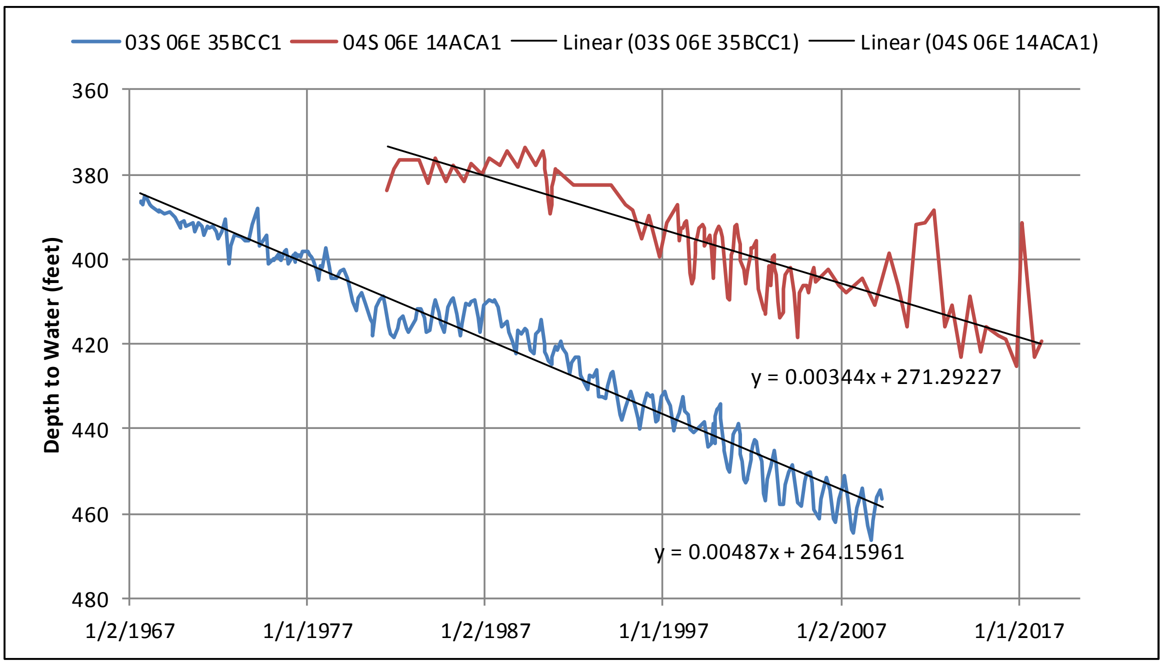


Figure 3. Groundwater levels in the regional aquifer south and west of the City.

North of the City, observational records for three wells are shown in Figure 4. These wells are located north of the fault line, and only wells completed in the deeper, regional system were considered. Levels in this area are significantly more stable than those west and south of the City. Seasonal fluctuations in three of the four wells are only a few feet. No trends in water level are indicated in any of the wells.

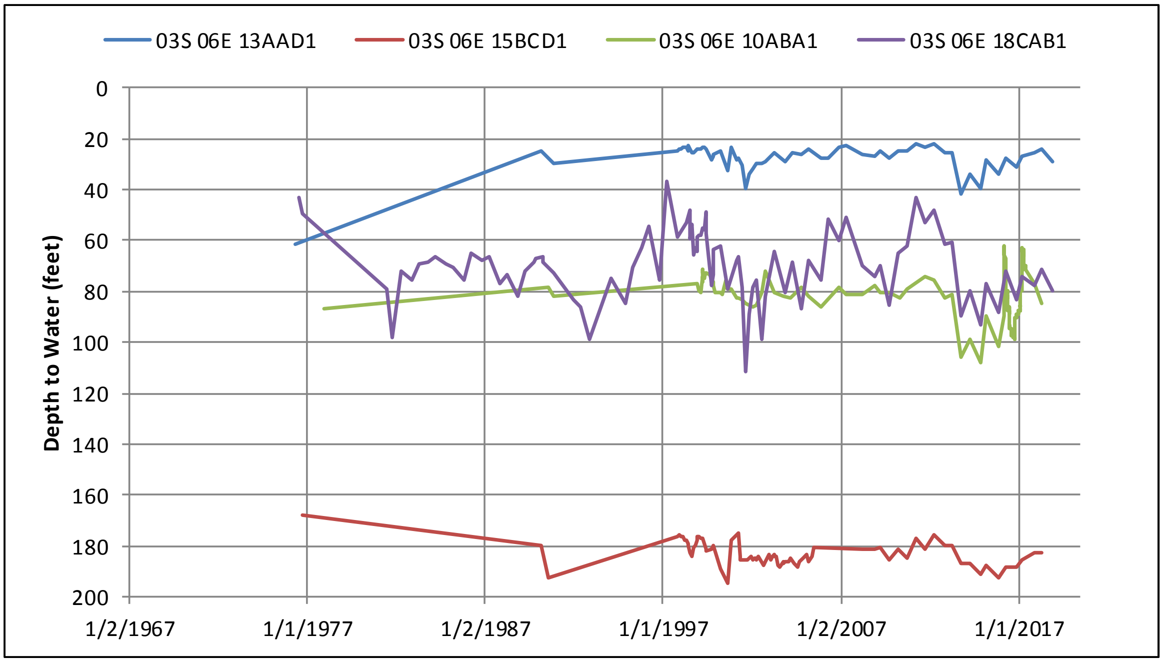


Figure 4. Groundwater levels in the regional aquifer north of the City.

D. Evaluation of Well Sites

Each potential well site is evaluated as follows.

Optimist Park Site

Previous analyses indicated that this site has a good potential for development of a high-yielding production well, based the performance of on Wells 11 and 13 and the prevailing lithologic information in the area. However, water levels in this area have been declining, as have peak well yields as indicated above, and could impact maximum well yields within the planning horizon, though not within the short- to medium-term. A new well developed in this area producing 2000 gpm will induce an estimated drawdown of 0.33 feet at Well 13 after 30 days of continuous pumping and 0.37 feet after 60 days. Although a high-yield site, large infrastructure upgrades would be required to allow additional water to be delivered to the system from this location.

Triangle Site

This site is located close to the Optimist Park site (about 0.9 miles northeast), and therefore the analysis for the Optimist site is applicable to the Triangle site. However, its location slightly to the north would tend to suggest slightly lower probability of high production. This site is also in relatively close proximity to a decommissioned landfill site with an unknown status. The regulatory implications of this landfill could be significant. The potential impact on water quality from the landfill is not known, but could be assessed with an exploratory well. Although a potentially high-yield site, large infrastructure upgrades would be required to allow additional water to be delivered to the system from this location.

Legacy Park Site

Based on the previous analysis, the well production data indicates this site has a relatively low probability of obtaining a high-yielding well. Water levels at this site as indicated by the observations well north of the freeway indicate greater aquifer stability for long-term planning. However, this site appears be located on or near the apparent fault line, so it is difficult to predict the aquifer level or lithology. For example, of the 10 deep domestic wells drilled in the NE1/4 Section 23 (roughly within 0.5 miles of the Legacy Park site), static water levels are shown in Table 2.

Although all wells are drilled into the lower, regional aquifer, static water levels vary from 48 to 415 feet. In contrast, all wells in SE1/4 Section 14 (0.25 to 0.5 miles north of Legacy Park) indicate shallow water depths generally less than 120 feet with an average of 89 feet.

There appears to be a positive correlation between well depth and static water depth, which could indicate a vertical gradient between different fracture zones. Due to this variability, it is not possible to predict the water level in a well at the Legacy Park site but it is more likely to be deeper than shallower since the well depth would likely exceed 500 feet.

Table 2. Wells near the Legacy Park site.

Name	Total depth (feet)	Static water level (feet below LS)
J H Bonner	350	288
M Fuquou	310	56
Kenneth Hansen	525	415
C E Mc Kimmy	311	56
Jim F Miller Jr	360	160
Benjamin E Park	330	75
Melvin L Rossow	300	168
Melvin L Rossow	242	48
Robert D Smith	225	145
Alfred E Stokesberry	310	72

Given the heterogeneity of the aquifer at the Legacy Park site, the possibility of a strong well at this location cannot be ruled out, but this site has a higher risk of a low-yielding well. If this site is to be developed an exploratory well to determine aquifer productivity is warranted to a greater extent than at other sites. For planning purposes an estimated yield of 1,000 gpm is recommended and the specific capacity will likely not exceed 5 gpm/ft (for comparison, the specific capacity of Well 16 is 3.3 gpm/ft).

Shop and 6th/18th Sites

Well logs in this area are generic and do not suggest anomalously high or low production possibility. Four nearby wells – the Nazarene Church, Family Trailer Park, Freer, and

Fisher – were analyzed and found to have hydraulic conductivities of 22 ft/day, 49 ft/day, 13 ft/day, and 597 ft/day, respectively (Figure 1). Due to consistency of the first three well logs, which are closest to the shop site, it is reasonable to assume that a well at either the Shop or the 6th & 18th sites may exhibit hydraulic conductivity similar to these three wells, but is unlikely to exhibit a value as large as the Fisher well. Assuming a value of 20 ft/day, a 2000-gpm well could likely be developed with a drawdown in the pumping well estimated to be 72 feet after 30 days or a specific capacity of 28 gpm/ft. This drawdown is relatively high but not unreasonable. To be conservative, recommended yield for planning purposes is 1,500 gpm at this site.

No long-term aquifer water level data exists in this area. Since the area is south of the fault line, the aquifer may be exhibiting declines similar to those seen in the southwest area, but the declines are not likely to significantly affect well yield in the short- to medium-term. A comparison of deep domestic wells drilled in the immediate vicinity since the 1970s indicates a decline on the order of 40 to 50 feet appears to have occurred in this area, in line with the observation well data. Because the aquifer transmissivity is lower in this area than at the Optimist and Triangle sites, the impact of aquifer declines will likely occur sooner and be of larger magnitude. Based on nearby well logs, water-bearing fracture zones exist in the 400-foot to 500-foot range, and the static water level is on the order of 410 feet. Declines in aquifer levels may dewater these zones and reduce yield. However, it is possible that the bulk of the yield may be derived from the significant water-bearing fractures from 550 to 700 feet, making the upper zones less important. The heterogeneity of the fractured basalt system prevents a more definitive evaluation.

Tank 2 Site

This site is north of the fault line, close to Well 14 which has a relatively low hydraulic conductivity (estimated at 2.6 ft/day), and is also close to Wells 1, 5, and 9, which are poor producers from the lower zone (#9 is a good producer from the upper zone only). There are no other wells in the immediate vicinity with test data. It appears that there is some probability that this well will have yield characteristics similar to or slightly lower than Well 14, which tested at 1500 gpm at 141 feet of drawdown or a specific capacity of 11 gpm/ft. The well site is 2,400 feet from Well 14, and some interference may occur, but a Theis analysis indicates only 0.31 feet after 60 days of pumping at 1500 gpm. The Tank 2 site is also close to the Well 9 site, and may exhibit similar behavior including high pumping from recharge-fed upper zones but much lower yield when those zones are dewatered later in the season. The static water elevation at this site is much higher than at the southern sites, resulting in substantially lower pumping levels (100 to 150 feet, depending on drawdown). Aquifer water levels at the Tank 2 site are anticipated to be stable.

C. Analysis

If the only factor were the likelihood of high yield and low drawdown, the Optimist and Triangle sites would be preferred. At these sites, the risk of developing a well with insufficient yield is relatively low, and an exploratory well would not be warranted. However, major infrastructure costs in mainline upgrades and related work would be required to deliver additional flow to the system from the west side. These costs likely outweigh the hydrogeologic benefits at these sites at this time.

The Legacy Park site should be considered, as it would entail the least connection cost to the distribution system, but this site has some significant drawbacks and risks. An exploratory well would be strongly recommended at this site, which would offset some of the savings in connection costs. Yield will likely be lower than average at this site, and a planning number for potential yield should not exceed 1,000 gpm. Pumping level will also likely be high due to anticipated large drawdown, but the static water level cannot be accurately determined due to the well's location on or near the fault line.

The Tank 2 site has the benefit of being in a zone having stable aquifer levels. However, well yield is expected to be relatively low (1,000 to 1,500 gpm) with high drawdown based on the performance of Well 14. Infrastructure upgrades could be significant, but would need to be assessed by additional computer modeling of the distribution system.

The Shop and 6th/18th sites are essentially equivalent in terms of hydrogeologic factors. A large-yielding well of 1,500 to 2,000 gpm can likely be developed at either site, and infrastructure costs to connect to the system are modest. Having a source on the east side of the system is a significant benefit for maintenance of system pressures within an acceptable range. The risk of developing a low-yielding production well is moderate. Drilling an exploratory well can significantly reduce this risk, and the City should make that decision based on cost and level of risk tolerance.

The total anticipated depth at all sites is 800 feet, which should intercept essentially all significant water-bearing fracture zones without penetrating the clay strata underlying the basalt aquifer system. Most of the City wells extend at least to this depth. Well 14 is 692 feet deep and Well 16 is 590 feet.

Based on the analyses described above, a tabulation of pertinent information regarding the well sites and estimated performance of a well at each site is provided in Table 3.

Table 3. Well site analysis.

Well Site	Land Surface Elev (ft)	Estimated Static WL (ft)	Likely maximum yield (gpm)	Estimated Total depth (ft)	Estimated spec. cap. (gpm/ft)	Estimated drawdown (ft)	Pumping water level (ft)
Optimist	3167	445	2000	800	200	10	455
Triangle	3173	445	2000	800	100	20	465
Shop	3129	410	1500	800	28	54	464
6th & 18th	3133	410	1500	800	28	54	464
Tank 2	3263	198	1250	800	10	125	323
Legacy Park	3175	350	1000	800	5	200	550

Transmissivity Estimation with Partial Penetration - Mountain Home Area

Bradbury and Rothschild (1985) specific capacity method.
Suitable for situations where a single time and drawdown measurement is available.
Includes effects of partial penetration using Sternberg (1973) approach.
Enter data in blue, pay attention to units. Vary "Trial T" until equal to "Calc T".

Well No.	Name	Location*	Pumping Rate [gpm]	Drawdown [ft]	Time [min]	Well radius [in]	Storativity	SWL [ft]	Aquifer bottom [ft]	Avg open interval [ft]	Average aquifer thickness [ft]	Specific capacity	L/b	G	sp	Trial T (vary) [ft2/d]	Calc T [ft2/d]	Calc K [ft/d]	ln K
1	A&A Development	NESE15 T3S R6E	200	1	60	4	0.15	152	800	353.5	648	200.0	0.55	1.58	4.98	70014.0	70014.9	108.1	4.68
2	Simplot	SESE16 T3S R6E	250	54	480	4	0.15	200	800	337	573	4.6	0.59	1.63	4.08	1360.0	1360.2	2.4	0.86
3	MH Well #8	NWNWNW25 T3S R6E	1840	65	2040	8	0.15	395	800	287	373	28.3	0.77	1.93	1.31	6628.0	6628.2	17.8	2.88
4	MW Well #15	NWNWNW25 T3S R6E	2100	109	1440	12	0.15	489	800	209	257	19.3	0.81	2.02	0.80	3369.0	3669.9	14.3	2.66
5	Lawson	NWSW26 T3S R6E	1300	35	180	6	0.15	18	800	680.5	765	37.1	0.89	2.17	0.64	6902.0	6902.1	9.0	2.20
6	MH Well #13	SWNE27 T3S R6E	2200	1	360	8	0.15	445	800	404.5	355	2200.0	1.14	2.51	-0.47	481451.0	481451.2	1358.1	7.21
7	MH Well #14	NESE19 T3S R7E	1480	141	91	8	0.15	198	800	493.5	532	10.5	0.93	2.24	0.34	1396.0	1396.3	2.6	0.97
8	Nazarene Church	SESWNW31 T3S R7E	300	10	480	4	0.15	355	800	254	440	30.0	0.58	1.61	4.08	9720.0	9720.4	22.1	3.10
9	Family Trailer Park	NESENW1 T4S R6E	50	1	60	3	0.15	364	800	188.5	436	50.0	0.43	1.53	7.78	21315.0	21315.1	48.9	3.89
10	Corder (MH Farm)	NWNESW13 T4S R6E	1600	88	660	6	0.15	336	800	349	420	18.2	0.83	2.05	0.95	3746.0	3745.7	8.9	2.19
11	Leydet (MH Farm)	NENWNE13 T4S R6E	2700	40	120	8	0.15	328	800	68	452	67.5	0.15	2.08	25.05	64323.0	64323.0	142.3	4.96
12	Febrache	NENENE13 T4S R6E	1000	23	180	6	0.15	323	800	135.5	466	43.5	0.29	1.66	12.61	24880.0	24879.7	53.4	3.98
13	Galey	NESE7 T4S R7E	586	82	240	4	0.15	308	800	153	451	7.1	0.34	1.59	10.96	3637.0	3637.4	8.1	2.09
14	MH Well #7 (dry)	NESE23 T3S R6E	100	570	60	10	0.15	271	800	89	244	0.2	0.36	1.56	7.18	48.7	48.7	0.2	-1.61
15	Freer	SWNW6 T4S R7E	2360	109	330	9	0.15	301	800	255	445	21.7	0.57	1.61	3.55	5831.0	5831.0	13.1	2.57
16	Boyer	NENE14 T3S R6E	100	1.5	60	3	0.15	45	800	168	754	66.7	0.22	1.82	21.59	57653.6	57653.6	76.4	4.34
17	Fisher	NENE6 T4S R7E	1800	5	360	6	0.15	312	800	103	486	360.0	0.21	1.86	18.65	290004.8	290004.8	597.3	6.39
18	MH Well #16	NWSW13 T3S R7E	846	259	1440	6	0.0001	132	800	203	539	3.3	0.38	1.55	8.98	1845.9	1845.9	3.4	1.23
																Mean	58579.3	138.1	3.0
																Median	6765.1	16.1	2.8
																Max	481451.2	1358.1	7.2
																Min	48.7	0.2	-1.6
																Std dev	125519.0	334.5	2.1

* From drilling records, corrected if needed based on water right records and/or aerial photo evidence.

ATTACHMENT J

Operator Training

KELLER ASSOCIATES

Operator Name:

David Sonnentag

Date	IBOL Licenses
9/10/2003	Water Distribution I
7/6/09	Water Distribution II

Date	Course Description	CEU's WW	CEU's W	CEU's W/WW	Location
8/26-27/2003	Water I&II Certification Review		1.4		Boise, ID
5/16-19/2004	SWIOS Water/Wastewater Conference	0.4	0.6	0.4	Boise, ID
2/11/2005	Motor Grader Operator Safty Training				Mountain Home
10/20/2005	Water Tank Maintenance		0.7		Boise, ID
12/13/2006	Red, Black, Stinky Water		0.6		Mountain Home
1/31/2007	Traffic Control Technician				
10/17-18/2007	Collections I&II Review	1.4			Boise, ID
10/31/07	Small Water System O & M			0.7	Nampa, ID
10/24/08	Chemical Feed, Chlorinate			0.6	Idaho Falls
1/16/09	Waterworks Training			0.6	Nampa, ID
Mar-09	Maintenance, Pumps,Motors,Circuits			0.1	
3/19/09	Water Main Installation			0.1	
Sep-10	Loss Control Seminar				Mountain Home
11/3/10	Pipeline Emergency Response			0.2	Mountain Home
11/30/10	Crew Leader			0.7	Boise, ID
7/28/11	Excavation Safty		0.6		Garden City, ID
6/21/12	Basic Cross Connection Training		0.6		Emmett
8/29/2013	Pipeline Emerency Response			0.2	Mountain Home
9/11/2013	AWWA Annual Conference		0.375	0.225	Sun Valley
10/8/2013	Source Water Protection		0.6		Twin Falls
7/22-24/2014	Water III&IV Certification Review		1.4		Boise, ID
2/11/2015	Supervisor workplace drug awareness				Mtn. Home
10/21/15	Variable Frequency Drives			0.6	Mountain Home
Nov-16	Arc Flash			0.6	mountain Home
9/13/17	Pipeline Training				Mountain Home
10/11-13/17	AWWA IMS Annual Conference			1.275	Sun Valley
2/7/18	Planning Successful Projects			0.6	Caldwell
4/12/18	Basic Pumps			0.6	Mountain Home
5/3/18	Pipeline Emerency Response				Mountain Home
5/16/18	Drinking Water Regulations		0.6		Boise, ID
Jun-18	Sanitary Survey		0.6		Mountain Home
9/12-13/2018	IRWA Fall Conference	0.1	0.6	0.5	Worley
2/13/19	Emergency Response			0.6	Ammon
Mar-19	Pipeline Emergency Response				Mountain Home

Operator Name:

Joe McLeod

Date	*IBOL Licenses*
12/6/1995	Water Distribution I

		CEU's			
Date	*Course Description*	*WW*	*W*	*W/WW*	*Location*
3/15-16/2000	Rural Water Association Training		0.8		Boise, ID
3/17-18/1999	Rural Water Association Training		1.2		Boise, ID
2/7/03	Waterworks Training		0.6		Nampa, ID
1/26/06	Waterworks Training		0.75		Nampa, ID
9/1-2/2009	Water I&II Licensure Review		1.4		Nampa, ID
4/19/11	Basic Cross Connection		0.6		Meridian
9/29/11	Pipeline Emergency Response			0.2	Mountain Home
2/20/12	Waterworks Training		0.6		Nampa, ID
2/5/13	Waterworks Training		0.6		Nampa, ID
5/20-22/2013	Idaho Water/Wastewater Conference		0.5	0.9	Boise, ID
1/30/14	waterworks training		0.6		Meridian ID
Oct-14	Water law to you		0.6		Mountain Home
4/15/15	Variable Frequency Drives			0.6	Boise, ID
Jan-16	Revised Total Coliform Rule		0.6		Kuna Id.
Nov. 2016	Arc Flash			0.6	Mountain Home
3/15 3/17/2017	IRWA Spring Conterence		0.7	0.6	Boise, ID
9/13/2017	Pipeline Training				Mountain Home
2/8/2018	Waterworks Training			0.6	Nampa, ID
3/13-3/15/2019	IRWA Spring Conterence		0.6	0.7	Boise, ID

Operator Name:

Ryan Day

Date	IBOL Licenses
Jan. 2014	Water distribution I
Dec. 2015	Water distribution II

			CEU's		
Date	Course Description	WW	W	W/WW	Location
3/13-15/2013	IRWA Annual Technical Conference		0.4	0.8	Idaho Falls
10/22/14	Water law to you		0.6		Mountain Home
9/8-9/9 2015	Water review I & II		1.4		Boise
10/21 2015	Variable Frequency Drives			0.6	Mountain Home
8/18/16	Control valve		0.6		Nampa
11/2/16	ARC Flash				Mountain Home
9/13/17	Pipeline Training				Mountain Home
10/11-13/17	AWWA IMS Annual Conference			1.275	Sun Valley
2/7/2018	Planning Successful Projects			0.6	Caldwell
4/12/2018	Basic Pumps			0.6	Mountain Home
5/3/2018	Pipeline Training				Mountain Home
5/16/2018	Drinking Water Regulations		0.6		Boise
18-Jun	Sanitary Survey		0.6		Mountain Home
9/12-13/2018	IRWA 2018 Fall Conference		0.3	0.7	Worley Id.

Operator Name:

Danny Garland

Date	IBOL Licenses
12/16/2015	Water distribution I
9/1/2017	Water distribution II

		CEU's			
Date	Course Description	WW	W	W/WW	Location
9/8-9/9 2015	Drinking Water Certifcation ReviewI&II		1.4		Boise, ID
Feb-16	Waterworks Training			0.6	Nampa
3/15 3/17/2017	IRWA Spring Conference		1.1	0.1	Boise, ID
4/3 4/7/2017	Backflow training				Boise, ID
9/13/2017	Pipeline Training				Mountain Home
3/21-23/2018	IRWA Spring Conference		0.7	0.6	Boise, ID
4/12/2018	Basic Pumps			0.6	Mountain Home
10/29-10/30	Backflow training				Las Vegas
1/21/2019	Backflow Training		0.08		Garden City
3/13-3/15/2019	IRWA Spring Conference		0.1	1.2	Boise, ID

Operator Name:

Jon Harwood

Date	IBOL Licenses
12/1/17	Water Distribution I

Date	Course Description	CEU's WW	CEU's W	CEU's W/WW	Location
3/15 3/17/2017	IRWA Spring Conference		0.8	0.5	Boise
9/6 9/7/17	Water 1 Review	1.2			Boise
9/13/17	Pipeline Training				Mountain Home
2/8/18	Waterworks Training			0.6	Nampa
4/12/18	Basic pumps			0.6	Mountain Home

Operator Name:

Robert Riley

Date	IBOL Licenses
	Water Distribution I

Date	Course Description	CEU's WW	CEU's W	CEU's W/WW	Location
3/21-23/2018	IRWA Spring Conference		1.1	0.2	Boise, ID
3/13-3/15/2019	IRWA Spring Conference		1.1	0.2	Boise, ID

Idaho Drinking Water Program System Classification Worksheet

All community and nontransient noncommunity public water system owners and operators are required to submit proof of current conditions related to their system classification at least every five years (IDAPA 58.01.08.553.01). The classification is used to determine the required level of licensed operator(s). Please work with your local DEQ or health district field office to complete this worksheet.

Public Water System No.: 42000032 System Name: City of Mountain Home

Contact Person: David Sonnentag Title: Water Superintendent

Address: P.O. Box 10 City: Mountain Home State: ID Zip: 83647

Business Phone: (208)587-2108 Email: dsonnentag@mountain-home.us

Population served by this distribution system (number of people, not number of connections): 14,626

System Type (choose one): ◉ Community ○ Nontransient Noncommunity ○ Transient Noncommunity

Complete the worksheet on the following pages, then return to Table 1 and select the classification(s) of the public water system (PWS) based on the outcome.

Table 1. System classification.

Distribution Classification:	Treatment Classification:
☐ VSWS ☐ I ☒ II ☐ III ☐ IV	☐ I ☐ II ☐ III ☐ IV
or	or
☐ Not applicable	☒ Not applicable

Licensed Operator Requirements (IDAPA 58.01.08.554)

Community, nontransient noncommunity, and all systems supplied by surface water, including ground water under the direct influence of surface water, are required to be under the direct supervision of a properly licensed distribution and/or treatment operator licensed at the same level of system classification or higher.

Transient ground water systems are **only** required to be under the direct supervision of a properly licensed distribution or treatment operator if they are surface water or ground water under the direct influence of surface water.

Step 1--Very Small Water System (VSWS) Classification (Choose A or B)

Determine if your PWS is classified as a Very Small Water System (VSWS).

> A VSWS is a community or nontransient noncommunity PWS that serves five hundred (500) persons or fewer and has no treatment other than disinfection or has only treatment which does not require any chemical treatment, process adjustment, backwashing, or media regeneration by an operator (e.g., calcium carbonate filters, granular activated carbon filters, cartridge filters, ion exchangers).

◉ A. My system serves more than 500 people. If yes, **go to Step 2.**

○ B. My system serves 500 or fewer people and utilizes only ground water. Select only one choice below (i, ii, or iii).

- ○ i. My system has **no** treatment. On Table 1 (page 1), choose "VSWS" as the Distribution Classification and "Not Applicable" as the Treatment Classification. **Go to Step 4.**
- ○ ii. My system **only** has the following exempt treatment processes. Select all that apply (a full list of treatment processes is listed in Step 3), then choose "VSWS" as the Distribution Classification and "Not Applicable" as the Treatment Classification on Table 1 (page 1) and **go to Step 4.**

Process Code	Process	Process Code	Process
☐ 005	Point of Use (POU), Activated Carbon - Granulated	☐ 401/403	Gaseous Chlorination
☐ 010	Point of Use (POU), Ion Exchange	☐ 421/423	Sodium hypochlorite or calcium hypochlorite
☐ 015	Point of Use (POU), Reverse Osmosis	☐ 470	Exempt, Softening - VSWS *(Water softener)*
☐ 354	Exempt, Roughing Filter - VSWS	☐ 720	Ultraviolet Radiation
☐ 356	Exempt, Cartridge Filter - VSWS	☐ 800	Raw water, little or no variation
☐ 361	4-Log Treatment of Viruses *(Ground Water System)*		

- ○ iii. My system has treatment other than what is listed above in B.ii. On Table 1 (page 1), choose "Not applicable" as the Distribution Classification. **Skip Step 2; go to Step 3.**

Step 2--Distribution Classification

Choose the Distribution Classification based on the number of people (not connections) served by this public water system.

Distribution Classification	Population Served
☐ Distribution Class I	501 to 1,500
☒ Distribution Class II	1,501 to 15,000
☐ Distribution Class III	15,001 to 50,000
☐ Distribution Class IV	50,001 and greater

Enter the Distribution Classification in Table 1 (page 1).
To determine the treatment classification, **go to Step 3.**

Step 3--Treatment Classification Evaluation

Choose A or B below and enter the information in Table 1 (page 1).

○ A. This system **only** has the following exempt treatment processes that will not require a Treatment Classification. Select all that apply, then choose "Not Applicable" as the Treatment Classification in Table 1 (page 1).

Process Code	Process	Process Code	Process
☐ 005	Point of Use (POU), Activated Carbon - Granulated	☐ 401/403	Gaseous Chlorination
☐ 010	Point of Use (POU), Ion Exchange	☐ 421/423	Sodium hypochlorite or calcium hypochlorite
☐ 015	Point of Use (POU), Reverse Osmosis	☐ 470	Exempt, Softening - VSWS *(Water softener)*
☐ 354	Exempt, Roughing Filter - VSWS	☐ 720	Ultraviolet Radiation
☐ 356	Exempt, Cartridge Filter - VSWS	☐ 800	Raw water, little or no variation
☐ 361	4-Log Treatment of Viruses *(Ground Water System)*		

◉ B. This system has treatment in addition to or other than the items in A. Review and enter the applicable point values in the "System Points" column for each applicable row of Table 2 to reflect system treatment processes.

Table 2. Treatment classification process and description.

Process Code	Item	Points	System Points
	System Size --Population (all systems--choose one)		
---	Very Small (25-500)	1	
---	Small (501-3,300)	5	
---	Medium (3,301-10,000)	10	
---	Large (10,001-100,000)	15	15
---	Very Large (100,001+)	20	
	Water Supply Source (mark all that apply)		
---	Ground Water	0	0
---	Surface Water or Ground Water Under the Direct Influence of Surface Water (GWUDI)	8	
361*/ 363	Required Contact Time (CT) - 4-log Treatment/ Removal of Viruses	2	
	Raw Water Quality Variation (all systems--choose one) This designation reflects the effect of changing raw water quality on treatment process changes that would be necessary to achieve optimized performance.		
800*	Raw water, little or no variation	0	0
805	Raw water, minor variation (consistently <10 NTU, treatment adjustments rarely made)	1	
810	Raw water, moderate variation (regular treatment adjustments made monthly)	3	
815	Raw water, significant variation (regular treatment adjustments made weekly)	5	
820	Raw water, severe variation (regular treatment adjustments made daily or source may be subject to non-point discharge, agricultural/urban storm runoff, or flooding)	7	
825	Raw water, quality subject to agriculture point sources or municipal wastewater point source discharges (within the mixing zone of an upstream municipal NPDES discharge)	8	
830	Raw water, quality subject to industrial wastewater pollution (within the mixing zone of an upstream industrial NPDES/IPDES discharge)	10	

Print Form

Process Code	Item	Points	System Points
	Raw Water Quality is Subject to: (mark all that apply)		
835	Raw water, taste/odor (treatment process adjustments are routinely made) [1]	2	
840	Raw water, color >15 Color Units (not due to precipitated metals) -- *See exception in Table Note 1*	3	
845	Raw water, iron and/or manganese >MCL: *See exception in Table Note 1*	3	
850	Raw water, algal growth (treatment process adjustments are routinely made) [1]	3	
	Disinfection (mark all that apply)		
425	Onsite generation of hypochlorite	1	
421*, 423*	Liquid chlorine (sodium hypochlorite) or in solid form (calcium hypochlorite tablets or powder)	5	5
401*, 403*	Gaseous chlorination	8	
720*	Ultraviolet light	2	
541, 543	Ozonation	10	
200	Chloramines	10	
220	Chlorine dioxide	10	
190	Brominization	5	
455	Iodine	5	
	Coagulation/ Flocculation (mark all that apply)		
240	Coagulation	6	
245	Coagulant aid	2	
360	Flocculation	2	
	Clarification/Sedimentation (mark all that apply)		
660	Sedimentation/ Clarification	4	
665	Sedimentation, Upflow Clarification (2 pts. flocculation + 4 pts. sedimentation/clarification) [2]	6	
	Filtration (mark all that apply)		
352	Pre-filtration, roughing filter (staged cartridges, pressure sand w/o coagulation)	1	
341	Cartridge/bag filters	5	
342	Diatomaceous earth filters [3]	10	
343	Greensand filtration	10	
344	Pressure sand filters	10	
345	Rapid sand filters	15	
346	Slow sand filters	5	
347	Membrane/ Ultrafiltration	10	
350	Filter aid	2	
354*	Exempt--roughing filter (Very Small Water System only)	0	
356*	Exempt--cartridge filter (Very Small Water System only)	0	
	Other Treatment Processes (mark all that apply)		
005*	Point of Use (POU), activated carbon- granular (point of use only)	0	
010*	Point of Use (POU), ion exchange (point of use only)	0	
015*	Point of Use (POU), reverse osmosis (point of use only)	0	
141	Aeration, cascade [3]	3	
147	Aeration, slat tray [3]	3	
149	Aeration, spray [3]	3	
143	Aeration, diffused [3]	5	
145	Aeration, packed tower [3]	5	

Process Code	Item	Points	System Points
160	Algae control (surface water reservoir treatment)	3	
460	Ion exchange (softening, inorganic removal, radionuclides removal)	5	
470*	Exempt, softening (Very Small Water System only)	0	
100	Ion exchange, activated alumina	5	
121	Activated carbon, granular	5	
125	Activated carbon, powdered	2	
180	Bone char	5	
580	Peroxide	5	
560	Permanganate (oxidation)	4	
680	Sequestration (addition of a phosphate)	4	
380	Fluoridation	4	
300	Distillation	10	
640	Reverse osmosis [3]	10	
320	Electrodialysis [3]	15	
500	Lime-Soda Ash Addition	5	
741, 742	pH Adjustment	4	
Stability or Corrosion Control (mark all that apply)			
441	Inhibitor, Bimetallic Phosphate	4	
443	Inhibitor, Hexameta Phosphate	4	
445	Inhibitor, Orthophosphate	4	
447	Inhibitor, Polyphosphate	4	
449	Inhibitor, Silicate	4	
620	Reducing Agents	4	
Sludge/Backwash Water Disposal (mark all that apply)			
---	Sludge Treatment--Disposal to sanitary sewer or off watershed	0	
700	Sludge Treatment--On site treatment of waste (examples: sludge drying beds, discharge to lagoons and/or on-site disposal/land application)	3	
710	Backwash Water--Any water recycled to plant raw water influent	5	
	Total System Treatment Points:		20

* Exempt treatment processes.
See page 6 for table notes.

Add the total points and determine the system classification. Enter the classification in Table 1 (page 1).

Treatment Classification	**System Points**
☐ Treatment Class I	30 or fewer
☐ Treatment Class II	31-55
☐ Treatment Class III	56-75
☐ Treatment Class IV	76 or greater

Step 4--Sign and Mail

Mail the completed, signed form to your regional Idaho Department of Environmental Quality or health district drinking water contact for system classification evaluation. Retain a photocopy of the original form for your files.

Director of Public Works 2/26/19

Signature Date

Table Notes:

1. **Raw water quality is subject to:**
   - Taste and/or odor (T&O) for which treatment process adjustments are routinely made (2 points): 1) T&O issue has been identified in a pre-design report, etc., 2) a process has been installed to address, and 3) operational control adjustments are made at least seasonally. Do not give points for T&O when there is no specific additional impact on operation (e.g., if a system is already pre- chlorinating for disinfection, give no points for T&O).
   - Color > 15 Color Units (CU) (not due to precipitated metals) (3 points) ***with the following exceptions:*** Color will be considered elevated and points assigned when levels exceed 75 Color Units (CU) for conventional filtration, 40 CU for direct filtration[3], or 15 CU for all other technologies, except reverse osmosis (no points given for color for reverse osmosis).
   - Iron (FE) and/or manganese (MN) > Maximum Contaminant Level (MCL): Fe (2 points), Mn (3 points) (3 points maximum allowed) ***with the following exceptions***: Iron and manganese levels will be considered elevated and points assigned if they are greater than the MCL, except for applications of manganese greensand filters. For applications of manganese greensand filters, iron and manganese levels will be considered elevated when their combined level exceeds 1.0 mg/L (3 points allowed).
   - Algal growths for which treatment process adjustments are routinely made (3 points): Raw water will be considered subject to algae growths when treatment processes are specifically adjusted due to the presence of high levels of algae on at least a weekly basis for at least two months each year.
2. **Upflow clarification** (sludge blanket clarifier) (6 points): Also known as sludge blanket clarification. Includes such proprietary units as Super-Pulsator. These units include processes for flocculation and sedimentation. Important note: these are not the same as adsorption[3] clarifiers.
3. **Water Treatment Definitions**
   Definitions reprinted from "Master Glossary of Water and Wastewater Terms" (www.owp.csus.edu/glossary/index.php) with permission from Office of Water Programs, California State University, Sacramento.
   - **Adsorption**
     The gathering of a gas, liquid, or dissolved substance on the surface or interface zone of another material.
   - **Aeration**
     The process of adding air to water. Air can be added to water by passing air through water or passing water through air.
   - **Diatomaceous earth**
     A fine, siliceous (mad of silica) "earth" composed mainly of the skeletal remains of diatoms.
   - **Direct filtration**
     A method of treating water which consists of the addition of coagulant chemicals, flash mixing, coagulation, minimal flocculation, and filtration. The flocculation facilities may be omitted, but the physical-chemical reactions will occur to some extent. The sedimentation process is omitted.
   - **Electrodialysis**
     The selective separation of dissolved solids on the basis of electrical charge, by diffusion through a semipermeable membrane across which an electrical potential is imposed.
   - **Reverse osmosis**
     The application of pressure to a concentrated solution which causes the passage of a liquid from the concentrated solution to a weaker solution across a semipermeable membrane. The membrane allows the passage of the water (solvent) but not the dissolved solids (solutes).

Attachment K

City Council Meeting Presentation

KELLER
ASSOCIATES

KELLER ASSOCIATES

September 23, 2019

1

City of Mountain Home

WATER MASTER PLAN
CITY COUNCIL WORKSHOP

GROWING POSSIBILITIES

1

PROJECT OBJECTIVES

2

1. Update model and master plan
2. Identify existing deficiencies
3. Develop improvement alternatives
4. Update capital improvement plan and water master plan

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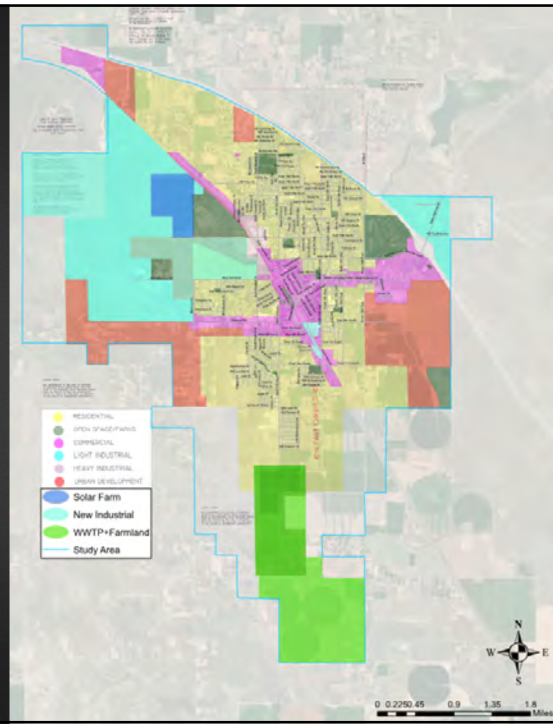
2

STUDY AREA

3

- **2018** population of 14,260
- **2040** study area population of approximately 19,831



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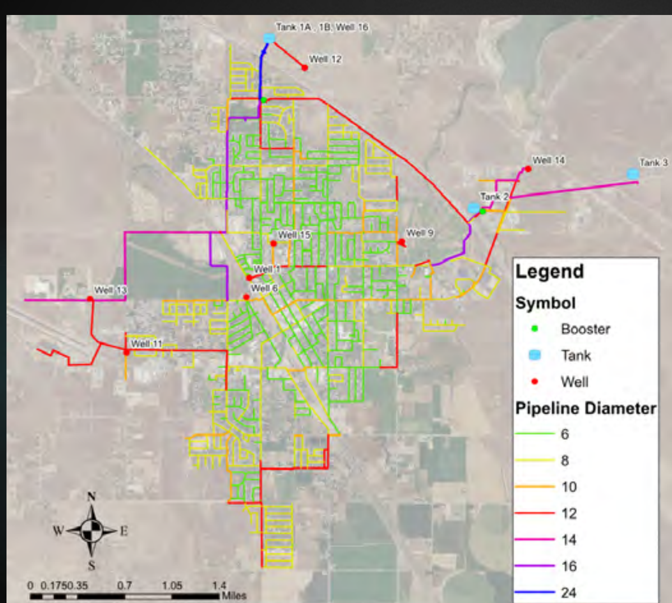
3

EXISTING DISTRIBUTION SYSTEM

4



- **4** TANKS
- **2** BOOSTER STATIONS
- **9** ACTIVE WELLS
- **93** MILES OF DISTRIBUTION PIPES
- **Greatest Challenge:** AGING INFRASTRUCTURE

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4

PERFORMANCE STANDARDS

5

- Used to define what constitutes a deficiency
- Idaho Department of Environmental Quality

Planning Criteria	Recommended Keller Assoc. (2019)
Pressures	
Min pressure at max hour demand, psi	40
Minimum pressure during fire event, psi	20
Maximum pressure – new development, psi	80
Pipelines	
Maximum velocity, fps	10+
Backup Source	
Standby Power?	Yes
Delivery peak demands with largest pump out of service?	Yes
Storage	
Equalization storage	Calculated
Operational	10% of each reservoir
Fire storage	3,000 gpm @ 2 hrs – Upper Zone 4,000 gpm @ 4 hrs – Main Zone
Emergency storage	Offset by wells with standby power

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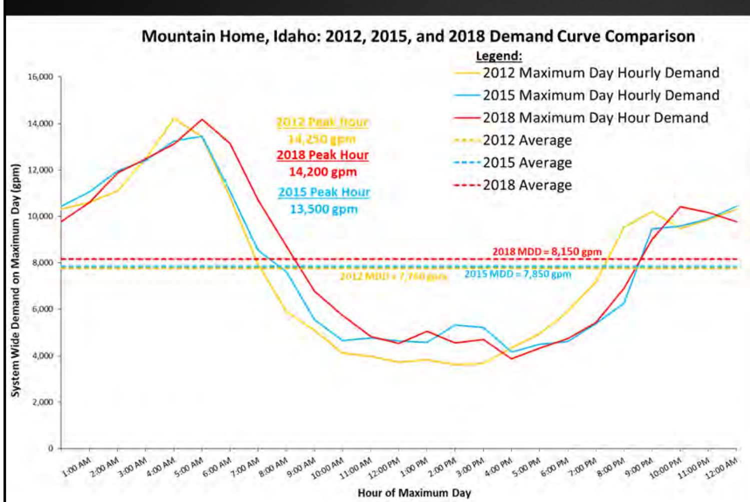
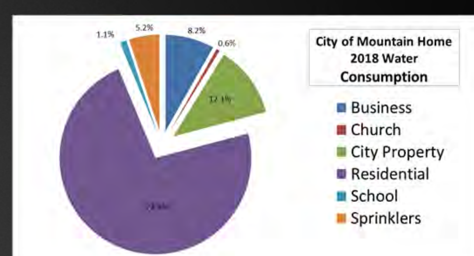
5

SYSTEM DEMANDS

6





Year	Recorded Well Production (MG/yr)	Billing Based Consumption (MG/yr)	Annual Water Loss (%)
2016	53	46	12%
2017	48	43	11%
2018	52	44	15%

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6

POPULATION AND DEMAND PROJECTIONS

7

- Assuming a growth rate of 1.5%
- Projections assume 1,000 gpm from industry by 2040

Estimated Year	Total Population	Average Day Demand	Max Day Demand	Peak Hour Demand
2018	14,260	3,000	8,150	14,200
2020	14,691	3,140	8,450	14,680
2030	17,069	3,840	10,010	17,250
2040	19,831	4,420	11,580	20,000

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7

EXISTING AND FUTURE STORAGE

8

Storage Component	Year 2018	Year 2040	Year 2040 - With Additional Standby Power
Population	14,260	19,831	19,831
Operating Storage[1] (gal)	498,600	498,600	498,600
Peaking Storage[2] (gal)	2,184,000	3,040,000	3,040,000
Fire Storage[3] (gal)	960,000	960,000	960,000
Additional Emergency Storage[4] (gal)	0	539,000	0
Total Storage Required (gal)	*3,642,600*	*5,037,600*	*4,444,444*
Total Storage Available (gal)	4,986,000	4,986,000	4,986,000
Storage Surplus (gal)	**1,343,000**	**(51,000)**	**542,000**

- The City's future need for storage can be offset by equipping future wells with standby power

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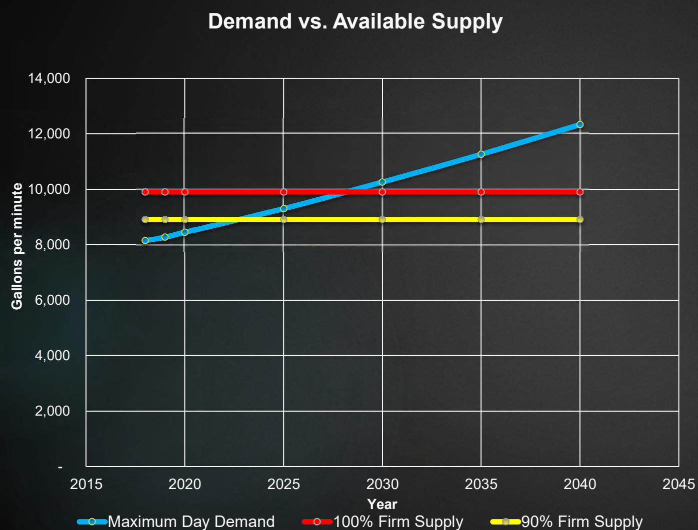
8

EXISTING AND FUTURE SUPPLY

9



- It is anticipated that the City will exceed it's 90% firm capacity between 2020 and 2025
- The City will likely exceed its 100% firm capacity by 2030.
- NEW WELL RECOMMENDATIONS:
  - New Well by 2022 – at City Shop location
  - Two additional wells by 2040

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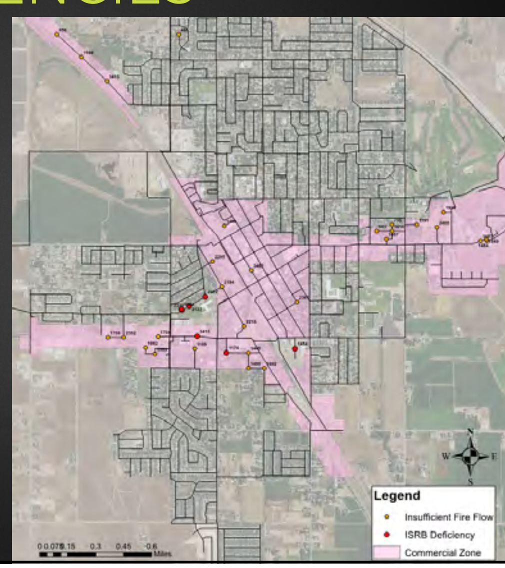
9

EXISTING CONDITIONS FIRE FLOW DEFICIENCIES

10

- In general, the system is adequately sized to provide fire flows.
- **Exceptions:**
  - Several hydrants within commercial zone do not meet the 2,500 gpm target
  - Several structures determined by the ISRB do not meet the requirements
  - RECOMMENDATIONS: New pipelines/upsize existing pipelines



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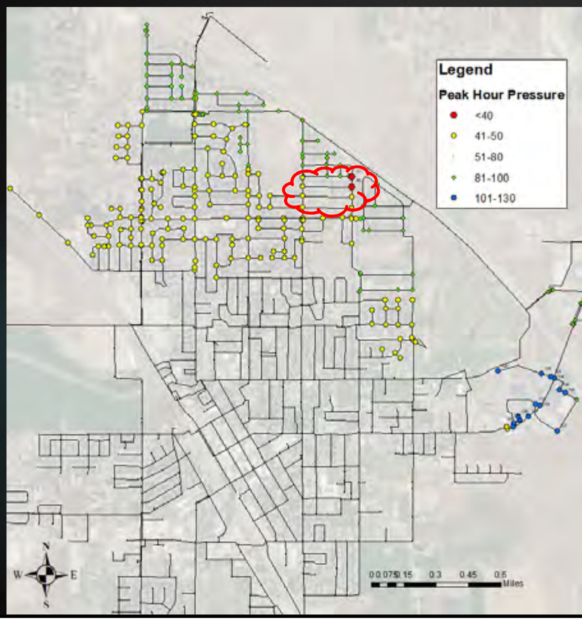
10

EXISTING CONDITIONS PRESSURES

11



- Low pressures between the Main and Middle pressure zones
- RECOMMENDATIONS:
  - Extend the Middle Pressure zone to eliminate low pressure areas

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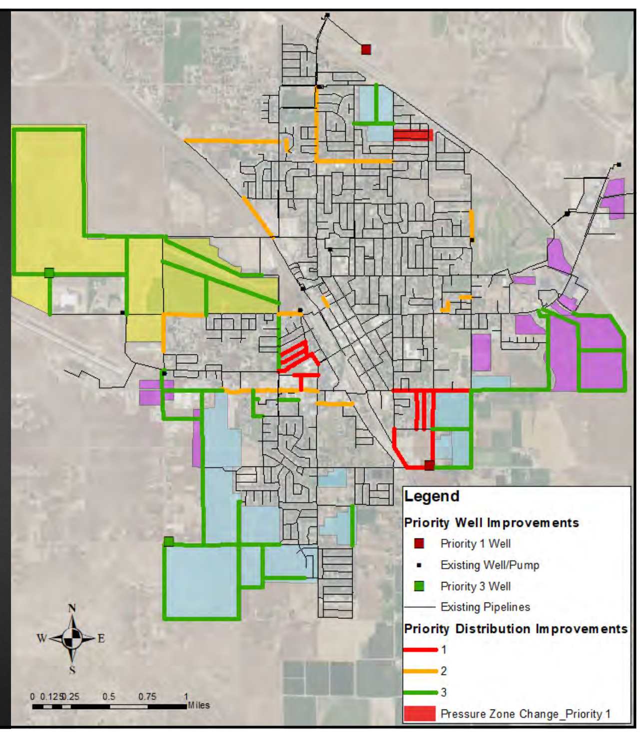
11

WATER MASTER PLAN

Projects are organized by priority

Project sheets and 6-Year CIP developed to assist with future budgeting



12

MASTER PLAN IMPROVEMENTS

13

Water System Capital Improvement Plan - Priority Improvements

Project ID#	Project Description		Est. Cost (2019 Dollars)
	Priority 1 Improvements (Year 1 - 5)		
1.1	Well 17 and Transmission Pipeline	$	3,219,000
1.2	Replace Transite Pipeline on S 12th E, S 13th E, E 6th S	$	923,000
1.3	Upgrade Pipeline on West 2nd N, near West Elementary	$	449,000
1.4	Commercial Fire Upgrades, near DeMeyer	$	252,000
1.5	Replace Transite Pipeline on Chesnut St and W 3rd N	$	584,000
1.6	Medium Pressure Zone Service Area Expansion	$	33,000
1.7	Replace Well 12	$	1,594,000
	Total Priority 1 Improvments	**$**	**7,054,000**
	Priority 2 Improvements (Years 5 - 15)		
2.1	W 5th N, Water Main Upgrade	$	215,000
2.2	Transmission Pipeline Upgrades on Elmcrest and West 5th North	$	830,000
2.3	Old State Highway 30 Pipeline	$	380,000
2.4	NE Pearl St and W 17th N Pipelines	$	776,000
2.5	Queen's Court Pipeline	$	85,000
2.6	Upgrade Transmission Pipeline on N 3rd E and E 15th N	$	1,542,000
2.7	Connect Well 9 to Medium Pressure Zone	$	610,000
2.8	E 4th N and E 5th N Pipelines	$	237,000
2.9	N 2nd E Pipeline	$	82,000
2.10	Airbase Road Pipeline	$	939,000
2.11	Upgrade Pipelines along W 7th S	$	264,000
	Total Priority 2 Improvments	**$**	**5,960,000**
	Priority 3 Improvements (Year 15+ or growth dependent)		
3.1	N Haskett St Pipeline Upgrades	$	562,000
3.2	Well 18 - SW Mountain Home	$	2,426,000
3.3	West Airbase Road and Elmcrest St Upgrades	$	1,568,000
3.4	Connecting to Lateral North of S Haskett St LDS church	$	180,000
3.5	Well 19 - New Industrial Well	$	2,060,000
3.6	City-wide Pipesize Upsizing	$	1,669,000
	Total Priority 3 Improvements	**$**	**8,465,000**
	TOTAL	***$***	***21,479,000***

Priority 1

- New well
- Replace pipes/Well 12
- Solve low pressure
- Meet ISRB requirements

Priority 2 - 3

- Fire Flow increases, Future supply, storage, and transmission needs

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SAMPLE PROJECT SHEET

14

Distribution Project Title:

Upgrade Pipeline on West 2nd N, near West Elementary

Location:

West 2nd N, around West Elementary

Project Identifier:

1.3

Objective:

Provide fire protection to West Elementary school and improve transmission in the system.

Design Considerations:

- Construction of new pipe north of the school, complete when school is out.
- Coordinate with project 1.5
- Maintain services during construction

General Line Item	Estimated Quantity	Unit	Unit Price	Item Cost (Rounded)	Total Cost (2019 Dollars)
12-inch PVC Pipe - Excavation, Backfill, Valves, Hydrants, Fittings, Valves, Services, Hydran	1,730	LF	$110	$190,300	
Connect to Existing Water Main (10" & 12")	2	EA	$6,500	$13,000	
1/2 Lane (7') Pavement Repair	1,730	LF	$25	$43,250	
Traffic Control w/o Flaggers	1,730	LF	$4	$6,920	
Existing Utility Protection & Coordination	1,730	LF	$2	$3,460	
Reconnect Services	20	EA	$500	$10,000	
Subtotal					*$266,930*
Mobilization, Bonding & Insurance - Percent of Item Cost Sum			10%	$26,693	
Contingency			30%	$80,079	
Total Construction Costs					*$373,702*
Engineering and CMS - % of total construction costs			20%	$74,740	
Total Project Costs (rounded)					**$449,000**

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LONG-TERM PLANNING

15

On-going Asset Replacement

Component	Annual Budget	Comments
Pipelines	$ 351,000	All cast iron/steel, 4-inches and smaller replaced over 20 years
Fire Hydrants	$ 86,000	2% of system per year
Meters	$ 102,000	Based on current budget for accelerated meter conversion; can be reduced once fully converted.
Well Facilities	$ 174,000	Includes well facility and periodic well hole
Booster Facilities	$ 30,000	includes booster facility components
Storage	$ 45,000	Includes minor repairs, cleaning and inspection
Total	**$ 788,000**	

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6-YEAR CAPTIAL IMPROVEMENT PLAN

16

		Annual Costs in 2019 Dollars					
Priority 1 Projects	**Total Cost**	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24	FY 24-25
1.1: Well 17 and Transmission Pipeline	$ 3,219,000	$ 643,800	$ 1,287,600	$ 1,287,600			
1.2: Replace Transite Pipeline on S 12th E, S 13th E, E 6th S	$ 923,000			$ 92,300	$ 830,700		
1.3: Upgrade Pipeline on West 2nd N, near West Elementary	$ 449,000				$ 449,000		
1.4: Commercial Fire Upgrades, near DeMeyer	$ 252,000					$ 252,000	
1.5: Replace Transite Pipeline on Chesnut St and W 3rd N	$ 584,000					$ 584,000	
1.6: Medium Pressure Zone Service Area Expansion	$ 33,000	$ 33,000					
1.7: Replace Well 12	$ 1,594,000					$ 159,400	$ 1,434,600
Sub-Total	$ 7,054,000	$ 676,800	$ 1,287,600	$ 1,379,900	$ 1,279,700	$ 995,400	$ 1,434,600
*Annual Replace - Pipe, FH, Meter, Well/Booster, Storage**	*$ 600,000*	*$ 100,000*	*$ 100,000*	*$ 100,000*	*$ 100,000*	*$ 100,000*	*$ 100,000*
Total CIP + Replacement Budgets	**$ 7,654,000**	**$ 776,800**	**$ 1,387,600**	**$ 1,479,900**	**$ 1,379,700**	**$ 1,095,400**	**$ 1,534,600**

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RATE FORECAST

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	Anticipated	Baseline/Budget	Forecast	Forecast	Forecast	Forecast	Forecast
	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24	FY 24-25
User Rate % Annual Increase		**10.0%**	**10.0%**	**5.0%**	**5.0%**	**5.0%**	**5.0%**
Typical User Rate	**$30.02**	**$33.02**	**$36.32**	**$38.14**	**$40.05**	**$42.05**	**$44.15**
Revenues							
Metered Sales[1]	$ 2,650,000	$ 2,915,000	$ 3,206,500	$ 3,366,825	$ 3,535,166	$ 3,711,925	$ 3,897,521
Other Charges [2]	$ 154,340	$ 186,683	$ 192,283	$ 198,052	$ 203,993	$ 210,113	$ 216,416
Service Availability Fee[3]	$ 25,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000	$ 85,000
Total Revenues	**$ 2,829,340**	**$ 3,186,683**	**$ 3,483,783**	**$ 3,649,877**	**$ 3,824,159**	**$ 4,007,038**	**$ 4,198,937**
Total Operating Revenues	**$ 2,675,000**	**$ 3,000,000**	**$ 3,291,500**	**$ 3,451,825**	**$ 3,620,166**	**$ 3,796,925**	**$ 3,982,521**
Expenditures							
Operations[4]	$ 842,657	$ 856,315	$ 882,004	$ 908,465	$ 935,719	$ 963,790	$ 992,704
Salaries and Benefits[4]	$ 810,803	$ 895,126	$ 921,980	$ 949,639	$ 978,128	$ 1,007,472	$ 1,037,696
Capital Improvements[4,5]	$ 472,700	$ 676,800	$ 1,326,228	$ 1,463,936	$ 1,398,363	$ 1,120,331	$ 1,663,095
Replacements[4,6]	$ 181,603	$ 100,000	$ 103,000	$ 106,090	$ 109,273	$ 112,551	$ 115,927
Debt Repayment - Long Term[7]	$ 297,946	$ 475,262	$ 475,262	$ 475,262	$ 475,262	$ 475,262	$ 475,262
Total Expenditures	**$ 2,605,708**	**$ 3,003,503**	**$ 3,708,474**	**$ 3,903,392**	**$ 3,896,744**	**$ 3,679,407**	**$ 4,284,684**
Net Change in Fund Balance	**$ 223,631**	**$ 183,180**	**$ (224,691)**	**$ (253,515)**	**$ (72,585)**	**$ 327,631**	**$ (85,747)**
Initial Fund Balance	$ 1,886,951						
Ending Fund Balance	**$ 2,110,582**	**$ 2,293,762**	**$ 2,069,071**	**$ 1,815,556**	**$ 1,742,971**	**$ 2,070,602**	**$ 1,984,855**

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DECLINING BALANCE SUMMARY

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	Improvement	Available EDUs*
System Wide	Existing Condition	1,850
	New Well 17 (1500 gpm)	3,436
	New Well 18 (1500 gpm)	5,022
	Additional Transmission	varies
Pressure Zones	Medium Zone Additional Pumping Capacity	318
	Upper Zone Additional Pumping Capacity	240

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18

NEXT STEPS

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- DEQ approval of document
- Adopt water system master plan
- Update user rates
- Proceed with Priority 1 improvements
- Continue to update and refine model and planning as development occurs

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ATTACHMENT L

2015 Declining Balance Update

KELLER ASSOCIATES

KELLER associates

Technical Memorandum

TO: Wayne Shepherd, PE, Public Works Director
City of Mountain Home

FROM: James Bledsoe, P.E
Marliese von Huene, E.I.

DATE: November 24, 2015

RE: Water System Declining Balance Update

PROFESSIONAL ENGINEER
REGISTERED
10803
11-24-15
STATE OF IDAHO
JAMES BLEDSOE

Background

Periodic reviews of the water system are necessary to address changes in conditions since completion of the Mountain Home Water Facility Planning Study (FPS) in June 2011. An evaluation of the Mountain Home water system was completed in March 2013, based on new population data and flow data through 2012. The purpose of this technical memorandum is to update the declining balance for the water system, identifying remaining capacities for the various components of the water system, including supply, water rights, and storage.

Population and Flow Update

Recent flow data (2013 through September 2015) was analyzed in the preparation of this update. In addition, population estimates from 2010 on were reviewed and revised based on 2014 Census Bureau estimates and recent housing starts (residential building permits issued by the City each year). The population estimate for 2014 is 3% less than 2010 census numbers; the population decline is evident in the decreased flows from 2010 through 2014 (Attachment A). A summary of future demands can be found in Table 1.

A summary of historical demands can be found in Attachment A. In recent years, the City's per capita water usage has remained relatively steady. In evaluating a water system, the maximum daily flow is a critical factor as it affects needed water rights and well supply. For the 2013-2015 period, Keller Associates estimates the existing maximum day water system demand at approximately 7850 gpm (slightly above the 7760 gpm utilized in the 2013 Water System Declining Balance update). Using this value, the average water usage during the maximum day is 816 gallons per capita per day (gpcd).

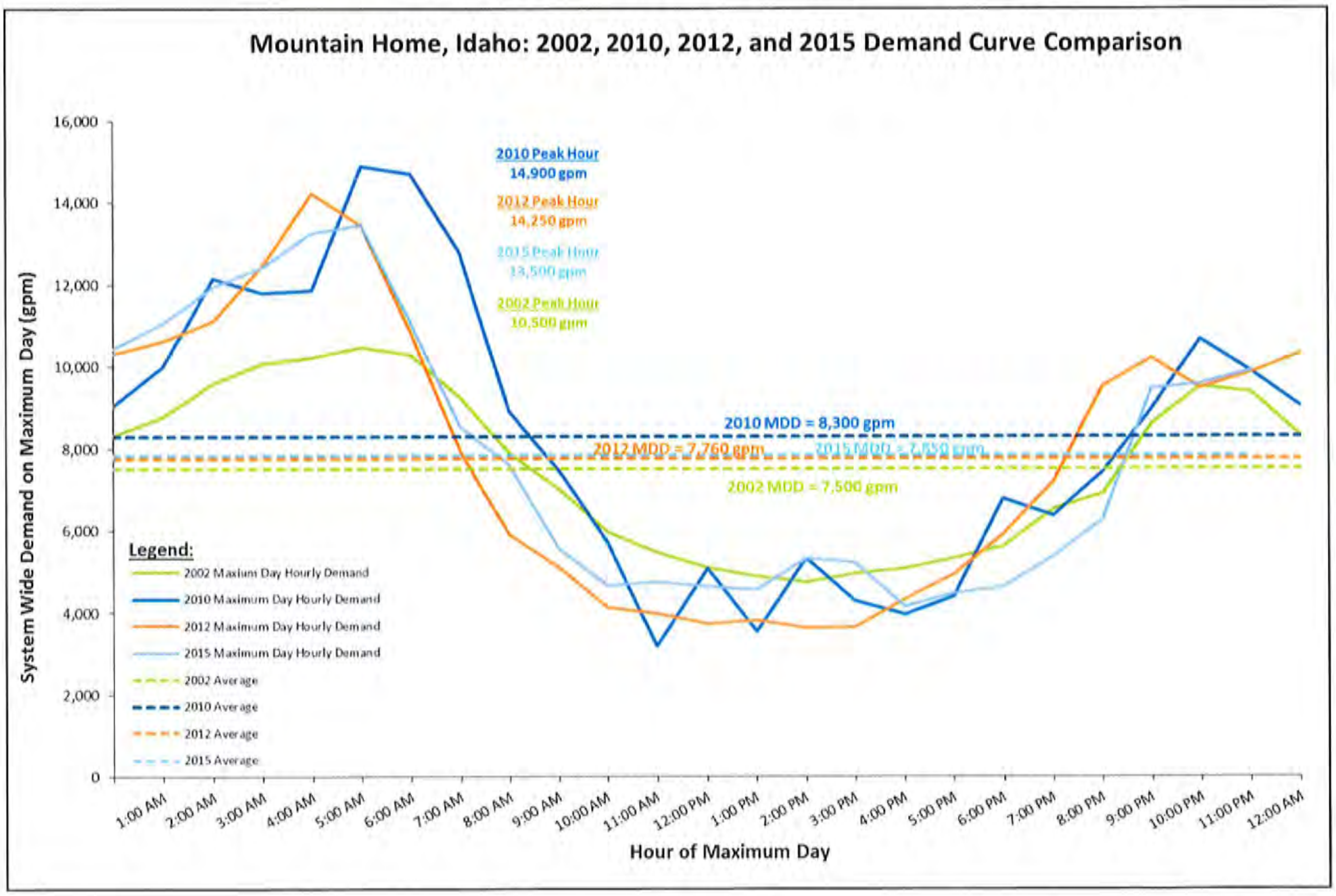
Table 1 – Future Population and Demands

Estimated Year	Total Population	Average Day Demands (gpm)	Maximum Day Demands (gpm)	Peak Hour Demands (gpm)
2015	13,880	2,940	7,900	13,500
2020	15,320	3,240	8,700	14,900
2025	16,910	3,580	9,600	16,400
2030	18,670	3,950	10,600	18,100
2035	20,610	4,360	11,700	20,000

Peak Hour Demands

Figure 1 illustrates the 24-hour demand pattern for high demand periods in recent years. The current peak hour demand of 13,500 gpm was approximately 1.72 times the average demand for that same day (compared to 1.84 peaking observed in 2012).

Figure 1 – 24-Hour Demand Pattern



Unaccounted-for Water

Unaccounted-for water (sometimes referred to as water loss) refers to the difference between the water delivered to the water system from the wells and what is recorded in the billing system. Annual water loss, summarized in Table 2, generally shows a downward trend, as the City has made a more concerted effort to reduce the unaccounted-for water usage. For the 2013-2014 period, the City achieved an unaccounted-for water level of 10%. This is generally considered in the industry an acceptable level of unaccounted-for water. Attachment B compares monthly production to monthly water consumption for the period of 2007-2012.

Table 2 – Unaccounted-for Water

Year	Recorded Well Production (MG/yr)	Billing Based Consumption (MG/yr)	Unaccounted-for Water (%)
2007	52	42	19%
2008	53	42	21%
2009	51	42	17%
2010	49	40	17%
2011	47	39	17%
2012	52	44	15%
2013	52	47	10%
2014	54	48	10%

Water Usage By User Category

Attachment C illustrates the water usage by user category for 2013 and 2014. A comparison of water usage by category for the peak month to the average annual usage shows that the makeup of water usage remains relatively constant throughout the year. Additionally, the percent of water usage that can be attributed to residential uses (single family, multi-family, and trailer park) has declined slightly, comprising approximately 71% (previously 75%) of the City's total water system demand.

Water Supply

Reported well capacities were obtained from SCADA data recorded in the summer months of 2015, and have seen a reduction since the 2013 update. The most notable reduction is with Well 9. At the time of the last declining balance update, this well was just recently reintroduced to the City's water system and its long-term performance was uncertain. During peak summer demand periods, the pumping rate of Well 9 is now reduced to prevent excessive drawdown and limit the introduction of air into the system. In addition to Well 9, small declines in the production rates of Wells 1, 6, and 15 may be attributed to their proximity and the influence they have on each other when running concurrently. The City has a total pumping capacity of approximately 11,250 gpm, seen in Table 3. The Department of Environmental Quality requires that the system be able to meet all standards with the largest well off-line (referred to as firm capacity). The City's firm capacity with the largest well off-line is approximately 9,100 gpm. Given the lengthy time to locate, permit, develop and construct wells, Keller Associates recommends that the City begin the process of developing new water sources many years before they are needed.

Table 3 – Observed Pumping Capacities in 2013 and 2015 (gpm)

Existing Water Supply	2015	2013
Well 1	750	800
Well 6	2,000	2,100
Well 9	900	1,550
Well 11	2,150	2,100
Well 12	1,200	1,200
Well 13	1,950	2,100
Well 14	1,200	1,200
Well 15 (VFD)	1,100	1,200
Total Production Capacity	**11,250**	**12,250**
Less Largest Well	(2,150)	(2,100)
Firm Pumping Capacity	**9,100**	**10,150**

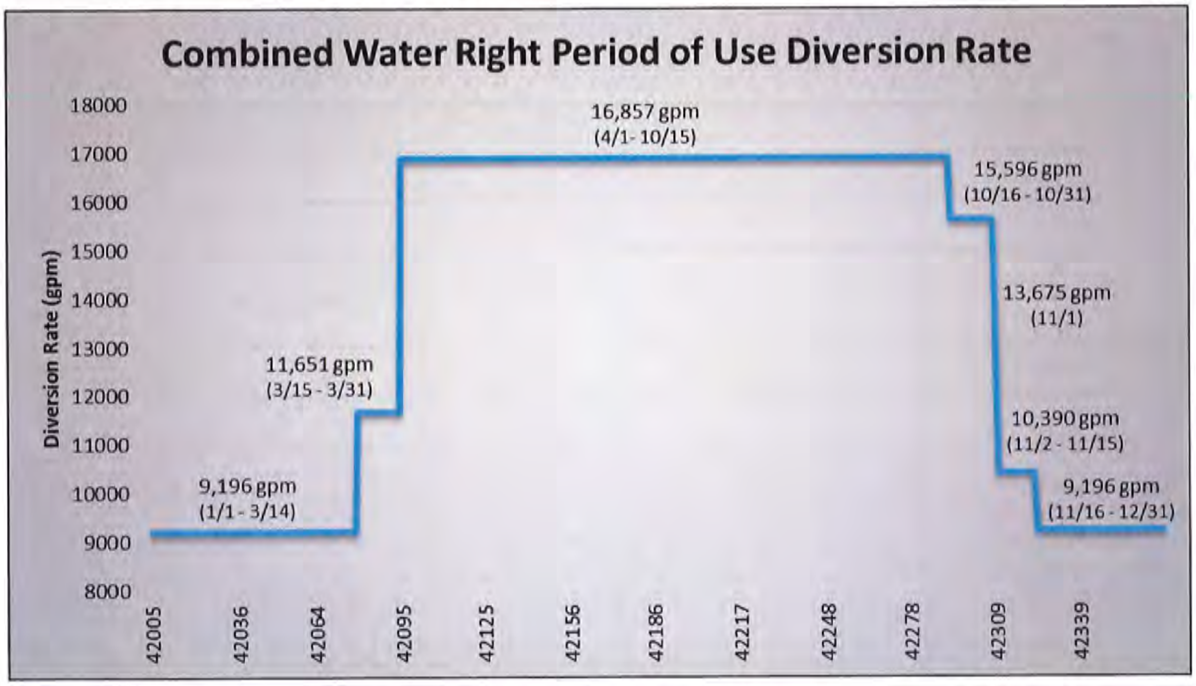
Water Storage

Based on current system demands, the peaking storage for the existing system is approximately 2.09 MG (lower than the calculated 2.21 MG reported in the 2013 update). The total recommended storage, including fire and operating storage needs, is approximately 3.35 MG, which is greater than the 3.0 MG of effective storage available from the City's three storage tanks. In order to mitigate this storage deficit, the City currently dedicates excess firm pumping capacity from the wells to offset peaking storage demands. This requires that the wells deliver peak hour demands for new water users, rather than supplying maximum day demands and relying on storage to provide the peak usage. Additional future demands can be supplied by additional pumping capacity; however, Keller Associates also recommends additional storage capacity to more fully utilize the City's wells and water rights.

Water Rights

Since the previous planning study update, the City has acquired what was formerly the Brown water right and has added the City's farm rights to the potable water rights portfolio. The City currently has water rights to pump 16,857 gpm during the summer months as seen in Figure 2. This is significantly higher than the total well pumping capacity, which should allow the City to add 2-3 additional wells under the existing water rights.

Figure 2 - Mountain Home Water Rights



Remaining Capacity

Calculations of remaining capacity for the system can be found in Attachment D. The remaining capacity of the water system was estimated to be approximately 453 additional equivalent dwelling units (EDUs) before needing either additional well supply or a water storage reservoir in service. This corresponds to a maximum City population of 15,040. The City has expressed a desire to add additional well supply capacity before constructing additional storage. With the addition of a new 1,500-gpm well, the water system would have an estimated remaining capacity of approximately 1,303 EDUs (population 17,216).

Once a new well is added to the system, the next recommended system improvement would be additional storage. Following the addition of storage, a second additional 1,500+ gpm well is recommended. Additional details on the timing of these recommendations are included in Appendix D. Because it sometimes takes years to permit, fund, design, and construct necessary improvements, Keller Associates recommends that the City begin implementation of improvements well in advance of when they are required.

Booster Station Considerations

Keller Associates also reviewed 2013/14 data for the upper and medium pressure zones to determine available booster station capacities (see Attachment E). Since the completion of the previous planning study update, the City added an additional pump to service the medium pressure zone. The existing pumps servicing the upper pressure zones were also replaced with slightly larger pumps.

Pump station flow meter records were reviewed to determine average and maximum daily demands for the pressure zones. Maximum demands were checked against available SCADA data. In estimating the remaining capacity of the upper zone, the use of Well 14 (which can be manually directed to the upper zone) was not considered in approximating the firm pumping capacity. Additionally, in estimating remaining capacity of the medium pressure zone, the existing PRV that services the zone was assumed to provide the firm backup supply of the zone.

Based on this analysis, the medium pressure zone can add a total of approximately 340 EDUs before the booster pumping capacity at the booster station needs to be increased. The upper pressure zone can add a total of approximately 272 EDUs before the booster pumping capacity at the booster station needs to be increased.

Table 4 – Declining Balance Summary

	Improvement	Available EDUs*	Approx. Service Population
System Wide	Existing Condition	453	15,040
	Bew Well 16 (1500 gpm)	1,303	17,216
	New 2 MG Storage	2,674	20,727
	New Well 17 (1500 gpm)	4,131	24,456
	Additional Transmission	varies	varies
Pressure Zones	Medium Zone Additional Pumping Capacity	340	14,750
	Upper Zone Additional Pumping Capacity	272	14,576

**Available EDUs is based on current number of users and is not adjusted to reflect vacancy rates, buildable lots, or undeveloped land within the city limits.*

Attachment A

City of Mountain Home
Summary of Historical Water Usage

Water demand summary (gpm*)

Year	Population	Average Day	Average Winter	Average Summer	Max Day
2002	11,566	2,759	1,156	5,047	7,200
2003	11,910	2,817	907	5,776	7,242
2004	12,163	2,948	907	5,668	7,483
2005	12,560	2,679	1,027	5,356	7,539
2006	13,015	2,287	904	5,994	9,100
2007	13,364	2,985	845	6,410	8,298
2008	13,851	3,073	907	6,296	7,890
2009	14,091	2,924	1,013	5,745	7,671
2010	14,206	2,808	839	6,051	8,225
2011	14,153	2,717	815	6,215	7,379
2012	14,063	2,983	815	6,156	7,230
2013	13,857	3,011	921	6,126	7,846
2014	13,780	3,096	847	6,285	7,807
2015	13,877		811	6,107	7,613

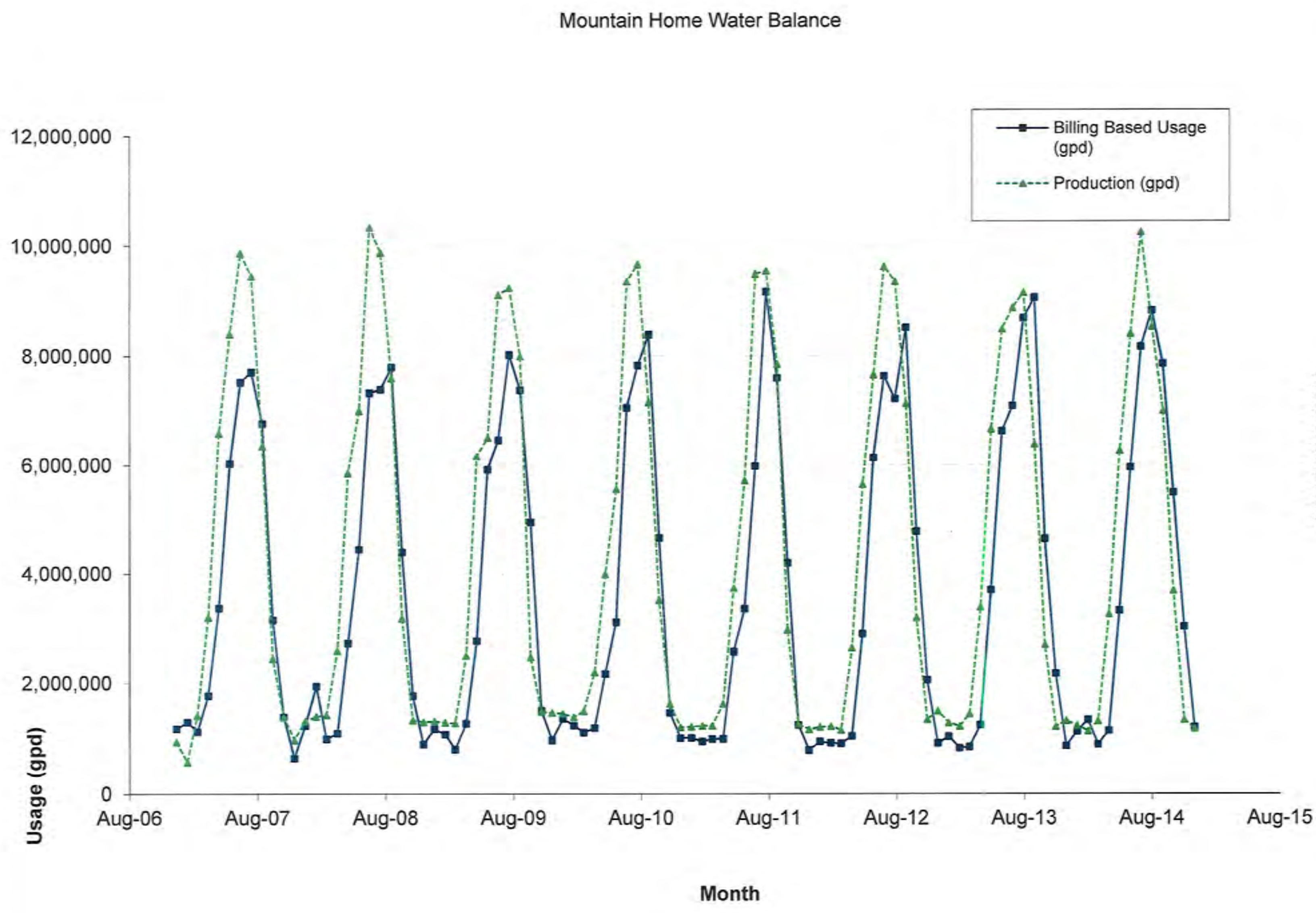
*gpm = gallons per minute
Maximum Day demands are based on 2-day average values

Water demand summary (gpcd)**

Year	Population	Average Day	Average Winter	Average Summer	Max Day
2002	11,566	344	144	628	896
2003	11,910	341	110	698	876
2004	12,163	349	107	671	886
2005	12,560	307	118	614	864
2006	13,015	253	100	663	1,007
2007	13,364	322	91	691	894
2008	13,851	319	94	655	820
2009	14,091	299	104	587	784
2010	14,206	285	85	613	834
2011	14,153	276	83	632	751
2012	14,063	305	83	630	740
2013	13,857	313	96	637	815
2014	13,780	324	89	657	816
2015	13,877		84	634	790
2011 2015 Average		**305**	**87**	**634**	**791**
Design 2015		**305**	**87**	**634**	**816**
2009 FPS		294	85	570	788
2003 FPS		355	136	651	889

**gpcd - gallons per capita per day
Data includes all domestic, commercial, industrial, and residential water usage - domestic usage is approximately 75% of total usage

Attachment B



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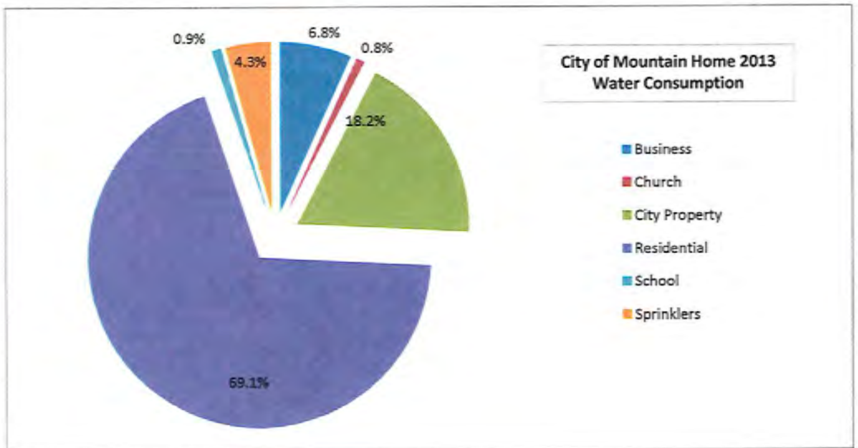
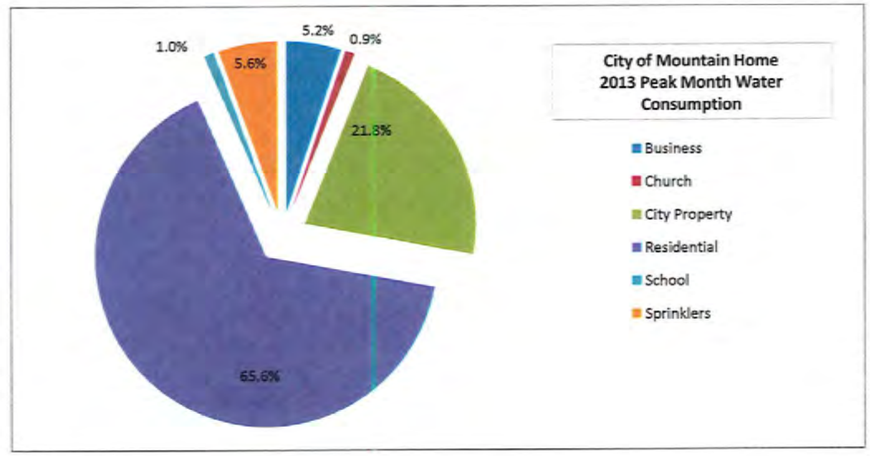
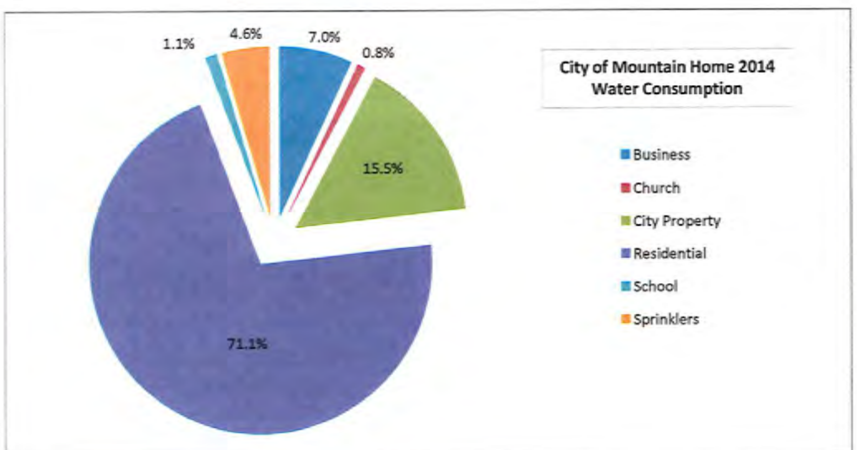
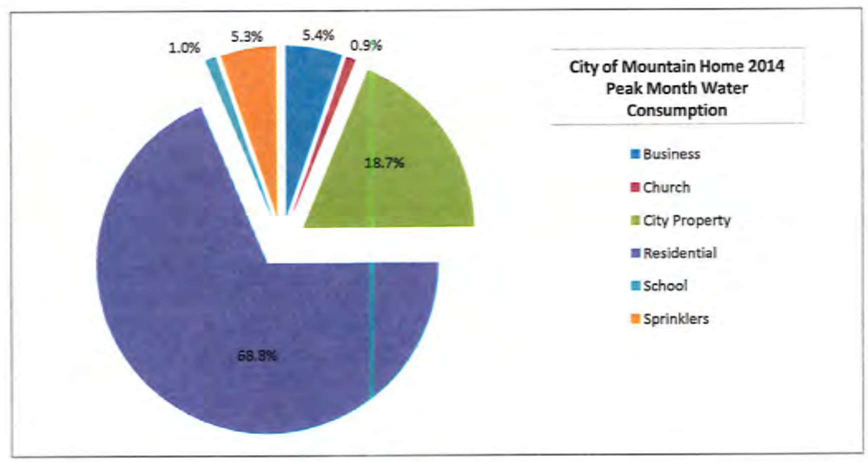
Attachment C









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Attachment D

City of Mountain Home Supply vs. Demand

Supply vs. Demand

	100% Firm
Firm Well Supply, gpm*	9,100
Max Day Demand, gpm**	7,846
Remaining Capacity, gpm	1,254

*Firm capacity refers to capacity of supply with largest well off-line

**Assumes 2008-2015 average per capita peak day demand

Demand per EDU

Max Day, gpcd	816	(includes all uses)
Residential component	71%	
Max Day Resident, gpcd	579	(includes only residential uses)
People / EDU[3]	2.56	
Max Day EDU, gpd	1483	
Max Day EDU, gpm	1.03	
Peak Hour Demand ERU, gpm	1.76	
2015 Population	13,880	

Remaining EDUs with Existing Storage and Wells	Max. Additional ERUs	Max. Population Served[1]
2015 Existing System[2]	453	15,040
Compare to 2013 Update	774	--

Available EDUs after Improvements	Max. Additional ERUs	Max. Population Served[1]
Phase 1: New Well 16 (1500 gpm) and new 2MG storage	2,674	20,727
Option 1: Build new Well 16 first	1,303	17,216
Option 2: Build new storage first	1,218	16,997
Phase 2: New Well 17 (1500 gpm)	4,131	24,456

Notes:

1 Based on 2015 population, recommended to start design for next stage significantly before this point

2 Based on wells having to deliver peak hour demands and maintain fire storage in tanks

3 EDU = Equivalent Dwelling Unit, i.e. a house with census value of 2.56 people

4 gpm = gallons per minute

5 gpcd = gallons per capita per day

Attachment E

2013/14 Flow Statistics

	Upper	Medium	Upper & Medium
Average Day (gpm)	133	288	421
Peak Month (gpm)	320	480	800
	July	July	July
Summer (gpm)	278	472	750
Winter (gpm)	45	137	182
Maximum Day (gpm)	420	657	958
Peak Hour* (gpm)	960	1,500	2,190

* Used Peaking Factor of 2.28, based off Medium Booster SCADA data in 2015

Note: Upper & Medium totals for maximum day and peak hour do not add to the third column, as these individual zone events do not happen at the same time.

Upper Zone Growth Potential

Maximum Day*(gpm)	420
Firm Pumping Capacity (gpm)	700
Available for Growth (gpm)	280
MDD gpm/ERU	1.03
Available ERUs	272

*Maximum day used because upper zone includes storage.

Note: If Well 14 is used for back up to the booster station, then Upper Zone Firm capacity is actually closer to 1400 gpm, which equates to 916 available ERUs

Medium Zone Growth Potential

Peak Hour* (gpm)	1,500
Firm Pumping Capacity (gpm)	2,100
Available for Growth (gpm)	600
Peak Hour gpm/ERU	1.76
Available ERUs	340

*Peak hour used because of lack of storage in medium zone.

Note: It may be possible that additional ERUs could be available based on PRV and transmission pipeline capacities, but these would need to be determined through additional computer modeling. Assume for new growth that demand per ERU will be comparable to system-wide max day and peak hour demands per ERU.

Upper Booster

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Day (gpm)	47	44	45	83	147	230	320	284	208	94	49	44

Medium Booster

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average (gpm)	138	136	140	260	443	475	480	461	392	256	140	136

Total [Upper & Medium]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average (gpm)	185	180	185	343	590	705	800	745	600	350	189	180

ATTACHMENT M

Energy Audit

KELLER ASSOCIATES

KELLER associates

Technical Memorandum

TO:	Wayne Shepherd, PE Public Works Director City of Mountain Home
FROM:	James Bledsoe, PE Adam Neiwert, PE
DATE:	August 4, 2016
SUBJECT:	Potable Water System Energy Audit

PROFESSIONAL ENGINEER
REGISTERED
1080
8-18-16
STATE OF IDAHO
JAMES BLEDSOE

BACKGROUND

The City of Mountain Home owns and operates a potable water system comprised of eight wells, two booster stations (total of five pumps), and three pressure zones. One additional well (Well #16) is anticipated to be added to the system in 2017.

Previous planning efforts have focused on meeting Department of Environmental Quality requirements for water supply, storage, and distribution. The purpose of this energy audit is to evaluate the energy efficiency of the water system pumps and to evaluate operational strategies that can reduce energy costs.

Keller Associates worked closely with Idaho Power and their consultants in completing this energy audit of the City's potable water system. As part of this audit, visits were made to each site to assess the condition of the electrical equipment and determine the wire-to-water efficiencies of each pump.

WIRE TO WATER EFFICIENCY TESTS

Keller Associates worked with City staff to inventory existing electrical assets and test the motor/pump efficiencies. Field tests were completed on May 25, 2016 and May 27, 2016. For each site, measurements were taken for suction pressure, discharge pressure, flow, and electrical power usage. This data was utilized to calculate the wire to water efficiencies for each pump. Table 1 summarizes the efficiencies of the City's pumps and the potential energy savings that could be realized with new pumps and motors that achieved a typical combined (motor + pump) upper efficiency level of 75%. Appendix A includes the calculations and assumptions, and available pump curves are found in Appendix B.

Table 1: Mountain Home Potable Water Pump Efficiencies & Potential Energy Savings

Pump Name	Measured Wire to Water Efficiency	Name Plate Motor Efficiency	Calculated Pump Efficiency	kWh per MG Pumped	kWh per MG Pumped with 75% efficient System	kWh Savings per MG	Annual Power Savings [1]
Well 1	NA	95.8%	N/A	N/A	N/A	N/A	N/A
Well 6	69%	95.0%	72.8%	3,344	3,085	259	$ 2,609
Well 9 @ 38.5 hz	60%	95.8%	62.1%	1,039	825	214	$ 116
Well 11 [2]	64%	95.0%	67.1%	3,429	2,915	514	$ 10,429
Well 12	53%	88% [4]	60.4%	1,727	1,224	503	$ 2,446
Well 13 [3]	65%	88% [4]	74.2%	3,094	2,695	399	$ 10,745
Well 14	75%	95.8%	78.4%	1,924	1,928	0	N/A
Well 15 @ 56.0 hz	65%	95.4%	67.8%	3,628	3,128	500	$ 6,177
Pilot Booster 1/2	71% [5]	92.4%	77.2%	841	800	41	$ 176
Pilot Booster 3 @ 60 hz[6]	NA	93.6%	NA	NA	NA	NA	N/A
3rd Street Booster 1 @ 60 hz	49%	91.7%	53.3%	582	379	203	$ 1,852
3rd Street Booster 2 @ 50 hz	76%	93.6%	81.3%	509	517	0	N/A

1. Calculated with 2014 Production data and assuming $0.06 per kWh.
2. Well 11 was rebuilt in 2012.
3. Well 13 was rebuilt in 2013.
4. Motor efficiency not on nameplate, assumed to be 88% as motor is not premium efficient motor.
5. An anomaly in the data for Pump 2 resulted in a calculated wire to water efficiency exceeded 79%. Assumed that the true wire to water efficiency is equal to Pilot Booster 1 (71%) which is the same motor, pump, and age.
6. Anomaly in data for Pump 3 resulted in a calculated wire to water efficiency of only 18%.

The maximum efficiency of a new well pump is approximately 84%, and the maximum efficiency of a new premium efficiency motor is approximately 96%. A well equipped with a new well pump and premium efficiency motor, installed with ideal conditions, can only expect a maximum wire to water efficiency of approximately 79%. Because typical pump and motor conditions do not generally lend themselves to ideal conditions, a typical overall upper limit for the combined efficiency of the pump and motor is often closer to 75%. With this in mind the current efficiencies of each pump are discussed below. In general, all well pump efficiencies are below the maximum wire to water efficiency of 79%.

Well 1

The pump test results suggest that this well is producing more flow than is possible based on the available pump curve. Either the pump has been modified/replaced, or the flow meter and/or pressure gauge are not measuring conditions at this well accurately. The existing 200 horse power well pump motor has a premium efficiency rating. Continued use of this motor is recommended. This well was not equipped with the necessary equipment to monitor drawdown at the time of this test. Keller Associates recommends that drawdown monitoring capabilities be added in the future.

Well 6

With no available pump curve, it is not possible to determine if this pump is operating on its curve. Test results at this well show an overall wire to water efficiency of 69%. The well pump has a calculated efficiency of 73.7%. Keller Associates believes the well level during the May pump test (560 ft) may have been inaccurate. The City retested the flow, discharge pressure, and well level in July, and observed a flow and discharge pressure nearly equal to the May test, and a well level of 569 ft. Assuming the power consumption in the July test was equal to the power consumption of the May test, the overall wire to water efficiency was calculated to be 70%. The combined motor/pump efficiency of this well is fairly close to the realistic upper limit of 75%, and replacing the pump at this time is not recommended. Keller Associates recommends that the City continue to perform regular maintenance on the pump to prolong the life of the pump and delay pump efficiency decline. The existing 500 horse power well pump motor has a premium efficiency rating (95%), and continued use of this motor is recommended.

Well 9

Test results at this well show an overall wire to water efficiency of 60%. The existing 200 horse power well pump motor has a premium efficiency rating (95.8%). Continued use of this motor is recommended. This well is equipped with a VFD that is currently set to run at 38.5 hz. The calculated efficiency of the well pump is 62.1% at this setpoint. This is well below the 82% efficiency mark that is targeted on the pump curve. This lower efficiency is believed to be largely a result of operating the pump at the lower speeds, but pump wear and other pump performance issues could be contributing factors. Keller Associates recommends that the City consider replacing the pump with a smaller pump the next time the pump needs to be pulled for service. The new pump should be optimized to efficiently deliver the current target design flow and pressure conditions.

Well 11

The available pump curve for Well 11 does not indicate how many stages this pump has or what size the impellers are and at the time of this analysis, this information was not readily available. Without this information, it is not possible to determine if this pump is running on its curve. The test data shows that this well has an overall wire to water efficiency of 64%. The existing motor at this well has an efficiency of 95%, making the pump 67.1% efficient. This pump was rebuilt in 2012. After this analysis was completed, problems at the well required that the well pump to be rebuilt or replaced. A subsequent test with the new installation could be completed to determine improved pump efficiency and assess how the production compares to the reported pump curve.

Well 12

The test data at this well shows the pump running well below its curve, and this well has the lowest wire to water efficiency of all of the wells at 53%. The City performed a second pump test to monitor drawdown and discharge pressure at this well in July and discovered that the SCADA system reports erroneous drawdown data and so the exact efficiency may be higher or lower than shown in these calculations. Additional troubleshooting and upgrades to the SCADA level monitoring system is recommended.

The pump and motor and associated well facilities are fairly old. Based on the anticipated annual power savings (based on 53% existing efficiency) and Idaho Power Rebate, it would take almost 40 years to pay for the project when looking at strictly the power savings. If Well 12 were operated more frequently throughout the year, than payback could be reached much sooner. A payback of 40 years is longer the anticipated life of the assets. However, given the age of the existing pump and motor, Keller Associates recommends that the existing well pump and standard efficiency motor be replaced with a new 200 hp premium efficiency motor and a new 1,500 gpm well pump in the near future. The City may choose to do this work in phases, completing the motor upgrades first, then reassessing the pump efficiency before choosing to replace the pumps. Table 2 below shows a cost estimate of these recommendations. Pump and motor upgrades should be coordinated with other electrical upgrades (discussed later).

Table 2: Well 12 Motor and Pump Replacement Opinion of Probable Cost

Item	Quantity	Unit	Unit Price	Cost
200 hp Motor (Premium Efficiency)	1	EA	$ 12,000	$ 12,000
1,500 gpm Well Pump	1	EA	$ 55,000	$ 55,000
Pull and Replace Pump		LS	$ 15,000	$ 15,000
35% Engineering & Contingency	1	LS	$ 20,500	$ 28,700
			Total	**$ 110,700**
			Annual Power Savings	**$ 2,450**
			Estimated Idaho Power Rebate	**$ 7,340**
			Improvement Payback (years)	**42**

Well 13

There is not an available pump curve for this well, and therefore it is not possible to determine if the pump is running on its curve based on the test data alone. The test data shows that this well has a wire to water efficiency of 65%. The motor at this well is fairly old (not a premium efficiency motor), and an efficiency was not listed on the motor's nameplate. An efficiency of 88% was assumed for this motor, making the pump 74.2% efficient. The pump was recently rebuilt in 2013, and will not need to be rebuilt in the near future. It is recommended that the existing motor be replaced with a new premium efficiency motor. With a new premium efficiency motor, the wire to water efficiency could be raised to 71.4%, approximately a 6% increase based on the existing motor's assumed efficiency.

Table 3: New Well 13 Premium Efficiency 500 hp Motor Replacement Opinion of Probable Cost

Item	Quantity	Unit	Unit Price	Cost
500 hp Motor (Premium Efficiency)	1	EA	$ 29,000	$ 29,000
Installation	1	LS	$ 7,200	$ 7,200
35% Engineering & Contingency	1	LS	$ 12,670	$ 12,670
			Total	**$ 48,870**
			Annual Power Savings	**$ 10,745**
			Estimated Idaho Power Rebate	**$ 34,209**
			Improvement Payback (years)	**1.4**

Well 14

The well test performed on May 25, 2016 showed an overall wire to water efficiency of 75%. The well was flowing at 1,321 gpm at a discharge pressure of 7.7 psi. The level during the test was constantly at 438 feet below ground surface. Keller Associates believes the level measurement during this test was not correct as virtually no drawdown was observed. The City retested the well flow, discharge pressure, and level in July. The City reported a flow of 1,200 gpm, a discharge pressure of 10 psi, and a well level of 552 feet (much greater drawdown). Assuming the power consumption of the July test was the same as the May 25th test, the overall wire to water efficiency was calculated to be 86%, which exceeds the maximum theoretical efficiency for the well. Had additional power consumption readings been taken at the well for the second test, we believe the actual efficiency would have been more inline with the original test. The existing 200 horse power well pump motor has a premium efficiency rating, and continued use of this motor is recommended. Keller Associates recommends continued monitoring and adjustment of SCADA ground water level recordings as needed.

Well 15

Test data at this well shows an overall wire to water efficiency of 65%. The existing 500 horse power well pump motor has a premium efficiency rating. Continued use of this motor is recommended. The calculated efficiency of the well pump is 67.8% with the pump operating at 56 hz (1100 gpm). This efficiency is slightly lower than target values, which can likely be attributed to the lower pump speeds and wear of the pump impellers from the sand. The wire to water efficiency for the pump was calculated to be about 6% lower when the pump is operating at 50 hz (700 gpm). This well is known for producing sand, and the City has historically operated the well in the flow range of 600 – 1200 gpm, which corresponds to the design range of the sand separator. For optimum efficiency, Keller Associates recommends that the City operate the well more as a constant speed pump at the higher flow rates. Keller Associates recommends the City inspect the pump impellers for wear next time the pump needs to be pulled for maintenance, and rebuild the pumps if needed.

Pilot Booster 1

The observed test data shows this pump running nearly on its pump curve with a wire to water efficiency of 71%, and a calculated pump efficiency of 77.2%. The existing 40 horse power pump motor has a premium efficiency rating. This motor was operating at 106% of name plate rating at the time this test was performed. Operating in this range is within the allowable service factor of the motor, but may shorten the life of the motor if this condition is typical. This is a newer installation, and it is recommended that no changes to the pump or motor be made at this time.

Pilot Booster 2

The observed test data shows this pump running slightly below its pump curve. The electrical data gathered suggests that this pump has a wire to water efficiency greater than 79%. An efficiency greater than 79% is higher than what would be achieved based on the reported motor and pump efficiencies, and therefore it was assumed that this pump has similar efficiencies to Pump 1. This is a relatively new installation, and it is recommended that no changes to the pump or motor be made at this time.

Pilot Booster 3

The test data shows this pump running well below its pump curve with an overall wire to water efficiency of 31%. The existing 30 horse power pump motor has a premium efficiency rating. Continued use of this motor is recommended. This is a relatively new installation, and it appears that the test data gathered is not representing the actual efficiency of this motor and pump. This conclusion is supported by conflicting test data gathered for the same pump/motor when tested at a lower speed. It is recommended that no changes to this pump and motor be made at this time. Additional testing of the pump and motor should be completed in the future.

3rd Street Booster 1

Test data at this site shows the pump running well below its pump curve. This motor and pump have an overall wire to water efficiency of 49%, and a calculated pump efficiency of 53.3%. The existing 25 horse power pump motor has a premium efficiency rating. Continued use of this motor is recommended. This booster pump runs almost continuously to supply the medium pressure zone with flow and pressure. Continual use of this pump for more than 10 years has likely caused wear of the pump impellers. It is recommended that the pump be rebuilt or replaced within the next couple of years (during the winter season).

Table 4: 3rd Street Booster 1 Replacement Opinion of Probable Cost

Item	Quantity	Unit	Unit Price	Cost
New 500 gpm Booster Pump	1	EA	$ 8,600	$ 8,600
Installation of new Booster Pump	1	LS	$ 6,400	$ 6,400
35% Engineering & Contingency	1	LS	$ 5,250	$ 5,250
			Total	**$ 20,250**
			Annual Power Savings	**$ 1,852**
			Estimated Idaho Power Rebate	**$ 5,555**
			Payback (years)	**7.94**

3rd Street Booster 2

Test data at this site shows an overall wire to water efficiency of 76%, and a calculated pump efficiency of 81.3%. The existing 60 horse power pump motor has a premium efficiency rating. Continued use of this motor is recommended. The purpose of this pump is to supply extra flow and pressure during peak demands in the medium pressure zone, or to supply the medium pressure zone when 3rd Street Booster 1 is taken offline. Since this pump does not run as often it has a higher efficiency and a longer remaining life than Pump 1. It is recommended that no changes be made to this pump or motor at this time.

ELECTRICAL FACILITIES, LIGHTING, AND POWER FACTORS

Electrical Facilities

Keller Associates also reviewed the electrical facilities with City staff and the City's electrician and identified electrical issues of concern. This included the pump panel disconnect at well 12 which is not operational. The disconnect is currently in the "on" position with no internal mechanism to shut it off. It is recommended that this motor control panel be replaced as soon as possible at an estimated project cost of about $21,000.

Some of the other pump control panels and related starters could be nearing the end of their life. The pump control panels at wells 11 and 13 are also recommended for replacement within the next few years.

Lighting

The lighting at water facilities which is generally less efficient and could be replaced with more efficient LED lighting fixtures. The City has a potential to save almost $1,000 per year by upgrading the facilities exterior lighting to LED. Payback at the facilities will vary between 3.6 and 12.7 years, depending on the facility. Keller Associates recommends replacing those with the shortest payback periods now and eventually replace all of the exterior and interior fixtures as part of the ongoing maintenance activities of each facility. Recommendations for each site are outlined in Appendix C and summarized in Table 5. They include the eventual replacement of interior lighting as part of the ongoing maintenance of the well facilities. Because of the infrequent use of interior lighting, replacing these lights now is not recommended.

Table 5: LED Lighting Recommendations

Facility	Interior Lighting Replacement Recommended	Exterior Lighting Replacement Recommended	Cost	Cost after Rebate	Power Savings	Payback (years)
Well 1	Y	Y	$ 1,150	$ 1,075	$ 132.37	8.1
Well 6	N	Y	$ 2,000	$ 1,900	$ 264.73	7.2
Well 9	Y	Y	$ 250	$ 225	$ 17.66	12.7
Well 11	Y	Y	$ 250	$ 225	$ 17.66	12.7
Well 12	Y	Y	$ 250	$ 225	$ 17.66	12.7
Well 13	Y	Y	$ 1,000	$ 950	$ 132.37	12.7
Well 14	Y	Y	$ 1,000	$ 950	$ 264.73	3.6
Well 15	N	Y	$ 2,000	$ 1,800	$ 141.35	12.7

Power Factors

When the individual pump motors were tested, power factor measurements were obtained. Power factor is the ratio between true power and apparent power. True power is measured in KW and apparent power is measured in KVA. The ideal power factor is one and anything less means that requires more power to do the same work. In other words, lower power factors translate to higher losses in the system and higher energy bill for customers with a demand larger than 1,000 KW. Because the losses are proportional to the square of the current; small improvements to power factor can bring a significant reduction in losses. Idaho power encourages power factor correction but does not require it. Customers with large demands (rate 19 accounts) have billing rates which are adjusted according to power factor. Where the customer's power factor is less than 90 percent, the company may adjust the KW measured to determine the Billing Demand by multiplying the measured KW by 90 percent and dividing by the actual power factor. To improve poor power factor, correction can be obtained by adding capacitors to the electrical system. Power factors lower than 0.88, for example, may be considered for correction. Target corrected power factors should be between 0.92 and 0.95. The results of the motor power factors are summarized in Appendix C.

It is understood that the City of Mountain Home has a 9S account for smaller customers. The billing adjustment benefits could not be realized with this account, and so no power factor correction is recommended at this time. If the City's account changes to rate 19 however, based on this evaluation, a new capacitor banks with a ratings of 50 kVARs could be installed for Wells 1, 12, and 14, and a new capacitor bank with a rating of 120 could be installed for Well #13. The cost of a 50KVAR capacitor bank with installation is estimated at $1,960. The cost of a 120KVAR capacitor bank with installation is estimated at $4,200.

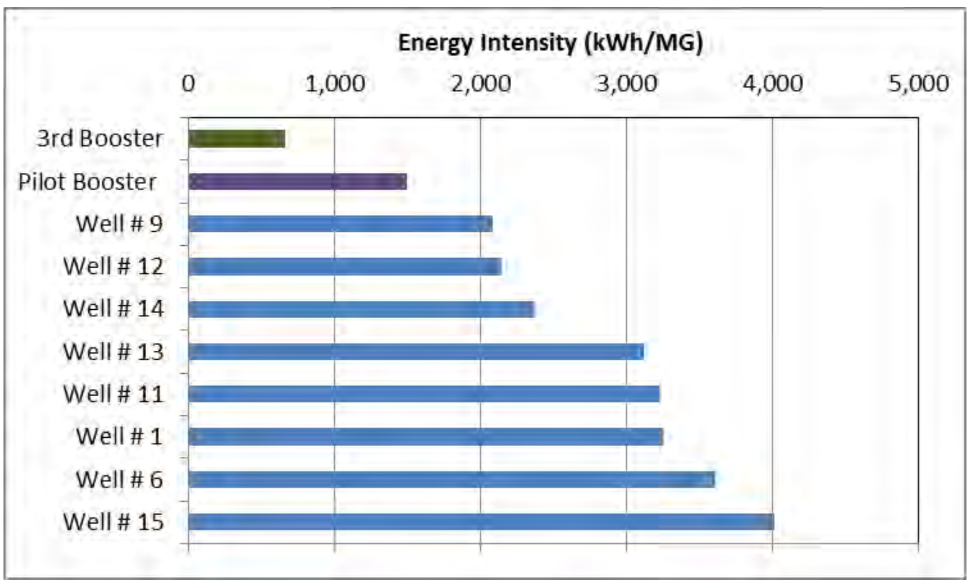
SYSTEM OPERATIONAL IMPROVEMENTS

This section presents what is referred to the energy intensity for each facility (referred to as an Energy Map and reported in terms of kWh of energy consumed for every million gallons of water pumps). This section also discusses changes in overall system operating controls/strategies that can be made. Finally, this section presents other operations and maintenance recommendations that resulted from the system evaluation and field work, and discusses peaking charges.

Energy Map & System Operations

Keller Associates worked closely with the City of Mountain Home and a consultant for Idaho Power (Hansen, Allen, and Luce, Inc.) who reviewed three years (2012-2014) of pump production data and energy consumption data. This information was summarized by them in Figure 1 below. Refer to Appendix D for supporting data.

Figure 1: Mountain Home Power Usage per Million Gallons of Water Pumped



The 3rd Street Booster supplies the water to the medium pressure zone and the low energy usage per million gallons of water pumped is mostly a result of the relatively low additional pressure that the pumps add to the system. The Pilot Booster rate is higher as it pumps to a higher pressure zone than the 3rd Street Booster station. Keller Associates worked with City personnel to compare the energy intensity of the Pilot booster station before and after the pump and motor upgrades were completed in 2015. Based on the energy usage from May 2015 through April 2016, the energy usage was about 23% lower per million gallon of water produced than reported for the period 2012-2014 prior to the improvements. Given the very minimal (e.g. <1%) pumping to the medium (lower energy) pressure zone, this energy savings is likely attributed to the more efficient pumps and motors.

The real value in the data presented in Figure 1 is the comparative power usage for water supplied to the system. The wells with the lowest cost per gallon to supply the water system are Wells 9, 12, and 14. The relatively lower cost is largely attributed to the higher groundwater levels in these wells, which in turn requires less energy to pump into the City's system. In is anticipated that Well 16 will have a similar lower cost of delivery.

Ideally, the City could operate Wells 9, 12, 14, and future Well 16 as the primary supply source for the water system and utilize wells with higher costs of supply for higher demand periods. The challenge with this arrangement is that historically wells 9 and 12 have experienced challenges in providing a reliable source of water when pumped for extended durations. In fact, after the first summer of operation, drawdown levels in Well 9 increased substantially, and the City had to add a VFD to ramp down the supply from Well 9. More fully utilizing Well 14 is a possibility but would require some modifications in the pump controls (i.e. running the Well based on Tank 1 levels).

Keller Associates recommends that the City experiment with running Wells 9, 12, 14, and future Well 16 more often and in a lead role, particularly during lower demand periods. Running Wells 12, 14, or 16 during the winter months, for example, could supply the majority if not all of the City's water at a lower cost. In making these operational adjustments, the City should track closely well drawdown patterns to ensure that adequate water above the pump bowls are maintained and the wells can be counted on for their full supply during the peak summer demand periods. With the completion of Well 16 and new storage improvements, the City will have added water supply redundancy that will allow them to more fully experiment with varying operations and increased usage of Wells 9, 12, and 14. Keller Associates recognizes that adjustments in well operations may be needed to maintain desired tank levels.

The higher energy usage for the Wells 1, 6, 11, and 13 can largely be attributed to the depth of the water. Well 15 had the highest energy usage, which can be attributed to a number of factors including added headloss resulting from sand separator and lower pump efficiencies that result when the pump is operated at lower speeds. The City has observed that problems with sand entering the system can be mitigated by operating Well 15 more continuously. For this reason, the City typically runs this well non-stop through the summer period. As a power saving measure, the City can wait to start it a little later in the season when it is needed (likely in June, rather than May) and turn it off when it is no longer needed (likely early September). Keller Associates also recommends that the pump operate at the higher speeds for better efficiencies, and only operate the VFD functionality in the event that drawdown is excessive or one of the tanks is taken off-line.

Keller Associates recommends that the City continue monitor the energy intensity (kWh/MG) for each well source and continue to look for operating adjustments to more fully utilize sources with the lowest energy intensity.

As part of the efficiency evaluation, Keller Associates worked with IPC's consultants to evaluate alternative operational strategies, including pumping Well 14 into the upper zone to avoid inefficiencies associated with pumping water twice (once to the lower zone and a second time to the upper zone) and running Well 9 into the Medium zone. Based on the analysis results, no change in operations are recommended at this time.

Another operational change explored included reducing the operating pressure of the medium zone by about 10 psi. This would allow the system to continue to deliver acceptable pressures at a slightly reduced energy cost by about $1,000 per year. To accommodate this, the City would need to adjust the setpoints for the three pumps and two hydraulic valves that control pressures for the medium pressure zone.

Other Operations & Maintenance Improvements

In the process of completing the tests, Keller Associates also identified related operational and maintenance improvements that should be made. These include

1. *Well 1:* Investigate the pump to waste operations, which currently exceed the capacity of the infiltration chamber and result in localized flooding. Consider reduced waste times, expanded subsurface storage, and/or improved infiltration capabilities.

2. *Well 6:* Repair/replace dysfunctional butterfly valve handle.

3. *Well 9:* Repair/replace air release valve which is "sticky" and does not always close.

4. *Pilot Site Controls:* Updates to controls for electrically operated valves at the Pilot site for more efficient operation. Recommended program changes were provided to the City of May 25, 2016 and will improve system redundancy and allow the City to better utilize Well 14 which uses less power per gallon of water produced than other wells.

5. *Pressure Monitoring:* A few pressure gages did not match pressure transducer readings reported by the SCADA system. These should be checked every 6-12 months, and adjustments should be made. Use 200 psi liquid filled pressure gages.

6. *Well Drawdown Monitoring:* For improved monitoring of well drawdown data, the pressure transducers that measure well level should be checked every 6-12 months, and provisions should be added to the well to facilitate these tests were practical. Additionally, SCADA improvements to the system are recommended to better display and trend depth of water above pump bowls. This improved monitoring will provide the City with needed information to more fully utilize Wells 9, 12, and 14 (wells with lowest power usage per gallon of

water pumped), while providing the operational data necessary to ensure that the supply will be adequate during the peak demand months of July and August.

Peaking Charges & Sampling

The City pays a power demand charge every billing period that a well is operated. City staff have limited the operations of wells during the low demand periods to avoid unnecessary peak demand charges. The City also winterizes Wells 9, 12, and 15. Monitoring which wells are called on during the low demand period and adjusting On/Off set points and the sequence of operations could potentially realize additional peak demand savings.

Sampling for DEQ can be coordinated with higher demand periods to avoid unnecessary peaking charges. However, it should be noted that EPA requires sampling every 5 years in November. As a potential cost savings measure, for wells equipped with generators, the City could use the generator to power facility for November sampling.

Power Flex Program

Additionally, it should be noted that the City of Mountain Home is participating in the Idaho Power Flex Program which provides an economic incentive to the City for volunteering to shut off power usage during critical peak periods for the power utility. By enrolling in the program, the City is not obligated to restrict use of their facilities, but is given the option to do so in exchange for the monetary incentive. For the 2016 season, the City is enrolling Wells 6 and 11 in the program. Well 6 is equipped with a standby generator which the City could utilize the well without drawing power from the system.

SUMMARY OF RECOMMENDATIONS

Keller Associates recommends that the City implement the operations and maintenance improvements outlined in this technical memorandum. Additional, we recommend that the City move forward with the following capital improvements, taking advantage of IPC rebates where applicable.

APPENDICES

Appendix A – Calculations and Assumptions

Appendix B – Pump Curves

Appendix C – Electrical Recommendations

Appendix D – Hansen, Allen, and Luce Data

APPENDIX A

Calculations and Assumptions

KELLER associates

214010-013/r/16-218

City of Mountain Home
Well No. 1

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Well Info

Depth of Well	856	ft
Reported Static Water Level	503	ft
Depth of Suction Assembly	617	ft
Casing/Hole Diameter	14	in (0 - 540 feet)
Casing/Hole Diameter	12	in (540 - 856 feet)
Pump Column Diameter	8	in
Colum X-sectional Area	0.35	ft^2
Reported Current Capacity	810	gpm

Discharge Piping Info

Size	8	in
Pipe X-Section Area	0.349	ft^2
Length to Pressure Gauge from Discharge Head	11.5	ft

Pump Test Data (5-27-2016)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Discharge Pressure - SCADA (psi)	Ground Water Level - SCADA (ft)	Measured Power Used (kWh)
Static						560	
Pump Started	8:18 AM						
	8:25 AM	768	1.71	65	63.7	560	
	8:28 AM	771	1.72	65	63.9	560	
	8:30 AM	775	1.73	65	63.9	560	
	8:32 AM	777	1.73	65	63.5	560	
	8:34 AM	768	1.71	64	63.1	560	
	8:36 AM	769	1.71	65	63.3	560	
	8:38 AM	766	1.71	65	63.3	560	
	8:40 AM	768	1.71	65	63.9	560	
							37.2
Average		770	1.72	64.9	63.6	-	

Level measuring device not functioning during test

Calculations

Flow	770	gpm
flow	1.72	cfs
time	15	min
Volume Pumped	11,550	gal
Volume Pumped	1,544	ft^3
Discharge Pipe Velocity	4.91	fps
Discharge Pipe Velocity Head	0.38	ft
Pump Column Velocity	4.91	fps
Pump Column Velocity Head	0.38	ft
Weight of water pumped	96,327	lbs
Discharge Pressure	65	psi
Discharge Pressure Head	150	ft
Ground Water Level	-	ft (below gs)
Total Height Water is Lifted	#VALUE!	ft
Power Needed	#VALUE!	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	#VALUE!	kWh
Well Pump/Well Efficiency (no headloss)	#VALUE!	
Total Headloss	12.53	ft
Actual Height Water is Lifted	#VALUE!	ft
Power Needed	#VALUE!	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	#VALUE!	kWh
Well Pump/Well Efficiency (with headloss)	**#VALUE!**	
Calculated kWh per MG Pumped	**3,221**	

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
Dischg. Head (90°)	8	0.28	0.11	
Tee	8x8x6	0.1	0.04	tee was closed
check valve	8	2.5	0.94	
Flow Meter	8	0	0.00	No loss
Elbow (90°)	8	0.14	0.05	
Total		**2.88**	**1.13**	

Half loss through elbow because pressure gauge is located on elbow.

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Pump Column

100	Assumed Steel pipe

C Factor for Discharge Piping

120	Assumed aged Ductile Iron (cement motor lined)

h_f Pump Column =	11.24	ft
h_f discharge Pipe =	0.15	ft
h_f Total Friction Loss =	11.39	ft
Total Headloss =	**12.53**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	#VALUE!
Energy savings (kW*hr) per MG	#VALUE!
2014 Production, MG	261
Annual Energy Savings, kWh	#VALUE!
Annual Power Savings (at $0.06/kWh)	#VALUE!
IPC Maximum Credit ($0.18/kWh)	#VALUE!

City of Mountain Home
Well No. 6

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Pump Test Data (5-27-2016)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Discharge Pressure - SCADA (psi)	Ground Water Level - SCADA (ft)	Measured Power Used (kWh)
Static						557	
Pump Started	9:02 AM						
	9:11 AM	1883	4.20	64	65.1	559	
	9:12 AM	1,850	4.12	64	63.6	559	
	9:14 AM	1,930	4.30	65	64.9	559	
	9:16 AM	1,930	4.30	65	64.6	559	
	9:18 AM	1,968	4.38	65	64.8	560	
	9:20 AM	1,965	4.38	64	64.8	560	
	9:22 AM	1,960	4.37	65	64.8	561	
	9:24 AM	1,990	4.43	64	63.9	561	
	9:26 AM	1,984	4.42	64	64.1	561	97.8
Average		1,947	4.32	64.4	64.51	559.9	

Well Info

Depth of Well	940	ft
Reported Static Water Level	540	ft
Depth of Suction Assembly	685	ft
Casing/Hole Diameter	24	in (0 to 70 feet)
Casing/Hole Diameter	20	in (70 to 107 feet)
Casing/Hole Diameter	?	in (107 to 940 feet)
Pump Column Diameter	10	in
Colum X-sectional Area	0.55	ft^2
Reported Current Capacity	2,100	gpm

Discharge Piping Info

Size	12	in (reduces to 10")
Pipe X-Section Area	0.79	ft^2
Size	10	in
Pipe X-Section Area	0.55	ft^2
Length to Pressure Gauge from Discharge Head	4.3	ft
Length of 12" Discharge Pipe	2.6	ft
Length of 10" Discharge Pipe	1.7	ft

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
Dischg. Head	10x12	0.33	0.33	
tee	12x12x8	0.1	0.05	tee was closed
reducer	12x10	0.05	0.05	
check valve	10	2.5	2.46	
Total		0.48	2.89	

Treated as a educing elbow, K value is an addition of a regular 10" elbow (k = 0.28) and a gradual 10" to 12" enlargement (k = 0.05). Headloss calculated with velocity head in pump column.

Calculations

Flow	1,950	gpm
flow	4.34	cfs
time	15	min
Volume Pumped	29,250	gal
Volume Pumped	3,910	ft^3
12" Discharge Pipe Velocity	5.53	fps
12"Discharge Pipe Velocity Head	0.48	ft
10" Pump Column Velocity	7.97	fps
10" Pump Column Velocity Head	0.99	ft
Weight of water pumped	243,945	lbs
Discharge Pressure	65	psi
Discharge Pressure Head	150	ft
Ground Water Level	560	ft (below gs)
Total Height Water is Lifted	710	ft
Power Needed	173,237,542	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	65.24	kWh
Well Pump/Well Efficiency (no headloss)	67%	
Total Headloss	26.45	ft
Actual Height Water is Lifted	737	ft
Power Needed	179,689,171	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	67.67	kWh
Well Pump/Well Efficiency (with headloss)	**69%**	
Calculated kWh per MG Pumped	**3,344**	

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Pump Column
100 Assumed Steel pipe

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f Pump Column =	23.49	ft
h_f 12" discharge Pipe =	0.03	ft
h_f 10" discharge Pipe =	0.04	ft
h_f Total Friction Loss =	23.56	ft
Total Headloss =	**26.45**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	3,085
Energy savings (kW*hr) per MG	259
2014 Production, MG	168
Annual Energy Savings, kWh	43,491
Annual Power Savings (at $0.06/kWh)	$ 2,609
IPC Maximum Credit ($0.18/kWh)	$ 7,828

City of Mountain Home
Well No. 6 With City Data Gathered in July

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Well Info

Depth of Well	940	ft
Reported Static Water Level	540	ft
Depth of Suction Assembly	685	ft
Casing/Hole Diameter	24	in (0 to 70 feet)
Casing/Hole Diameter	20	in (70 to 107 feet)
Casing/Hole Diameter	?	in (107 to 940 feet)
Pump Column Diameter	10	in
Colum X-sectional Area	0.55	ft^2
Reported Current Capacity	2,100	gpm

Discharge Piping Info

Size	12	in (reduces to 10")
Pipe X-Section Area	0.79	ft^2
Size	10	in
Pipe X-Section Area	0.55	ft^2
Length to Pressure Gauge from Discharge Head	4.3	ft
Length of 12" Discharge Pipe	2.6	ft
Length of 10" Discharge Pipe	1.7	ft

Calculations

Flow	1,950	gpm
flow	4.34	cfs
time	15	min
Volume Pumped	29,250	gal
Volume Pumped	3,910	ft^3
12" Discharge Pipe Velocity	5.53	fps
12"Discharge Pipe Velocity Head	0.48	ft
10" Pump Column Velocity	7.97	fps
10" Pump Column Velocity Head	0.99	ft
Weight of water pumped	243,945	lbs
Discharge Pressure	65	psi
Discharge Pressure Head	150	ft
Ground Water Level	569	ft (below gs)
Total Height Water is Lifted	719	ft
Power Needed	175,433,047	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	66.07	kWh
Well Pump/Well Efficiency (no headloss)	68%	
Total Headloss	26.45	ft
Actual Height Water is Lifted	746	ft
Power Needed	181,884,676	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	68.50	kWh
Well Pump/Well Efficiency (with headloss)	**70%**	
Calculated kWh per MG Pumped	**3,344**	

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	3,122
Energy savings (kW*hr) per MG	221
2014 Production, MG	168
Annual Energy Savings, kWh	37,159
Annual Power Savings (at $0.06/kWh)	$ 2,230
IPC Maximum Credit ($0.18/kWh)	$ 6,689

Pump Test Data (5-27-2016)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Discharge Pressure - SCADA (psi)	Ground Water Level - SCADA (ft)	Measured Power Used (kWh)
Static						557	
Pump Started	9:02 AM						
	9:11 AM	1883	4.20	64	65.1	559	
	9:12 AM	1,850	4.12	64	63.6	559	
	9:14 AM	1,930	4.30	65	64.9	559	
	9:16 AM	1,930	4.30	65	64.6	559	
	9:18 AM	1,968	4.38	65	64.8	560	
	9:20 AM	1,965	4.38	64	64.8	560	
	9:22 AM	1,960	4.37	65	64.8	561	
	9:24 AM	1,990	4.43	64	63.9	561	
	9:26 AM	1,984	4.42	64	64.1	561	97.8
Average		1,947	4.32	64.4	64.51	559.9	
		1,950			65	569	level provided by City
		flow provided by City			discharge pressure provided by City		

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
Dischg. Head	10x12	0.33	0.33	
tee	12x12x8	0.1	0.05	tee was closed
reducer	12x10	0.05	0.05	
check valve	10	2.5	2.46	
Total		**0.48**	**2.89**	

Treated as a educing elbow, K value is an addition of a regular 10" elbow (k = 0.28) and a gradual 10" to 12" enlargement (k = 0.05). Headloss calculated with velocity head in pump column.

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Pump Column
100 Assumed Steel pipe

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f Pump Column =	23.49	ft
h_f 12" discharge Pipe =	0.03	ft
h_f 10" discharge Pipe =	0.04	ft
h_f Total Friction Loss =	23.56	ft
Total Headloss =	**26.45**	**ft**

City of Mountain Home
Well No. 9 @ 38.5 hz

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Pump Test Data (5-25-2016)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Discharge Pressure - SCADA (psi)	Ground Water Level - SCADA (ft)	Measured Power Used (kWh)
Static				50		66	
Pump Started	12:16 PM						
38.5 hz	12:22 PM	881	1.96	55		68	
	12:24 PM	929	2.07	53		68	
	12:26 PM	926	2.06	53		68	
	12:28 PM	918	2.05	53		68	
							5.7
Average		914	2.04	53.5	#DIV/0!	68.0	

Well Info

Depth of Well	600	ft
Reported Static Water Level	78	ft
Depth of Suction Assembly	560	ft
Casing/Hole Diameter	24	in (0 to 1 feet)
Casing/Hole Diameter	20	in (1 to 70 feet)
Casing/Hole Diameter	20	in (70 to 600 feet)
Pump Column Diameter	10	in
Colum X-sectional Area	0.55	ft^2
Reported Current Capacity	1,550	gpm

Discharge Piping Info

Size	10	in
Pipe X-Section Area	0.545	ft^2
Length to Pressure Gauge from Discharge Head	5.4	ft

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
Dischg. Head	10	0.28	0.06	
tee	10x10x8	0.1	0.02	tee was closed
tee	10x10x8	0.1	0.02	tee was closed
Check valve	10	2.5	0.54	
Total		**2.98**	**0.65**	

Calculations

Flow	914	gpm
flow	2.04	cfs
time	6	min
Volume Pumped	5,484	gal
Volume Pumped	733	ft^3
Discharge Pipe Velocity	3.73	fps
Discharge Pipe Velocity Head	0.22	ft
Pump Column Velocity	3.73	fps
Pump Column Velocity Head	0.22	ft
Weight of water pumped	45,737	lbs
Discharge Pressure	54	psi
Discharge Pressure Head	124	ft
Ground Water Level	68	ft (below gs)
Total Height Water is Lifted	192	ft
Power Needed	8,762,439	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	3.30	kWh
Well Pump/Well Efficiency (no headloss)	58%	
Total Headloss	5.41	ft
Actual Height Water is Lifted	197	ft
Power Needed	9,009,646	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	3.39	kWh
Well Pump/Well Efficiency (with headloss)	**60%**	
Calculated kWh per MG Pumped	**1,039**	

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Pump Column
100 Assumed Steel pipe

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f Pump Column =	4.73	ft
h_f discharge Pipe =	0.03	ft
h_f Total Friction Loss =	4.76	ft
Total Headloss =	**5.41**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	825
Energy savings (kW*hr) per MG	214
2014 Production, MG	9
Annual Energy Savings, kWh	1,930
Annual Power Savings (at $0.06/kWh)	$ 116
IPC Maximum Credit ($0.18/kWh)	$ 347

City of Mountain Home
Well No. 11

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Well Info

Depth of Well	816	ft
Reported Static Water Level	445	ft
Depth of Suction Assembly	550	ft
Casing/Hole Diameter	20	in
Pump Column Diameter	10	in
Colum X-sectional Area	0.55	ft^2
Reported Current Capacity	2,100	gpm

Discharge Piping Info

Size	12	in
Pipe X-Section Area	0.785	ft^2
Length to Pressure Gauge from Discharge Head	5	ft

Pump Test Data (5-25-2016)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Discharge Pressure - SCADA (psi)	Ground Water Level - SCADA (ft)	Measured Power Used (kWh)
Static						488	
Pump Started	10:21 AM						
	10:29 AM	1,967	4.38	84	77.3	481	
	10:32 AM	1,903	4.24	84	77.9	482	
	10:34 AM	1,910	4.26	84	78.5	483	
	10:36 AM	1,878	4.18	84	79	482	
	10:38 AM	1,951	4.35	84	77.7	482	
	10:40 AM	1,986	4.42	84	78.5	482	
	10:42 AM	1,935	4.31	84	78.9	483	
	10:44 AM	1,911	4.26	84	79.1	483	
	10:46 AM	1,911	4.26	84	78.8	483	112.4
Average		1,928	4.30	84	78.41	482.3	

Calculations

Flow	1,928	gpm
flow	4.30	cfs
time	17	min
Volume Pumped	32,776	gal
Volume Pumped	4,382	ft^3
Discharge Pipe Velocity	5.47	fps
Discharge Pipe Velocity Head	0.46	ft
Pump Column Velocity	7.88	fps
Pump Column Velocity Head	0.96	ft
Weight of water pumped	273,352	lbs
Discharge Pressure	84	psi
Discharge Pressure Head	194	ft
Ground Water Level	482	ft (below gs)
Total Height Water is Lifted	676	ft
Power Needed	184,796,778	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	69.59	kWh
Well Pump/Well Efficiency (no headloss)	62%	
Total Headloss	20.05	ft
Actual Height Water is Lifted	696	ft
Power Needed	190,276,590	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	71.66	kWh
Well Pump/Well Efficiency (with headloss)	**64%**	
Calculated kWh per MG Pumped	**3,429**	

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
Well Head	10x12	0.33	0.32	
Tee	12x12x6	0.1	0.05	tee was closed
check valve	12	2.5	1.16	
Total		**2.93**	**1.53**	

Treated as a educing elbow, K value is an addition of a regular 10" elbow (k = 0.28) and a gradual 10" to 12" enlargement (k = 0.05). Headloss calculated with velocity head in pump column.

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Pump Column
100 Assumed Steel pipe

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f Pump Column =	18.47	ft
h_f discharge Pipe =	0.05	ft
h_f Total Friction Loss =	18.52	ft
Total Headloss =	**20.05**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	2,915
Energy savings (kW*hr) per MG	514
2014 Production, MG	338
Annual Energy Savings, kWh	173,824
Annual Power Savings (at $0.06/kWh)	$ 10,429
IPC Maximum Credit ($0.18/kWh)	$ 31,288

City of Mountain Home
Well No. 12

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Well Info

Depth of Well	585	ft
Reported Static Water Level	72	ft
Depth of Suction Assembly	570	ft
Casing/Hole Diameter	16	in (0 to 380 feet)
Casing/Hole Diameter	8	in (380 to 509 feet)
Pump Column Diameter	10	in
Colum X-sectional Area	0.55	ft^2
Reported Current Capacity	1,200	gpm

Discharge Piping Info

Size	10	in
Pipe X-Section Area	0.545	ft^2
Length to Pressure Gauge from Discharge Head	4.7	ft

Pump Test Data (5-25-2016)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Discharge Pressure - SCADA (psi)	Ground Water Level - SCADA (ft)	Measured Power Used (kWh)
Static						164	
Pump Started	2:50 PM						
	2:55 PM	1,580	3.52	50		159	
	2:56 PM	1,561	3.48	50	48.8	159	
	2:58 AM	1,558	3.47	50	48.7	160	
	3:00 AM	1,541	3.43	49	48.5	161	
	3:02 AM	1,547	3.45	50	48.5	161	
	3:04 AM	1,537	3.42	50	48.6	162	
	3:06 AM	1,534	3.42	50	48.5	162	
							29.47
Average		1,551	3.46	49.9	48.60	160.6	

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
Dischg. Head	10	0.28	0.17	
Tee	10x10x10	2.5	1.56	tee was closed
Check valve	10	2.5	1.56	
Total		5.28	3.29	

Calculations

Flow	1,551	gpm
flow	3.46	cfs
time	11	min
Volume Pumped	17,061	gal
Volume Pumped	2,281	ft^3
Discharge Pipe Velocity	6.34	fps
Discharge Pipe Velocity Head	0.62	ft
Pump Column Velocity	6.34	fps
Pump Column Velocity Head	0.62	ft
Weight of water pumped	142,289	lbs
Discharge Pressure	50	psi
Discharge Pressure Head	116	ft
Ground Water Level	160.6	ft (below gs)
Total Height Water is Lifted	276	ft
Power Needed	39,285,921	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	14.80	kWh
Well Pump/Well Efficiency (no headloss)	50%	
Total Headloss	16.17	ft
Actual Height Water is Lifted	292	ft
Power Needed	41,586,149	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	15.66	kWh
Well Pump/Well Efficiency (with headloss)	**53%**	
Calculated kWh per MG Pumped	**1,727**	

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Pump Column
100 Assumed Steel pipe

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f Pump Column =	12.80	ft
h_f discharge Pipe =	0.07	ft
h_f Total Friction Loss =	12.87	ft
Total Headloss =	**16.17**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	1,224
Energy savings (kW*hr) per MG	503
2014 Production, MG	81
Annual Energy Savings, kWh	40,774
Annual Power Savings (at $0.06/kWh)	$ 2,446
IPC Maximum Credit ($0.18/kWh)	$ 7,339

City of Mountain Home
Well No. 13

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Well Info

Depth of Well	850	ft
Reported Static Water Level	510	ft
Depth of Suction Assembly	560	ft
Casing/Hole Diameter	24	in (0 to 58 feet)
Casing/Hole Diameter	20	in (58 to 369 feet)
Casing/Hole Diameter	16	in (369 to 806 feet)
Casing/Hole Diameter	12	in (806 to 850 feet)
Pump Column Diameter	12	in
Colum X-sectional Area	0.79	ft^2
Reported Current Capacity	2,100	gpm

Discharge Piping Info

Size	12	in
Pipe X-Section Area	0.785	ft^2
Length to Pressure Gauge from Discharge Head	6.5	ft

Pump Test Data (5-27-2016)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Discharge Pressure - SCADA (psi)	Ground Water Level - SCADA (ft)	Measured Power Used (kWh)
Static						495	
Pump Started	9:40 AM						
	9:47 AM	1,995	4.44	57	57.6	496	
	9:49 AM	2,003	4.46	58	57.6	496	
	9:51 AM	1,995	4.44	57	56.7	496	
	9:53 AM	1,997	4.45	58	58.4	496	
	9:55 AM	1,994	4.44	59	58.1	496	
	9:57 AM	2,000	4.46	59	58.3	496	
	9:59 AM	2,002	4.46	59	58.6	496	
	10:01 AM	2,004	4.46	58	57.8	496	
	10:03 AM	2,008	4.47	59	57.9	496	99
Average		2,000	4.46	58.2	57.89	496	

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
Dischg. Head	12	0.26	0.13	
tee	12x12x6	0.1	0.05	tee was closed
Cla Val	12	10	5.00	
Total		**10.36**	**5.18**	

Globe valve K value of 10 is from PE reference book.

Calculations

Flow	2,000	gpm
flow	4.46	cfs
time	16	min
Volume Pumped	32,000	gal
Volume Pumped	4,278	ft^3
Discharge Pipe Velocity	5.67	fps
Discharge Pipe Velocity Head	0.50	ft
Pump Column Velocity	5.67	fps
Pump Column Velocity Head	0.50	ft
Weight of water pumped	266,880	lbs
Discharge Pressure	58	psi
Discharge Pressure Head	134	ft
Ground Water Level	496	ft (below gs)
Total Height Water is Lifted	630	ft
Power Needed	168,129,062	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	63.32	kWh
Well Pump/Well Efficiency (no headloss)		64%
Total Headloss	13.53	ft
Actual Height Water is Lifted	644	ft
Power Needed	171,739,888	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	64.68	kWh
Well Pump/Well Efficiency (with headloss)		**65%**
Calculated kWh per MG Pumped		**3,094**

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Pump Column

100	Assumed Steel pipe

C Factor for Discharge Piping

120	Assumed aged Ductile Iron (cement motor lined)

h_f Pump Column =	8.28	ft
h_f discharge Pipe =	0.07	ft
h_f Total Friction Loss =	8.35	ft
Total Headloss =	**13.53**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	2,695
Energy savings (kW*hr) per MG	399
2014 Production, MG	449
Annual Energy Savings, kWh	179,090
Annual Power Savings (at $0.06/kWh)	$ 10,745
IPC Maximum Credit ($0.18/kWh)	$ 32,236

City of Mountain Home
Well No. 14

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Well Info

Depth of Well	692	ft
Reported Static Water Level	200 / 250	ft
Depth of Suction Assembly	570	ft
Casing/Hole Diameter	20	in (0 to 24 feet)
Casing/Hole Diameter	20	in (24 to 200 feet)
Casing/Hole Diameter	16	in (200 to 650 feet)
Casing/Hole Diameter	12	in (650 to 692 feet)
Pump Column Diameter	12	in
Colum X-sectional Area	0.79	ft^2
Reported Current Capacity	1,200	gpm

Discharge Piping Info

Size	12	in
Pipe X-Section Area	0.785	ft^2
Length to Pressure Gauge from Discharge Head	5.2	ft

Pump Test Data

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Discharge Pressure - SCADA (psi)	Ground Water Level - SCADA (ft)	Measured Power Used (kWh)
Static						448	
Pump Started							
	10:08 AM	1,338	2.98	7.7		438	
	10:12 AM	1,320	2.94	7.6		438	
	10:15 AM	1,318	2.94	7.6		438	
	10:17 AM	1,316	2.93	7.7		438	
	10:18 AM	1,316	2.93	7.7		438	
	10:20 AM	1,316	2.93	7.8		438	
							30.5
Average		1,321	2.94	7.7		438	

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
Dischg. Head	12	0.26	0.06	
tee	12x12x8	0.1	0.02	tee was closed
Check valve	12	2.5	0.55	
Total		2.86	0.62	

Calculations

Flow	1,321	gpm
flow	2.94	cfs
time	12	min
Volume Pumped	15,852	gal
Volume Pumped	2,119	ft^3
Discharge Pipe Velocity	3.75	fps
Discharge Pipe Velocity Head	0.22	ft
Pump Column Velocity	3.75	fps
Pump Column Velocity Head	0.22	ft
Weight of water pumped	132,206	lbs
Discharge Pressure	8	psi
Discharge Pressure Head	18	ft
Ground Water Level	438	ft (below gs)
Total Height Water is Lifted	456	ft
Power Needed	60,257,630	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	22.69	kWh
Well Pump/Well Efficiency (no headloss)		74%
Total Headloss	4.56	ft
Actual Height Water is Lifted	460	ft
Power Needed	60,860,897	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	22.92	kWh
Well Pump/Well Efficiency (with headloss)		**75%**
Calculated kWh per MG Pumped		**1,924**

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Pump Column
100 Assumed Steel pipe

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f Pump Column =	3.91	ft
h_f discharge Pipe =	0.03	ft
h_f Total Friction Loss =	3.94	ft
Total Headloss =	**4.56**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor		75%
kWh per MG Pumped		1,928
Energy savings (kW*hr) per MG		(4)
2014 Production, MG		124
Annual Energy Savings, kWh		(472)
Annual Power Savings (at $0.06/kWh)	$	(28)
IPC Maximum Credit ($0.18/kWh)	$	(85)

City of Mountain Home
Well No. 14 With City Data from July

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Well Info

Depth of Well	692	ft
Reported Static Water Level	200 / 250	ft
Depth of Suction Assembly	570	ft
Casing/Hole Diameter	20	in (0 to 24 feet)
Casing/Hole Diameter	20	in (24 to 200 feet)
Casing/Hole Diameter	16	in (200 to 650 feet)
Casing/Hole Diameter	12	in (650 to 692 feet)
Pump Column Diameter	12	in
Colum X-sectional Area	0.79	ft^2
Reported Current Capacity	1,200	gpm

Discharge Piping Info

Size	12	in
Pipe X-Section Area	0.785	ft^2
Length to Pressure Gauge from Discharge Head	5.2	ft

Pump Test Data

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Discharge Pressure - SCADA (psi)	Ground Water Level - SCADA (ft)	Measured Power Used (kWh)
Static						448	
Pump Started							
	10:08 AM	1,338	2.98	7.7		438	
	10:12 AM	1,320	2.94	7.6		438	
	10:15 AM	1,318	2.94	7.6		438	
	10:17 AM	1,316	2.93	7.7		438	
	10:18 AM	1,316	2.93	7.7		438	
	10:20 AM	1,316	2.93	7.8		438	
							30.5
Average		1,321	2.94	7.7		438	
		1200		10		552	
		Flow from City		Pressure from City		Level from City	

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
Dischg. Head	12	0.26	0.05	
tee	12x12x8	0.1	0.02	tee was closed
Check valve	12	2.5	0.45	
Total		**2.86**	**0.51**	

Calculations

Flow	1,200	gpm
flow	2.67	cfs
time	12	min
Volume Pumped	14,400	gal
Volume Pumped	1,925	ft^3
Discharge Pipe Velocity	3.40	fps
Discharge Pipe Velocity Head	0.18	ft
Pump Column Velocity	3.40	fps
Pump Column Velocity Head	0.18	ft
Weight of water pumped	120,096	lbs
Discharge Pressure	10	psi
Discharge Pressure Head	23	ft
Ground Water Level	552	ft (below gs)
Total Height Water is Lifted	575	ft
Power Needed	69,067,210	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	26.01	kWh
Well Pump/Well Efficiency (no headloss)	85%	
Total Headloss	3.81	ft
Actual Height Water is Lifted	579	ft
Power Needed	69,525,091	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	26.18	kWh
Well Pump/Well Efficiency (with headloss)	**86%**	
Calculated kWh per MG Pumped	**2,118**	

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Pump Column
100 Assumed Steel pipe

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f Pump Column =	3.28	ft
h_f discharge Pipe =	0.02	ft
h_f Total Friction Loss =	3.30	ft
Total Headloss =	**3.81**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	2,424
Energy savings (kW*hr) per MG	(306)
2014 Production, MG	124
Annual Energy Savings, kWh	(37,982)
Annual Power Savings (at $0.06/kWh)	$ (2,279)
IPC Maximum Credit ($0.18/kWh)	$ (6,837)

City of Mountain Home
Well No. 15 @ 56 hz

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Well Info

Depth of Well	680	ft
Reported Static Water Level	498	ft
Depth of Suction Assembly	678	ft
Casing/Hole Diameter	28	in (0 to 60 feet)
Casing/Hole Diameter	22	in (60 to 852)
Pump Column Diameter	18	in
Colum X-sectional Area	1.77	ft^2
Reported Current Capacity	600 - 1400	gpm

Discharge Piping Info

Size	12	in
Pipe X-Section Area	0.785	ft^2
Length to Pressure Gauge from Discharge Head	6	ft

Pump Test Data (5-25-2015)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge before Sand Filter (psi)	Discharge Pressure - Gauge post Sand Filter (psi)	Discharge Pressure - SCADA before Sand Filter (psi)	Discharge Pressure - SCADA post Sand Filter (psi)	Ground Water Level - SCADA (ft)	Measured Power Used (kWh)	
Static								535		
Pump Started	3:35 PM									
	3:42 PM	1,097	2.44	80	58			563		
	3:44 PM	1,097	2.44	79	57	78.2	59.9	563		
	3:46 PM	1,104	2.46	78	58	76.4	58.8	564		
	3:48 PM	1,092	2.43	78	58	77.1	58.8	564		
									23.9	239
Average		1,098	2.45	78.75	57.75	77.2	59.2	563.5		

Calculations

Flow	1,098	gpm
flow	2.45	cfs
time	6	min
Volume Pumped	6,588	gal
Volume Pumped	881	ft^3
Discharge Pipe Velocity	3.11	fps
Discharge Pipe Velocity Head	0.15	ft
Pump Column Velocity	1.38	fps
Pump Column Velocity Head	0.03	ft
Weight of water pumped	54,944	lbs
Discharge Pressure	58	psi
Discharge Pressure Head	134	ft
Ground Water Level	564	ft (below gs)
Total Height Water is Lifted	697	ft
Power Needed	38,322,285	ft-lbs
1 ft-lbs = 3.766×10^{-7} kWh		
Power Needed	14.43	kWh
Well Pump/Well Efficiency (no headloss)	60%	
Total Headloss	49.46	ft
Actual Height Water is Lifted	747	ft
Power Needed	41,039,983	ft-lbs
1 ft-lbs = 3.766×10^{-7} kWh		
Power Needed	15.46	kWh
Well Pump/Well Efficiency (with headloss)	**65%**	
Calculated kWh per MG Pumped	**3,628**	

Minor Losses (fittings from well discharge head to pressure gauge)

Before Sand Filter

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
Dischg. Head	18x12	0.31	0.05	
tee	12x12x6	0.1	0.02	tee was closed
tee	12x12x10	0.1	0.02	tee was closed
Check valve	12	2.5	0.38	
90° elbow	12	0.13	0.02	
Pre Filter Total		**3.14**	**0.47**	

Treated as a 12" elbow (k = 0.26) and a 12x18 reducer (k = 0.05) with velocity head of discharge pipe.

Only used half of the 12" 90 degree k value (k =0.26) because pressure gauge is located in elbow

loss from first pressure gauge to second pressure gauge (sand Filter)

48.51 ft

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Pump Column
100 Assumed Steel pipe

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f Pump Column =	0.46	ft
h_f discharge Pipe =	0.02	ft
h_f Total Friction Loss =	0.48	ft
Total Headloss =	**49.46**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	3,128
Energy savings (kW*hr) per MG	500
2014 Production, MG	206
Annual Energy Savings, kWh	102,952
Annual Power Savings (at $0.06/kWh)	$ 6,177
IPC Maximum Credit ($0.18/kWh)	$ 18,531

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City of Mountain Home
Pilot Booster Pump 1

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Suction Piping Info

Size	12	in
Pipe X-Section Area	0.785	ft^2
length	102	ft
Tank base Elevation	3,265	ft
pump elevation	3,263	ft

Discharge Piping Info

Size	8	in
Pipe X-Section Area	0.349	ft^2
Length to Pressure Gauge from Discharge Head	5.4	ft

Pump Test Data (5-25-2016)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Tank 2 Level (ft)	Tank 3 Level (ft)	Measured Power Used (kWh)
Static							
Pump Started							
	11:02 AM	656	1.46	93	27.5	26.5	
	11:04 AM	634	1.41	94	27.5	26.5	
	11:06 AM	641	1.43	93	27.4	26.5	
	11:08 AM	653	1.45	94	27.3	26.5	
							3.26
Average		646	1.44	93.5	27.4	26.5	

Calculations

Flow	646	gpm
flow	1.44	cfs
time	6	min
Volume Pumped	3,876	gal
Volume Pumped	518	ft^3
12" pipe area	0.79	ft^2
12" pipe velocity	1.83	fps
12" pipe velocity head	0.05	ft
8" pipe Area	0.35	ft^2
8" pipe velocity	4.12	fps
8" pipe velocity head	0.26	ft
4" pipe area	0.09	ft^2
4" pipe velocity	16.5	fps
4" pipe velocity head	4.22	ft
Weight of water pumped	32,326	lbs
Discharge Pressure	94	psi
Discharge Pressure HGL	3,480	ft
Tank 2 Water Level	27.4	ft (above gs)
Tank 2 HGL	3,292.4	
Total Height Water is Lifted	188	ft
Power Needed	6,068,853	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	2.29	kWh
Well Pump/Well Efficiency (no headloss)	70%	
Total Headloss	3.37	ft
Actual Height Water is Lifted	191	ft
Power Needed	6,177,661	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	2.33	kWh
Well Pump/Well Efficiency (with headloss)	**71%**	
Calculated kWh per MG Pumped	**841**	

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
entrance	12	1	0.05	
tee	12x12x14	0.1	0.01	tee was closed
tee	12x12x12	0.1	0.01	tee was closed
tee	12x12x12	1	0.05	as elbow
45° bend	12	0.2	0.01	
tee	12x12x6	0.1	0.01	tee was closed
tee	12x12x12	0.1	0.01	tee was closed
tee	12x12x12	0.1	0.01	tee was closed
90° elbow	12	0.26	0.01	
90° elbow	12x8	0.31	0.08	
butterfly valve	8	0.63	0.17	
reducer (down)	8x4	0.1	0.42	use 4" velocity head
reducer (up)	8x4	0.3	1.27	use 4" velocity head
check valve	8	2.5	0.66	
butterfly valve	8	0.63	0.17	
tee	8x8x8	1	0.26	as elbow
Total		**8.43**	**3.18**	

Treated as a 12" elbow (k=0.26) and a 12x8 reducer (k=0.05) using 8" pipe velocity head

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Suction Pipe
120 Assumed Ductile Iron

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f suction piping =	0.13	ft
h_f discharge Pipe =	0.05	ft
h_f Total Friction Loss =	0.18	ft
Total Headloss =	**3.37**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	800
Energy savings (kW*hr) per MG	41
2014 Production, MG	72
Annual Energy Savings, kWh	2,935
Annual Power Savings (at $0.06/kWh)	$ 176
IPC Maximum Credit ($0.18/kWh)	$ 528

City of Mountain Home
Pilot Booster Pump 2

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Pump Test Data (5-25-2016)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Tank 2 Level (ft)	Tank 3 Level (ft)	Measured Power Used (kWh)
Static							
Pump Started	11:08 AM						
	11:10 AM	619	1.38	93	27.3	26.6	
	11:12 AM	602	1.34	92	27.3	26.6	
	11:14 AM	605	1.35	91	27.2	26.6	
							1.65
Average		609	1.36	92.0	27.3	26.6	

Suction Piping Info

Size	12	in
Pipe X-Section Area	0.785	ft^2
length	97	ft
Tank base Elevation	3,265	ft
pump elevation	3,263	ft

Discharge Piping Info

Size	8	in
Pipe X-Section Area	0.35	ft^2
Length to Pressure Gauge from Discharge Head	10.8	ft

Calculations

Flow	609	gpm
flow	1.36	cfs
time	4	min
Volume Pumped	2,436	gal
Volume Pumped	326	ft^3
12" pipe area	0.79	ft^2
12" pipe velocity	1.73	fps
12" pipe velocity head	0.05	ft
8" pipe Area	0.35	ft^2
8" pipe velocity	3.89	fps
8" pipe velocity head	0.23	ft
4" pipe area	0.09	ft^2
4" pipe velocity	15.5	fps
4" pipe velocity head	3.75	ft
Weight of water pumped	20,316	lbs
Discharge Pressure	92	psi
Discharge Pressure HGL	3,476	ft
Tank 2 Water Level	27.3	ft (above gs)
Tank 2 HGL	3,292	ft
Total Height Water is Lifted	183	ft
Power Needed	3,722,341	ft-lbs
1 ft-lbs = 3.766×10^{-7} kWh		
Power Needed	1.40	kWh
Well Pump/Well Efficiency (no headloss)	85%	
Total Headloss	3.04	ft
Actual Height Water is Lifted	186	ft
Power Needed	3,784,197	ft-lbs
1 ft-lbs = 3.766×10^{-7} kWh		
Power Needed	1.43	kWh
Well Pump/Well Efficiency (with headloss)	**86%**	
Calculated kWh per MG Pumped	**677**	

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	780
Energy savings (kW*hr) per MG	(103)
2014 Production, MG	72
Annual Energy Savings, kWh	(7,394)
Annual Power Savings (at $0.06/kWh)	$ (444)
IPC Maximum Credit ($0.18/kWh)	$ (1,331)

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
entrance	12	1	0.05	
tee	12x12x14	0.1	0.00	tee was closed
tee	12x12x12	0.1	0.00	tee was closed
tee	12x12x12	1	0.05	as elbow
45° bend	12	0.2	0.01	
tee	12x12x6	0.1	0.00	tee was closed
tee	12x12x12	0.1	0.00	tee was closed
tee	12x12x12	0.1	0.00	tee was closed
90° elbow	12x8	0.31	0.07	
butterfly valve	8	0.63	0.15	
reducer (down)	8x4	0.1	0.38	use 4" velocity head
reducer (up)	8x4	0.3	1.13	use 4" velocity head
check valve	8	2.5	0.59	
butterfly valve	8	0.63	0.15	
tee	8x8x8	1	0.23	as elbow
tee	8x8x8	0.1	0.02	
Total		**8.27**	**2.84**	

Treated as a 12" elbow (k=0.26) and a 12x8 reducer (k=0.05) using 8" pipe velocity head.

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Suction Pipe
120 Assumed Ductile Iron

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f suction piping =	0.11	ft
h_f discharge Pipe =	0.09	ft
h_f Total Friction Loss =	0.20	ft
Total Headloss =	**3.04**	**ft**

City of Mountain Home
Pilot Booster Pump 3 @ 60 hz

Values are incorreect, because the data collected is the same as the 50 hz test.

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Pump Test Data (5-25-2016)

	Time	Flow (gpm)	Flow (cfs)	Discharge Pressure - Gauge (psi)	Tank 2 Level (ft)	Tank 3 Level (ft)	Measured Power Used (kWh)
Static							
Pump Started	11:18 AM						
60 hz	11:19 AM	194	0.43	58	27.2	26.6	
	11:21 AM	228	0.51	59	27.2	26.6	
	11:22 AM	195	0.43	59	27.2	26.6	
	11:23 AM	210	0.47	59	27.2	26.6	
							1.56
Average		207	0.46	58.8	27.2	26.6	

Suction Piping Info

Size	12	in
Pipe X-Section Area	0.785	ft^2
length	92	ft
Tank base Elevation	3,265	ft
pump elevation	3,263	ft

Discharge Piping Info

Size	6	in
Pipe X-Section Area	0.196	ft^2
Length to Pressure Gauge from Discharge Head	4.0	ft

Calculations

Flow	207	gpm
flow	0.46	cfs
time	4	min
Volume Pumped	828	gal
Volume Pumped	111	ft^3
12" pipe area	0.79	ft^2
12" pipe velocity	0.59	fps
12" pipe velocity head	0.01	ft
8" pipe Area	0.35	ft^2
8" pipe velocity	1.32	fps
8" pipe velocity head	0.03	ft
6" pipe area	0.20	ft^2
6" Pipe velocity	2.35	fps
6" pipe Velocity head	0.09	ft
4" pipe area	0.09	ft^2
4" pipe velocity	5.3	fps
4" pipe velocity head	0.43	ft
Weight of water pumped	6,906	lbs
Discharge Pressure	59	psi
Discharge Pressure HGL	3,399	ft
Tank 2 Water Level	27.2	ft (above gs)
Tank 2 HGL	3,292	ft
Total Height Water is Lifted	107	ft
Power Needed	736,322	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	0.28	kWh
Well Pump/Well Efficiency (no headloss)		18%
Total Headloss	0.46	ft
Actual Height Water is Lifted	107	ft
Power Needed	739,514	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	0.28	kWh
Well Pump/Well Efficiency (with headloss)		**18%**
Calculated kWh per MG Pumped		**1,884**

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
entrance	12	1	0.01	
tee	12x12x14	0.1	0.00	tee was closed
tee	12x12x12	0.1	0.00	tee was closed
tee	12x12x12	1	0.01	as elbow
45° bend	12	0.2	0.00	
tee	12x12x6	0.1	0.00	tee was closed
tee	12x12x12	0.1	0.00	tee was closed
90° elbow	12x6	0.36	0.03	
butterfly valve	6	0.72	0.06	
reducer (down)	6x4	0.05	0.02	use 4" velocity head
reducer (up)	6x4	0.2	0.09	use 4" velocity head
check valve	6	2.5	0.21	
Total		**6.43**	**0.43**	

Treated as a 12" elbow (k=0.26) and a 12x6 reducer (k=0.1) using 6" pipe velocity head.

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for Suction Pipe
120 Assumed Ductile Iron

C Factor for Discharge Piping
120 Assumed aged Ductile Iron (cement motor lined)

h_f suction piping =	0.01	ft
h_f discharge Pipe =	0.02	ft
h_f Total Friction Loss =	0.03	ft
Total Headloss =	**0.46**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	448
Energy savings (kW*hr) per MG	1,436
2014 Production, MG	72
Annual Energy Savings, kWh	103,362
Annual Power Savings (at $0.06/kWh)	$ 6,202
IPC Maximum Credit ($0.18/kWh)	$ 18,605

City of Mountain Home

3rd Street Booster 1 @ 60 hz

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Pump Test Data (5-25-2016)

	Time	Flow (gpm)	Flow (cfs)	Suction Pressure	Discharge Pressure	Measured Power Used (kWh)
Static						
Pump Started						
	4:44 PM	607	1.35	46	82	
	4:45 AM	594	1.32	46	83	
	4:46 AM	602	1.34	46	83	
	4:47 AM	600	1.34	46	83	
						1.05
Average		601	1.34	46.0	82.8	

Suction Piping Info

Size	8	in
Pipe X-Section Area	0.349	ft^2
length	4.1	ft
Size	6	in
Pipe X-Section Area	0.20	ft^2
Length	1.5	ft

Discharge Piping Info

Size	6	in
Pipe X-Section Area	0.196	ft^2
Length	8.9	ft
Size	8	in
Pipe X-Section Area	0.349	ft^2
Length	1.7	ft

Calculations

Flow	601	gpm
flow	1.34	cfs
time	3	min
Volume Pumped	1,803	gal
Volume Pumped	241	ft^3
12" pipe area	0.79	ft^2
12" pipe velocity	1.70	fps
12" pipe velocity head	0.05	ft
8" pipe Area	0.35	ft^2
8" pipe velocity	3.84	fps
8" pipe velocity head	0.23	ft
6" pipe area	0.20	ft^2
6" Pipe velocity	6.82	fps
6" pipe Velocity head	0.72	ft
4" pipe area	0.09	ft^2
4" pipe velocity	15.3	fps
4" pipe velocity head	3.66	ft
Weight of water pumped	15,037	lbs
Discharge Pressure	83	psi
Discharge Pressure HGL	191	ft
Suction Pressure	46.0	psi
Suction HGL	106.3	ft
Total Height Water is Lifted	85	ft
Power Needed	1,278,267	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	0.48	kWh
Well Pump/Well Efficiency (no headloss)	46%	
Total Headloss	5.58	ft
Actual Height Water is Lifted	91	ft
Power Needed	1,362,099	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	0.51	kWh
Well Pump/Well Efficiency (with headloss)	**49%**	
Calculated kWh per MG Pumped	**582**	

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
tee	8x8x6	0.1	0.02	tee was closed
tee	8x8x6	1	0.72	tee as elbow
butterfly valve	6	0.72	0.52	
reducer	6x4	0.05	0.18	reduction
reducer	6x4	0.133	0.49	expansion
Check valve	6	2.5	1.81	
butterfly valve	6	0.72	0.52	
tee	8x8x6	1.08	0.78	as elbow and expansion
reducer	8x6	0.05	0.04	
tee	6x6x6	0.15	0.11	tee was closed
Total		**6.498**	**5.18**	

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for steel piping
120 Assumed Ductile Iron

h_f 8" Piping =	0.05	ft
h_f 6" Piping =	0.35	ft
h_f Total Friction Loss =	0.39	ft
Total Headloss =	**5.58**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	379
Energy savings (kW*hr) per MG	203
2014 Production, MG	152
Annual Energy Savings, kWh	30,859
Annual Power Savings (at $0.06/kWh)	$ 1,852
IPC Maximum Credit ($0.18/kWh)	$ 5,555

City of Mountain Home
3rd Street Booster 2 @ 50 hz

Yellow Cells are Reported Values
Green Cells Require User Input
Orange Cells are Results
Blue Cells are Potential Savings

Pump Test Data (5-25-2016)

	Time	Flow (gpm)	Flow (cfs)	Suction Pressure	Discharge Pressure	Measured Power Used (kWh)
Static						
Pump Started						
	5:00 PM	790	1.76	46	97	
	5:01 AM	803	1.79	46	97	
	5:02 AM	798	1.78	46	97	
	5:03 AM	790	1.76	46	97.5	
	5:04 AM	793	1.77	46	97.5	
						1.62
Average		795	1.77	46.0	97.2	

Suction Piping Info

Size	8	in
Pipe X-Section Area	0.349	ft^2
length	9.4	ft
Size	6	in
Pipe X-Section Area	0.20	ft^2
Length	0.0	ft

Discharge Piping Info

Size	6	in
Pipe X-Section Area	0.196	ft^2
Length	4.9	ft
Size	8	in
Pipe X-Section Area	0.349	ft^2
Length	10.4	ft

Minor Losses (fittings from well discharge head to pressure gauge)

Fitting	Size (in)	K - Value	Head loss (ft)	Notes
tee	8x8x6	0.1	0.04	tee was closed
tee	8x8x6	0.1	0.04	tee was closed
90° elbow	8	0.28	0.11	
butterfly valve	8	0.61	0.24	
reducer	8x4	0.1	0.64	reduction
reducer	8x4	0.3	1.92	expansion
check valve	8	2.5	1.00	
butterfly valve	8	0.61	0.24	
90° elbow	8	0.28	0.11	
tee	8x8x6	0.1	0.04	tee was closed
reducer	8x6	0.05	0.06	reduction
tee	6x6x6	0.15	0.19	tee was closed
Total		**5.18**	**4.64**	

Calculations

Flow	795	gpm
flow	1.77	cfs
time	4	min
Volume Pumped	3,180	gal
Volume Pumped	425	ft^3
12" pipe area	0.79	ft^2
12" pipe velocity	2.26	fps
12" pipe velocity head	0.08	ft
8" pipe Area	0.35	ft^2
8" pipe velocity	5.07	fps
8" pipe velocity head	0.40	ft
6" pipe area	0.20	ft^2
6" Pipe velocity	9.02	fps
6" pipe Velocity head	1.26	ft
4" pipe area	0.09	ft^2
4" pipe velocity	20.3	fps
4" pipe velocity head	6.40	ft
Weight of water pumped	26,521	lbs
Discharge Pressure	97	psi
Discharge Pressure HGL	225	ft
Suction Pressure	46	psi
Suction HGL	106	ft
Total Height Water is Lifted	118	ft
Power Needed	3,136,715	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	1.18	kWh
Well Pump/Well Efficiency (no headloss)	73%	
Total Headloss	5.19	ft
Actual Height Water is Lifted	123	ft
Power Needed	3,274,372	ft-lbs
1 ft-lbs = $3.766*10^{-7}$ kWh		
Power Needed	1.23	kWh
Well Pump/Well Efficiency (with headloss)	**76%**	
Calculated kWh per MG Pumped	**509**	

Major (Friction) Losses

Hazen-Williams Equation:

$$h_f = \frac{10.44 * L * Q^{1.85}}{C^{1.85} * D^{4.87}}$$

h_f = Headloss (ft)
L = Length of Pipe (ft)
Q = Flow (gpm)
C = Hazen Williams Coefficient
D = Pipe Diameter (inches)

C Factor for steel pipe
120 Assumed Ductile Iron

h_f 8" Piping =	0.27	ft
h_f 6" Piping =	0.27	ft
h_f Total Friction Loss =	0.55	ft
Total Headloss =	**5.19**	**ft**

Potential Energy Savings

Efficiency of New Pump/Motor	75%
kWh per MG Pumped	517
Energy savings (kW*hr) per MG	(8)
2014 Production, MG	152
Annual Energy Savings, kWh	(1,155)
Annual Power Savings (at $0.06/kWh)	$ (69)
IPC Maximum Credit ($0.18/kWh)	$ (208)

APPENDIX B

Pump Curves

KELLER associates

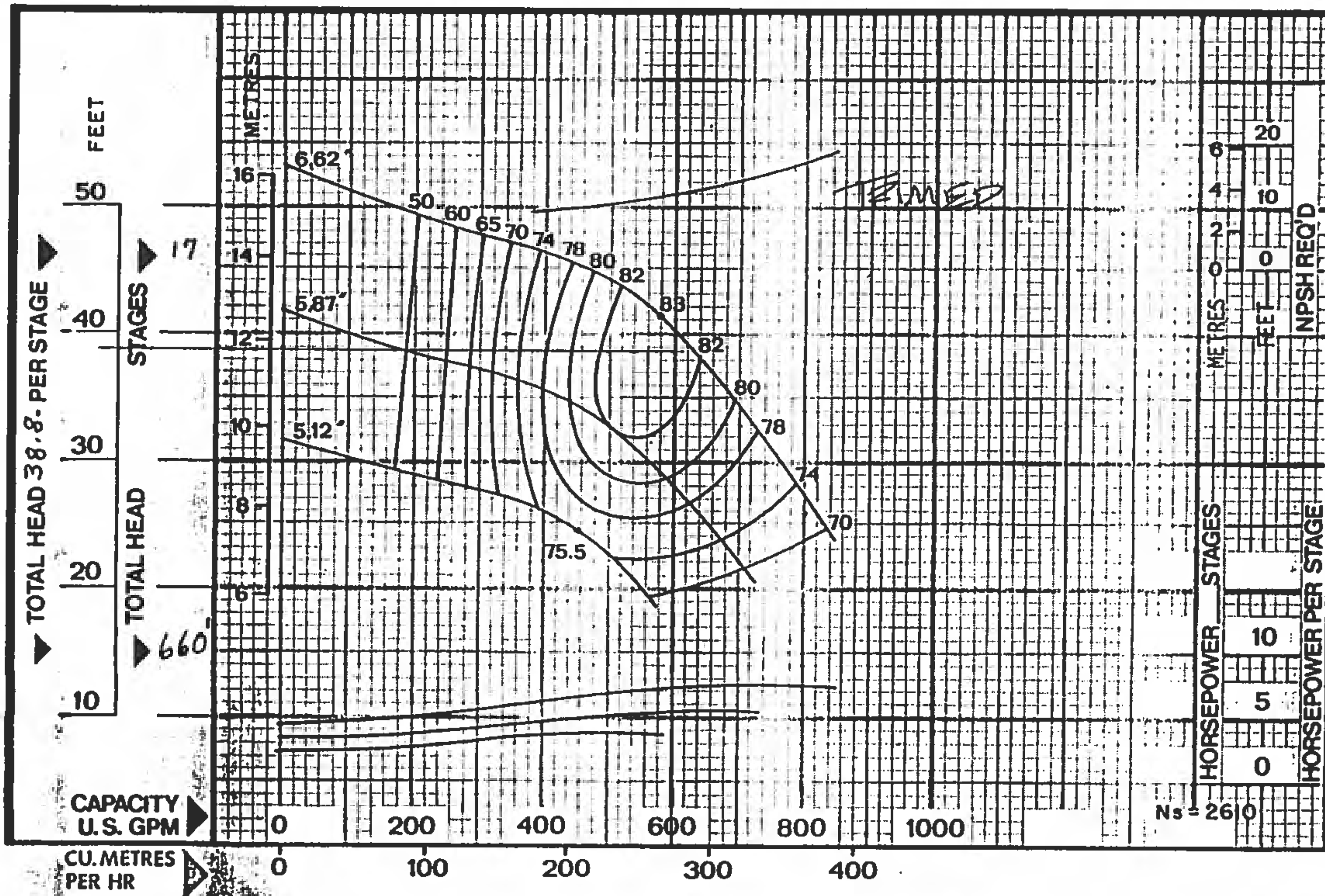
214010-013/r/16-218

Well 1

well # 1

GOULDS PROPOSAL NO	GOULDS SO NO	INQUIRY NO	CUSTOMER PO NO	P.O. DATE	ITEM NO	CUSTOMER
						City of Mountain Home

PROJECT	SERVICE	GPM CAPACITY	FT TDH	%EFFICENCY	RPM
	City Water	600	660	82 %	1760



Curve No. 1106

Size: 10 JMC

RPM: 1760

EFFICIENCY CHANGE

STGS.		
	1	- 3
	2	- 2
	3	- 1

PERF. BASED ON: BRZ. IMPELLERS & C.I. VITRIGLASS ENAMELLED BOWLS

Impeller = CLOSED

K = 7.0 Lbs./Ft. 10.4 Kg./M.

K (Bal.) =

GOULDS PUMPS

VERTICAL PUMP DIVISION

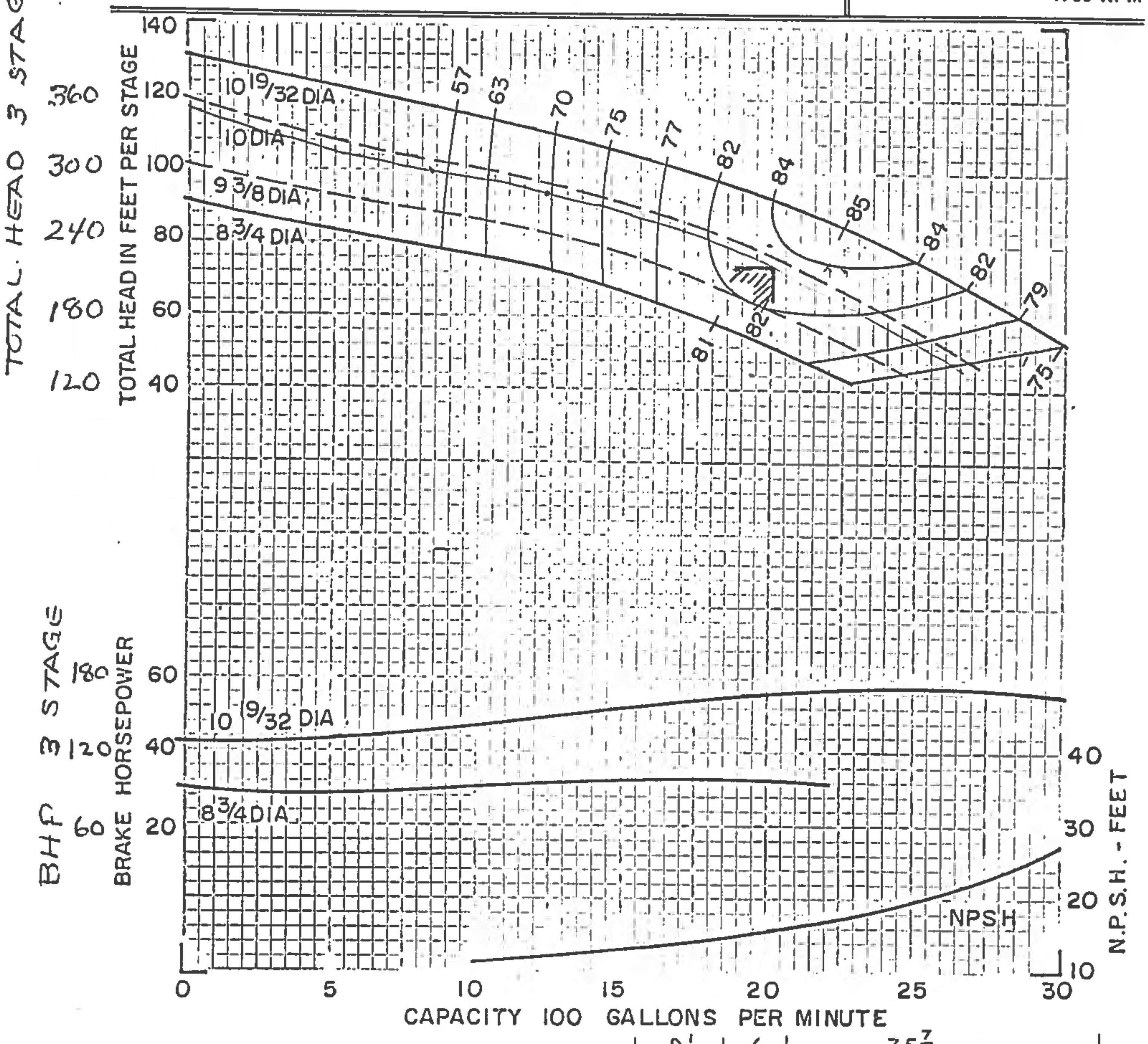
CITY OF INDUSTRY, CALIFORNIA

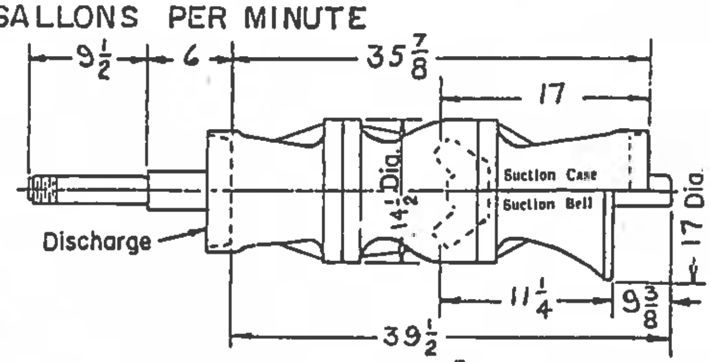
Characteristic based upon pumping clear, non-aerated water. Rating point only is guaranteed. Column losses not included.

Well 9

(60 CYCLE)

15H-226
1760 RPM





For additional stages add 13 3/8 per stage.

Efficiency shown is for 4 stages or more, with standard materials. For fewer stages or other materials change efficiency as shown.

No. of stages	Eff. change	MATERIAL	Eff. change	Standard materials	
				Impeller — bronze	
				Bowl — cast iron / enamelled	
6	—	Impeller-bronze	—	Thrust factor	15.7
5	—	Impeller-c.i.	-1	Rotor wt. per stage (lbs.)	58.2
4	—	Impeller-c.i. enm.	+1	Bowl wt. 1st stage (lbs.)	457
3	-.5	Bowl-c.i. enm.	—	Bowl wt. add'l. stage (lbs.)	186
2	-1.5	Bowl-cast iron	-2	Max. bowl horsepower	570
1	-3	Bowl-bronze	-1.5	Impeller eye area (sq. in.)	34.2

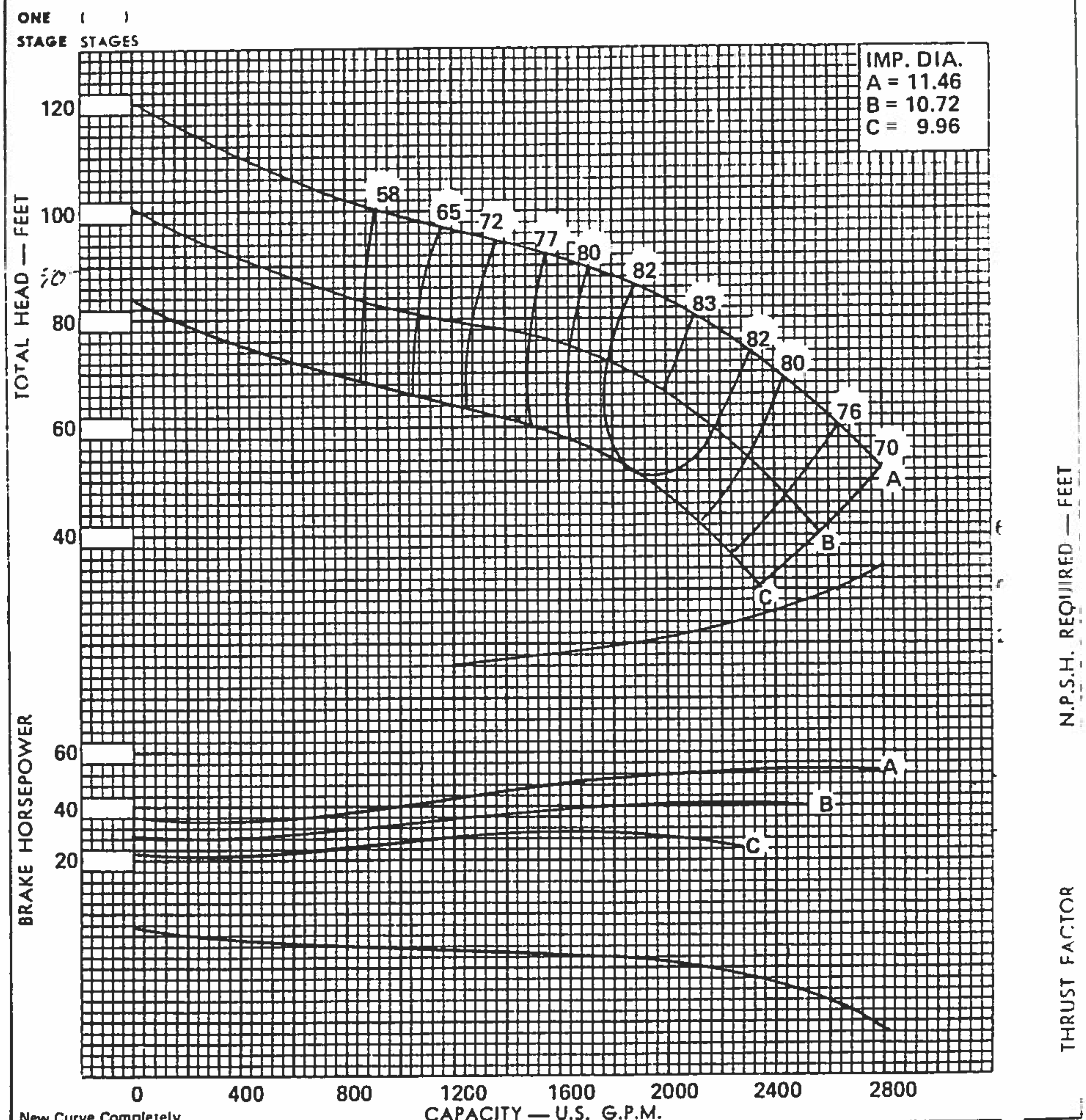
Impeller shaft diameter	2.25	Column pipe	12
Minimum impeller shaft end play	.75	Suction pipe	12

Well 11

CURVE NO. 18-146 9-1-78	No. Stages	Eff. Change	MATERIAL	Eff. Change
	1	2	IMP.—C.I.	1
	2	0	IMP.—NI-RI	-2
	3		BOWL—BRZ.	-1
	4		BOWL—NI-R.	1

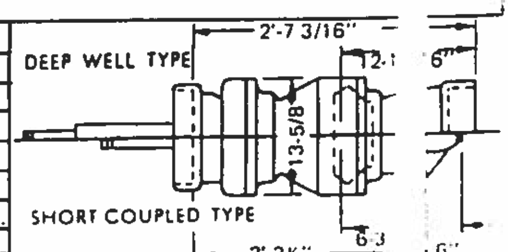
14 TLC 1770 R.P.M.

SINGLE STAGE LAB PERFORMANCE WITH STANDARD MATERIALS. EFFICIENCY SHOWN FOR 2 OR MORE STAGES. HORSE POWER SHOWN FOR ONE STAGE BASED ON 2 STAGE EFFICIENCY. CORRECTIONS SHOULD BE MADE FOR STAGES AND MATERIAL.



New Curve Completely

EYE AREA — SQ. IN.	=	34.26	IMPELLER WT.-LBS.	=	32.1
WR² PER IMPELLER	=	2.72 LB.-FT.²	ONE STAGE WT.-LBS.	=	435
MAX. SPHERE SIZE	=	1.25 in.	ADD'L STAGE WT.-LBS.	=	164
MAX. NO. STD. STAGES	=	7	IMPELLER NUMBER	=	7T13
MAX. OPERATING P.S.I.	=	390	DISCH. SIZES	=	10,12
STD. LATERAL	=	0.78 in.	SUCTION SIZES	=	10
STD. SHAFT DIA.	=	1.937 in.	MAX. LATERAL	=	1.26 in.
MAX. SHAFT DIA.	=	2.187 in.	BOWL CONN.		FLANGED-COLLETS
MIN. SUBMERGENCE	=	36 in.	ADD 13 " PER ADDITIONAL STAGE.		



Well 12

1770 R.P.M.

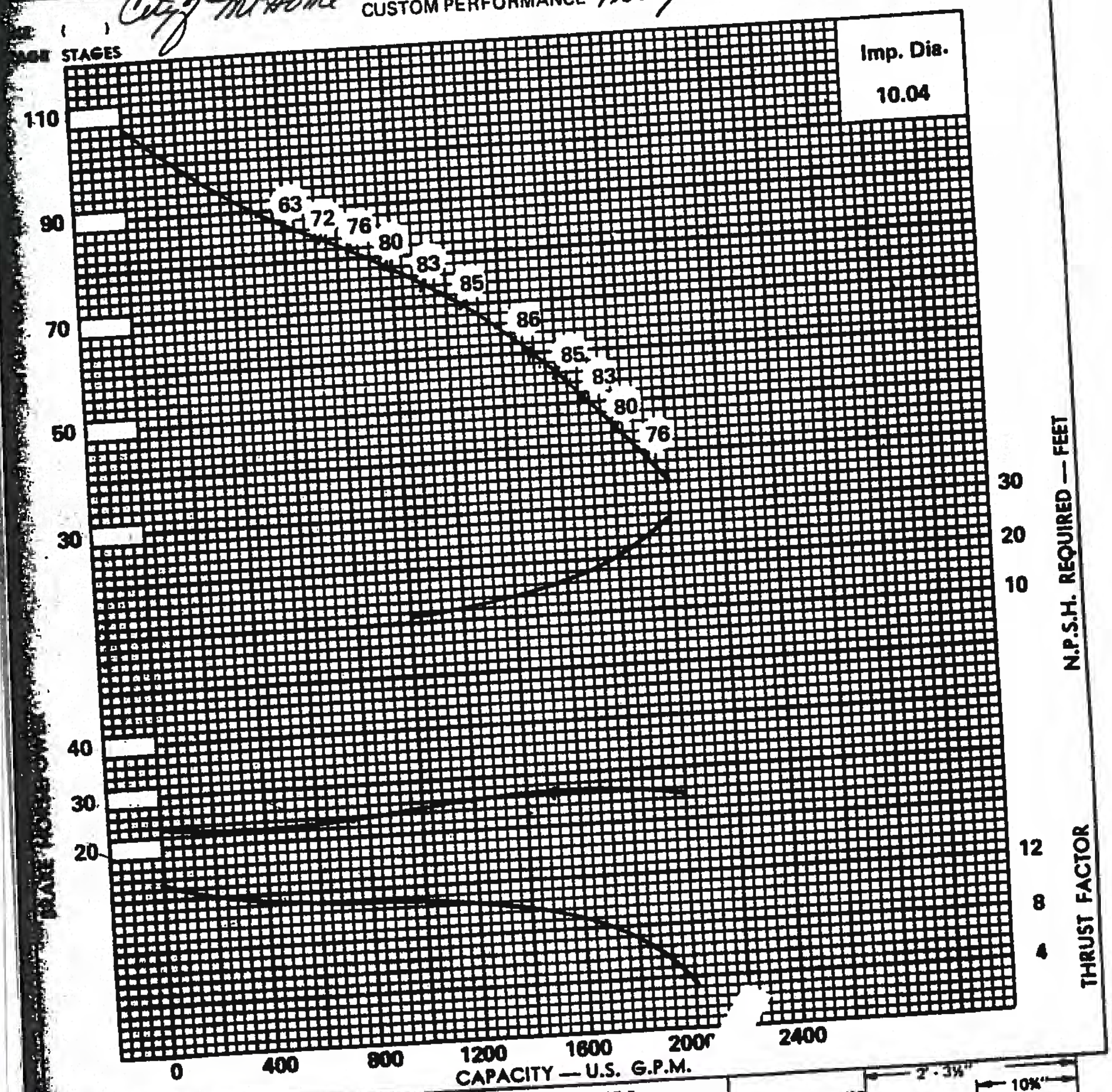
CURVE NO.
18-135X
7-1-79

No. Stages	Eff. Change	MATERIAL	Eff. Change
1	−2	IM — C.I.	−1
2	−1	IM — NI-RI	−1
3	0	BOWL — BRZ.	−1
4		BOWL — NI-R.	−1

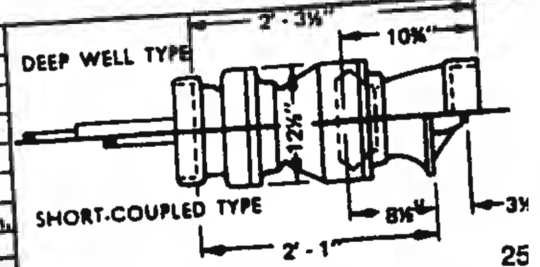
13C L

SINGLE STAGE LAB PERFORMANCE WITH STANDARD MATERIALS. EFFICIENCY SHOWN FOR 3 OR MORE STAGES. HORSE POWER SHOWN FOR ONE STAGE BASED ON 3 STAGE EFFICIENCY. CORRECTIONS SHOULD BE MADE FOR STAGES AND MATERIAL.

City of Mt Home CUSTOM PERFORMANCE 7 stage #12 Well



EYE AREA — SQ. IN.	= 25.5		IMPELLER WT.-LBS.	= 17.5	
WR^2 PER IMPELLER	= 1.45	LB.-FT.²	ONE STAGE WT.-LBS.	= 278	
MAX. SPHERE SIZE	= 1.00	in.	ADD'L STAGE WT.-LBS.	= 116	
MAX. NO. STD. STAGES	= 8		IMPELLER NUMBER	= 65C13	
MAX. OPERATING P.S.I.	= 400		DISCH. SIZES	= 8,10	
STD. LATERAL	= .84	in.	SUCTION SIZES	= 10	
STD. SHAFT DIA.	= 1.687	in.	MAX. LATERAL	= 1.00	in.
MAX. SHAFT DIA.	= 1.937	in.	BOWL CONN.	FLANGED — COLLET	
MIN. SUBMERGENCE	= 36	in.	ADD 11.38 " PER ADDITIONAL STAGE.		



Well #12

Well #14

Existing Pump

Well 14

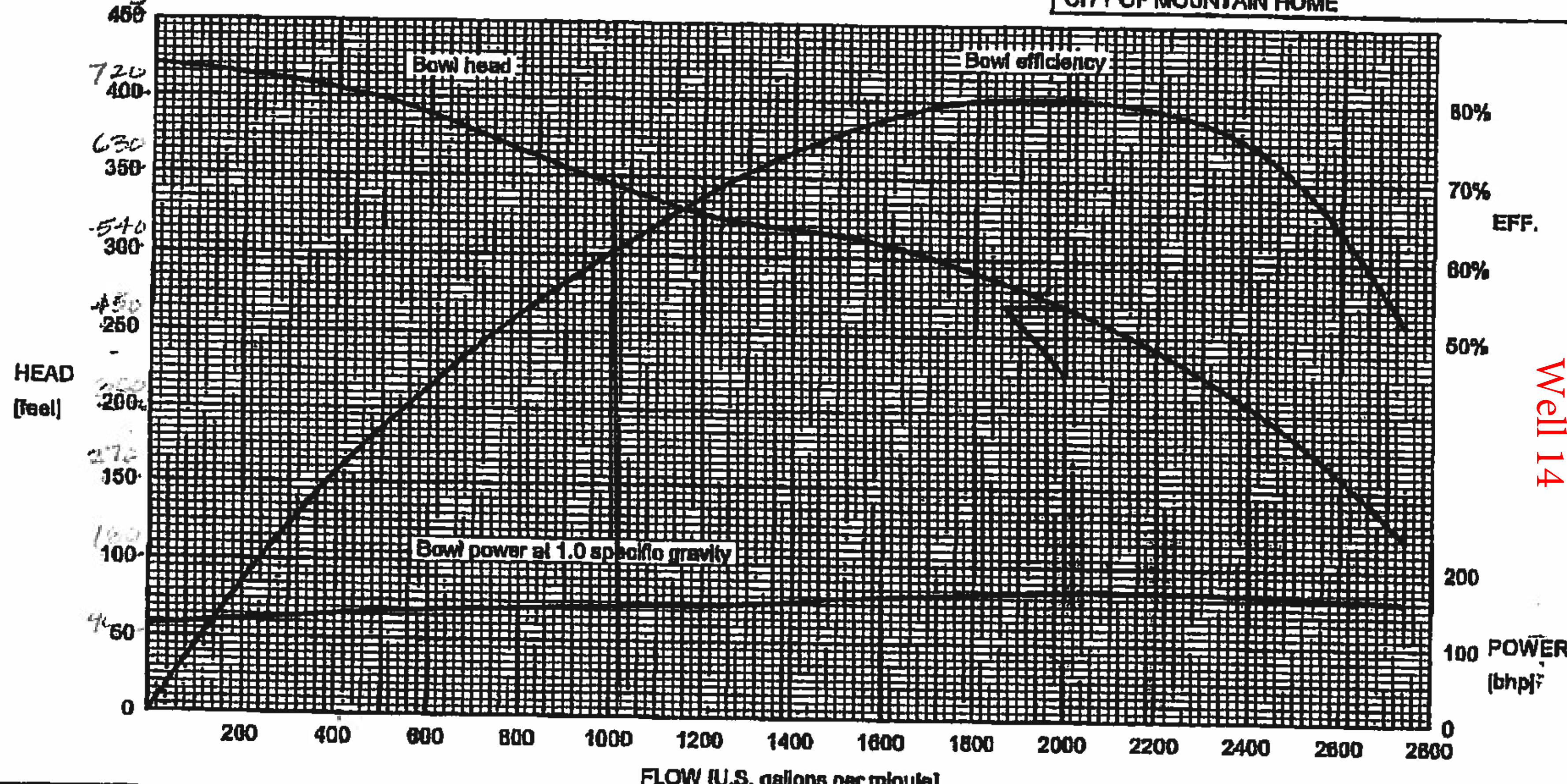
The head and power may be different than shown in accordance with Hydraulic Institute standards.

Note poor efficiency

9 stages = 250 Hp

200 HP DEEP WELL PUMP

CITY OF MOUNTAIN HOME



RIVERSIDE, INC.
111 S. ROSWELL BLVD.
P.O. BOX 720
PARMA, ID 83660-0720

FLOWAY PUMPS
FRESNO, CALIFORNIA
A WEIR COMPANY

TYPE:	12FKH
NO. OF STAGES:	5
R.P.M.:	1780
PUMP SERIAL NO.:	49065-1-1

DWG. NO. 4906501PC-REV1

Archimedes Professional 1.3.11 (printed: 9/5/2002 8:02:56 AM)

DWN. BY: MWA/MFC DATE: 09/05/2002

Well 15

DocuSign Envelope ID: 1DD36D19-77D0-4780-B72C-98AC28C4B145

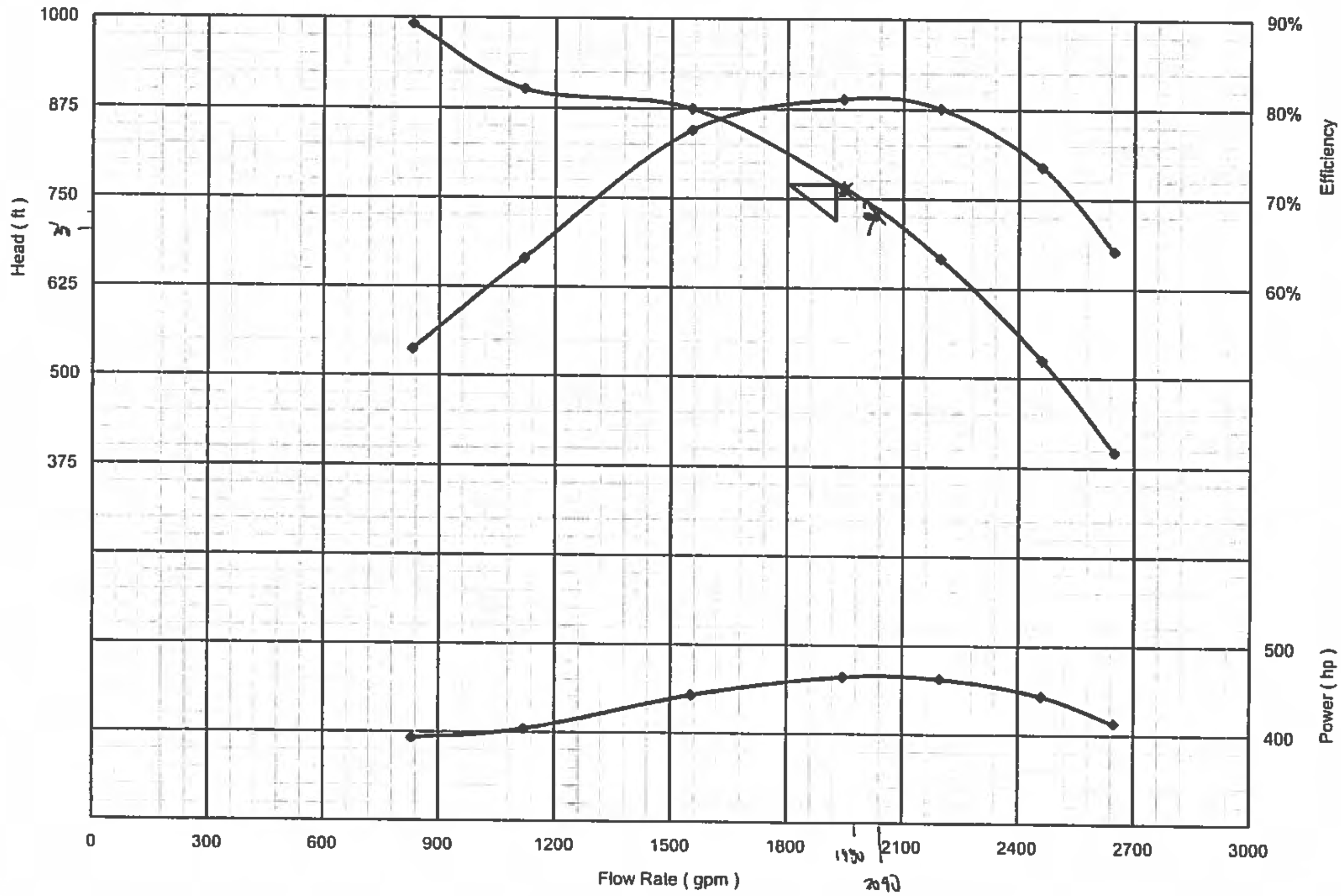
Well 15

NATIONAL PUMP COMPANY, LLC

7706 North 71st Ave. Glendale, AZ 85303

Test Information	
Test Number:	TST10-289A-0922
Customer Name:	PUMPTECH
Tag Number:	
Pump S/N:	358290A-1
Pump Model:	H12HC
Number STG:	16

Rated Conditions		
Type	Bowl	
Flow	1925	gpm
Head	770	ft
Min. Eff.		%
Speed	1780	rpm
Spec. Gr.	1.00	



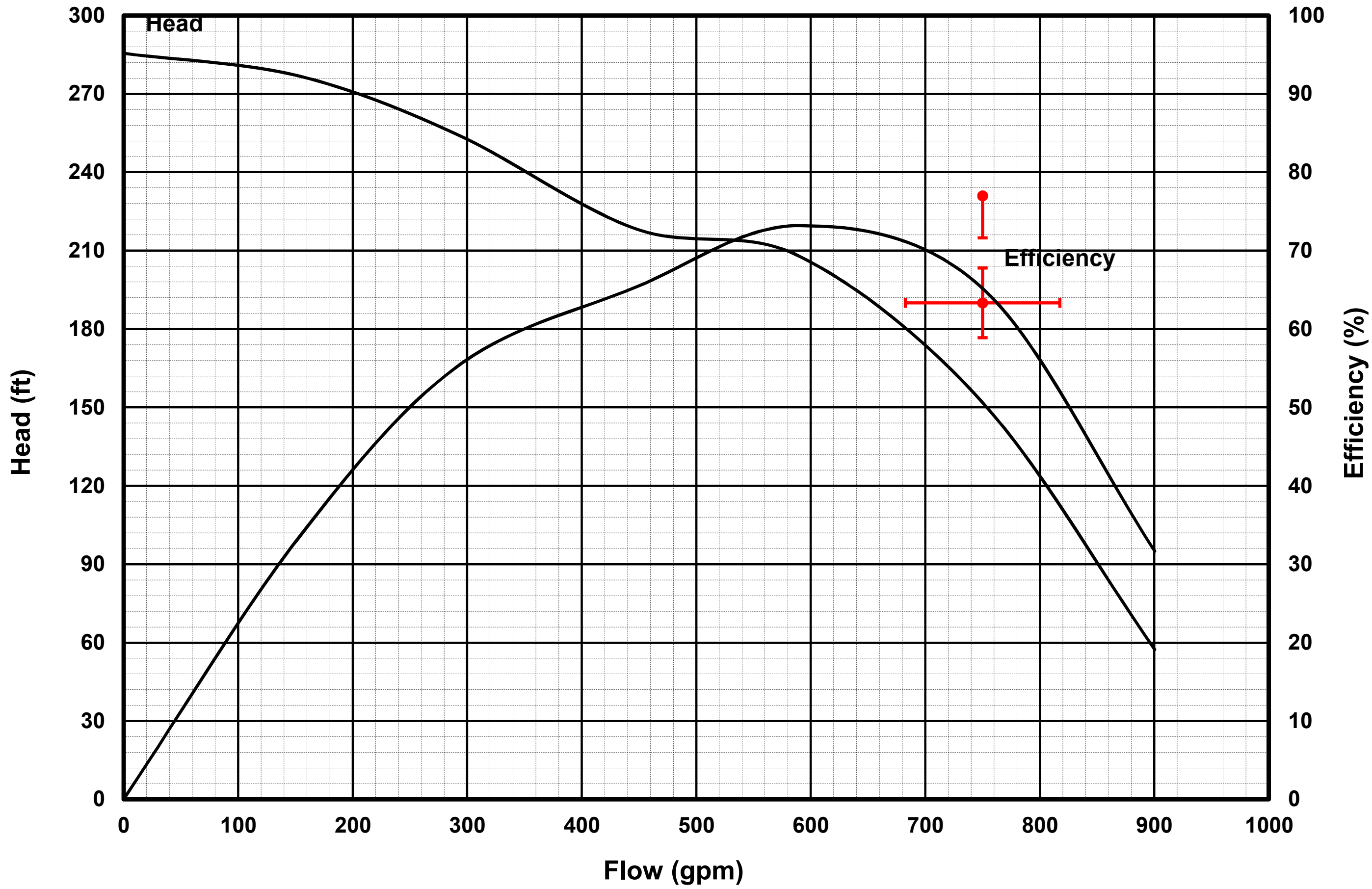
Pilot Booster Pump 1

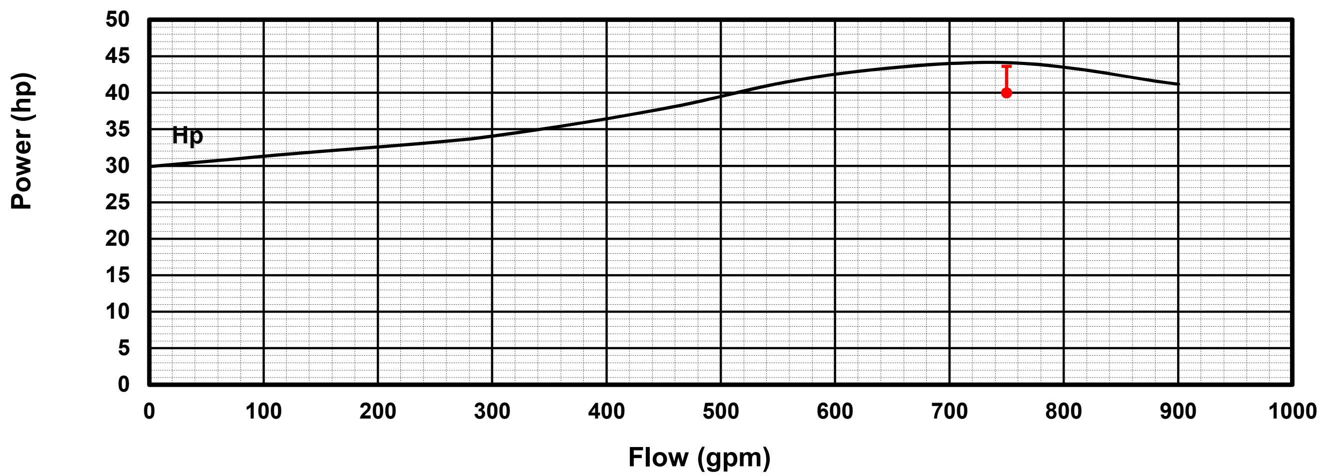
xylem Let's Solve Water

Xylem Inc. - Goulds Water Technology
Performance Test Curve

GOULDS WATER TECHNOLOGY a xylem brand

CUSTOMER: CH SPENCER
P.O. NUMBER: 6047517
SERIAL #: Smvt
PROJECT: none
CO #: 4118571
DATE: 2/20/15





Pump #: 1 of 2
Pump Model: SM6A1S2C1VB
# of Stages: 3
Impeller Dia$_1$: 4.63 in
Impeller Dia$_2$: N/A
Req. Speed: 3500 rpm
Req. Flow: 750 gpm
Req. Head: 190.0 psi

Certified Test Results
By:
Title: ENGINEER
Date: February 20, 2015

Pilot Booster Pump 2

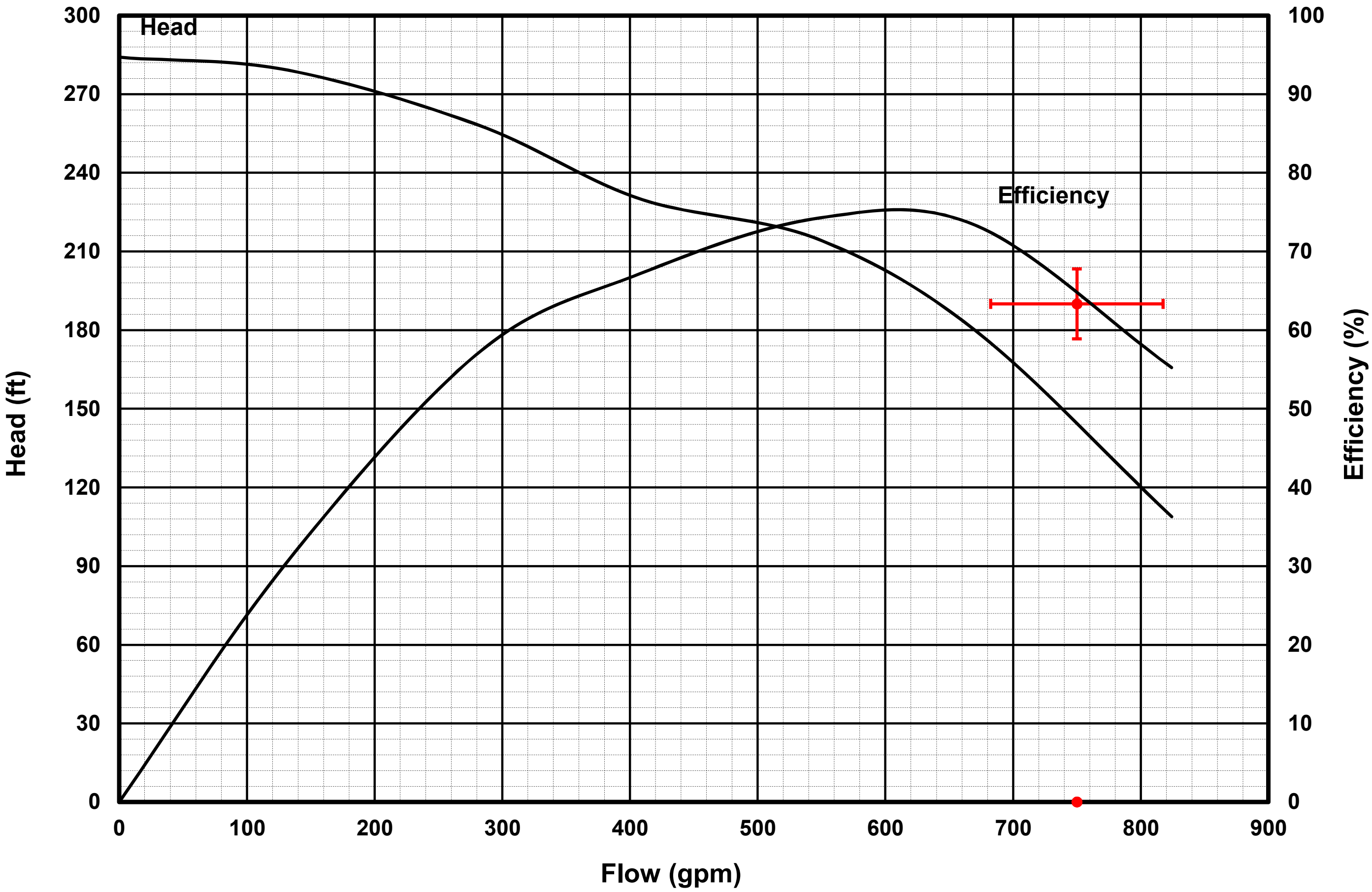
xylem Let's Solve Water

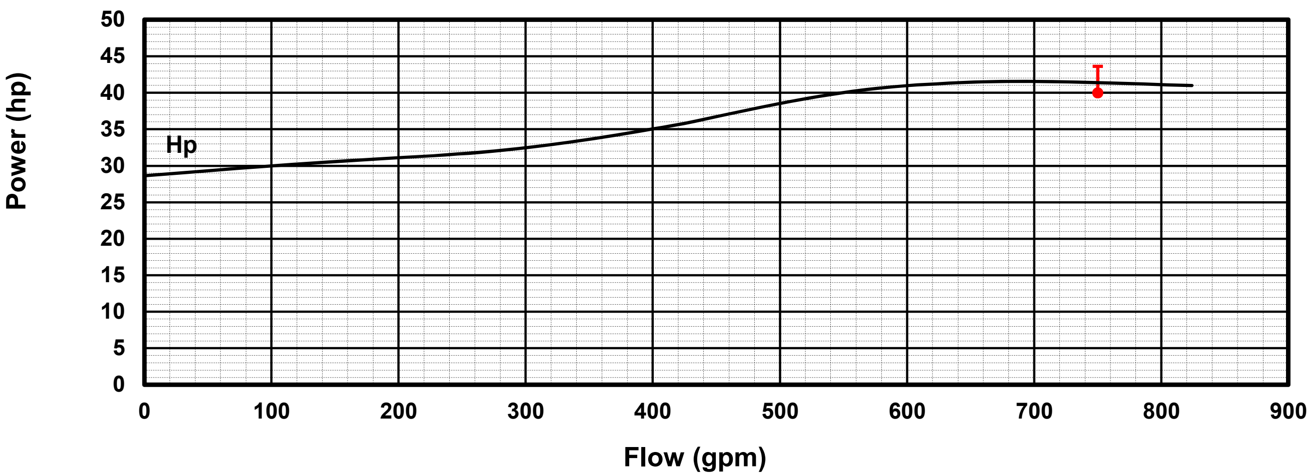
Xylem Inc. - Goulds Water Technology Performance Test Curve

GOULDS WATER TECHNOLOGY a xylem brand

CUSTOMER: CH SPENCER **SERIAL #:** Smvt **CO #:** 4118571

P.O. NUMBER: None **PROJECT:** none **DATE:** 2/23/15





Pump #: 2 of 2
Pump Model: SM6A1J2C1VB
# of Stages: 3
Impeller Dia$_1$: 4.63 in
Impeller Dia$_2$: N/A
Req. Speed: 3500 rpm
Req. Flow: 750 gpm
Req. Head: 190.0 psi

Certified Test Results

By:
Title: ENGINEER
Date: February 23, 2015

DocuSign Envelope ID: 1DD36D19-77D0-4780-B72C-98AC28C4B145

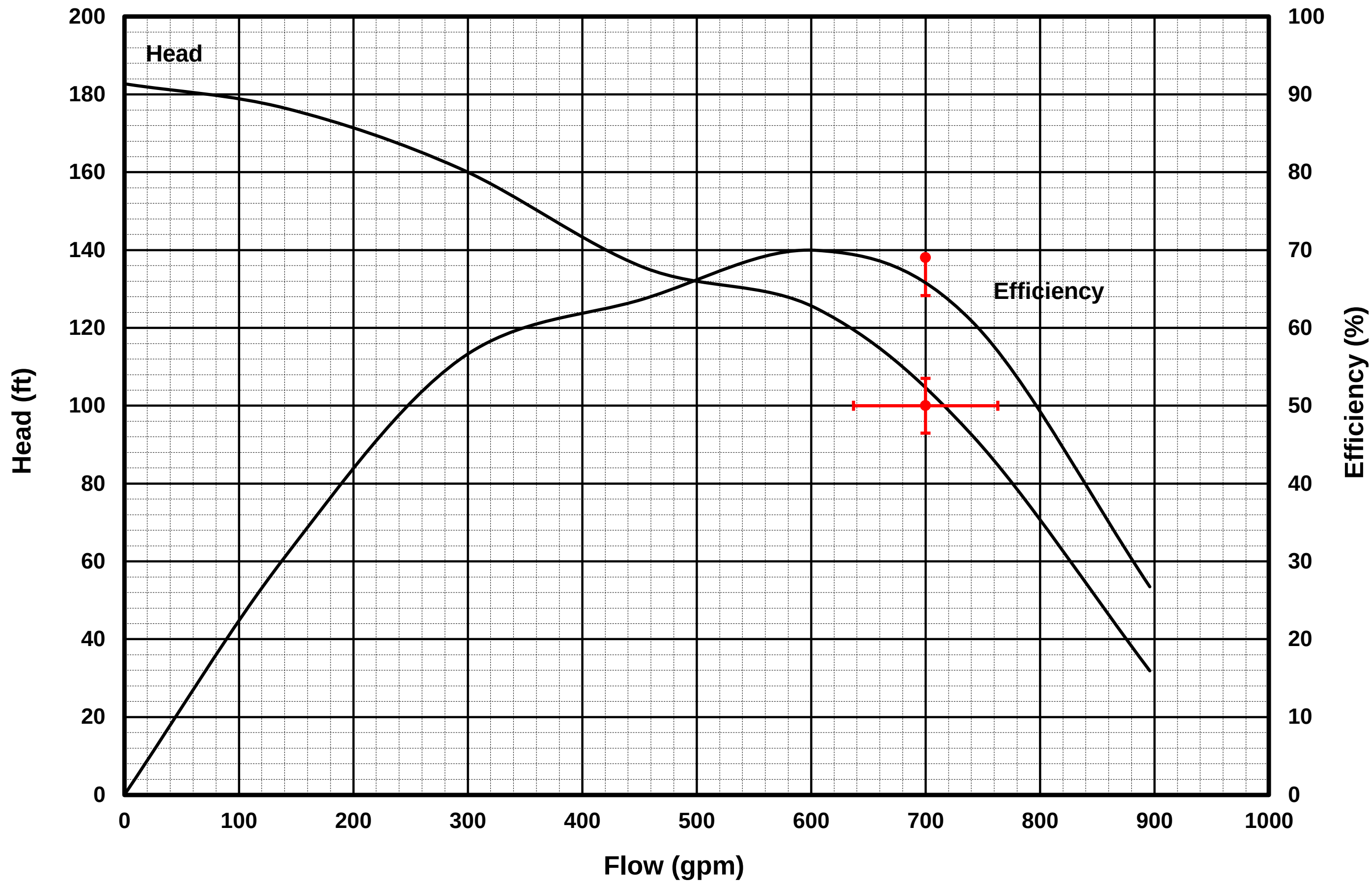
Pilot Booster Pump 3

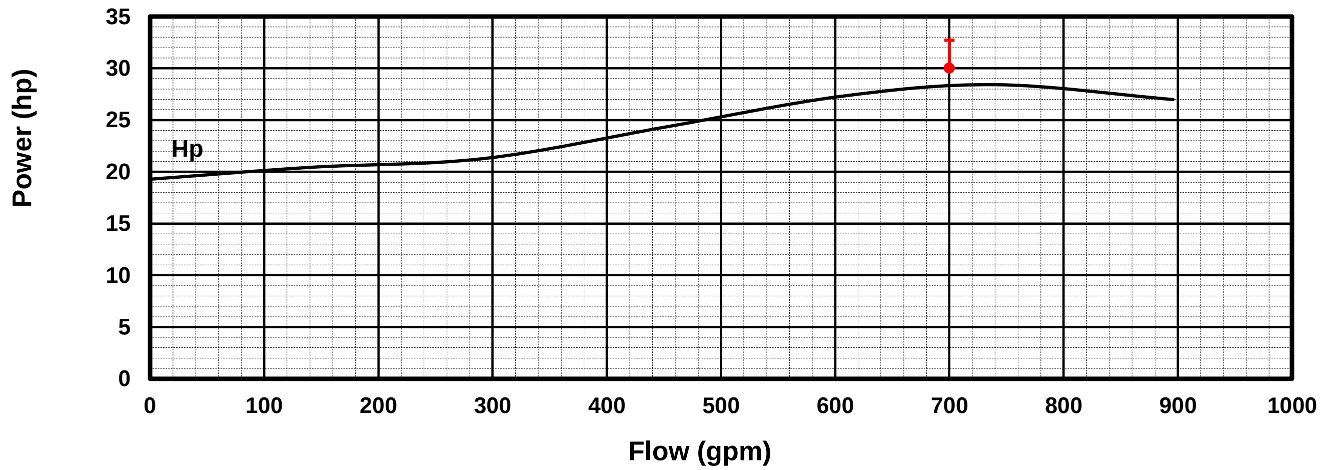
Xylem Inc. - Goulds Water Technology
Performance Test Curve

CUSTOMER: CH SPENCER
P.O. NUMBER: None

SERIAL #: Smvt
PROJECT: none

CO #: 4118571-0003
DATE: 2/20/15



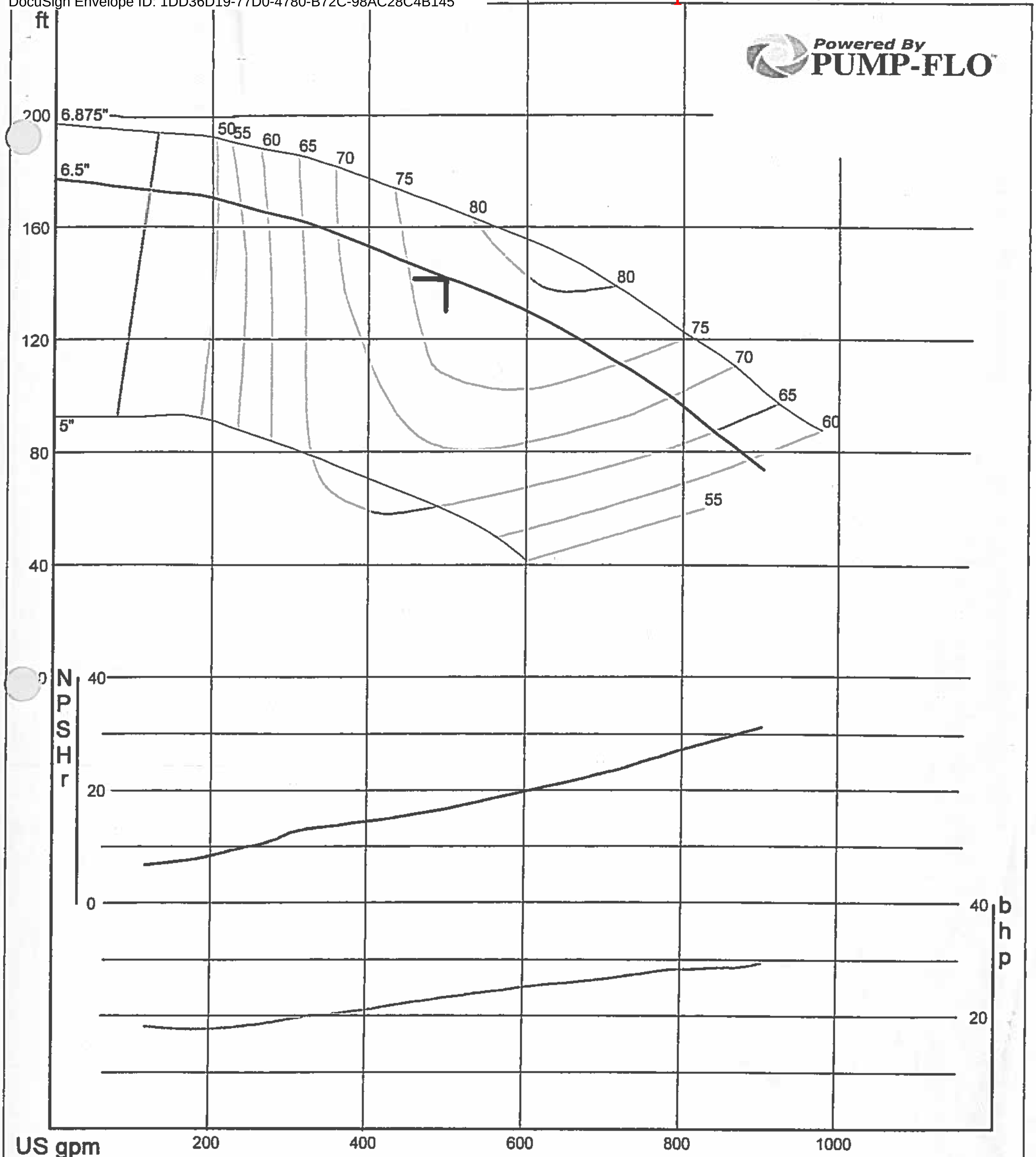


Pump #: 1 of 1
Pump Model: SM6A1H2B1VC
# of Stages: 2
Impeller Dia$_1$: 5.50 in
Impeller Dia$_2$: N/A
Req. Speed: 3525 rpm
Req. Flow: 700 gpm
Req. Head: 100.0 psi

Certified Test Results

By:
Title: ENGINEER
Date: February 20, 2015

3rd Street Booster Pump 1



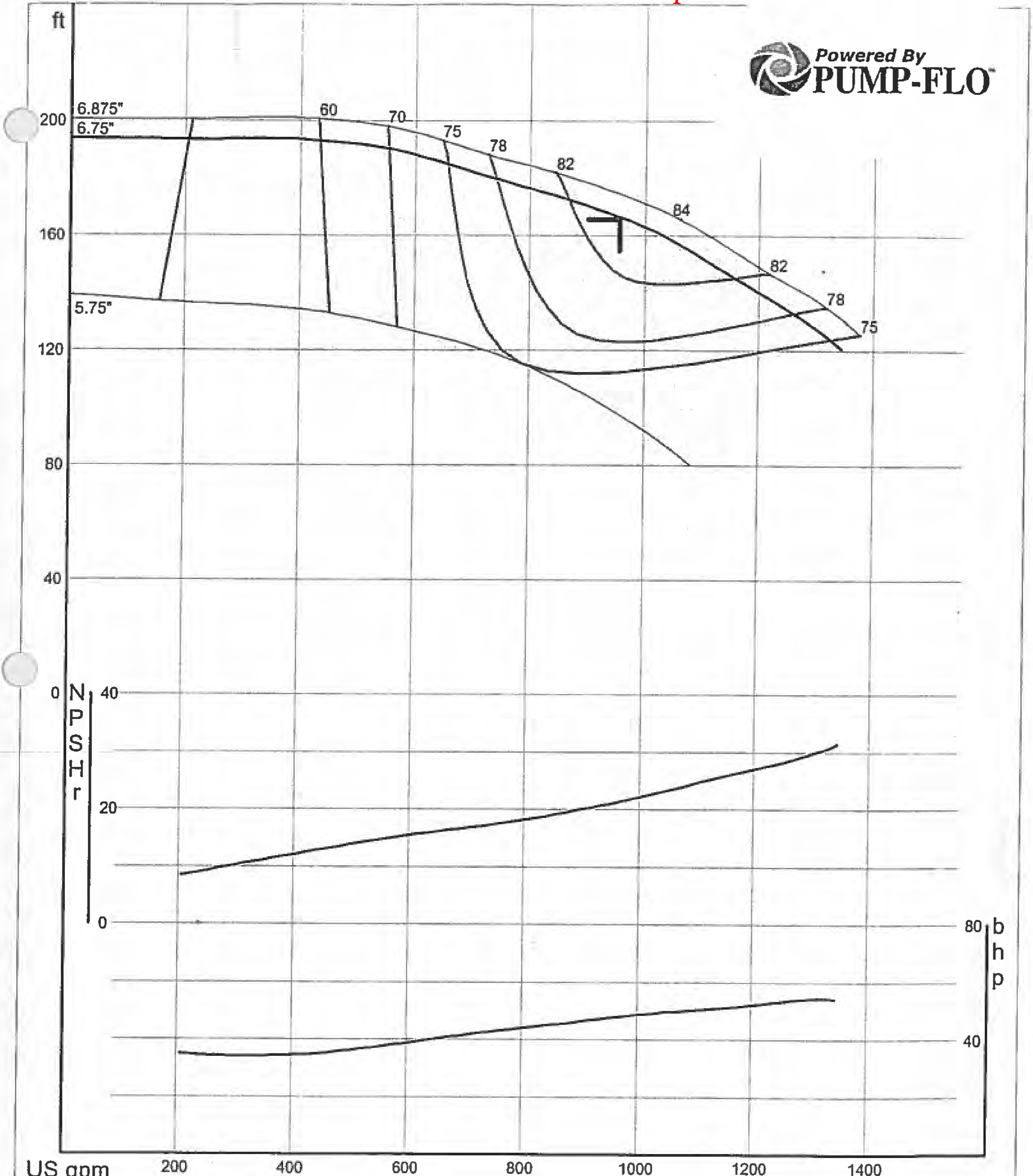
Curve No.: CS-17045

ntain Home-Pump 1.

American-Marsh Pumps
Catalog: WTRWKS60, vers 2.2
310_REI - 3600
Design Point: 500 US gpm, 142 ft

Size: 3x3-7 REI
Speed: 3450 rpm
Dia: 6.5 in

…et Booster Pump 2



Curve No.: CS-17056

Mountain Home-Pump 2.

American-Marsh Pumps
Catalog: WTRWKS60, vers 2.2
310_REI - 3600
Design Point: 950 US gpm, 165 ft

Size: 4x4-7 REI
Speed: 3580 rpm
Dia: 6.75 in

APPENDIX C

Electrical Recommendations

KELLER
associates

214010-013/r/16-218

APPENDIX C

LIGHTING RECOMMENDATIONS

1. Well 1. The interior lighting is currently incandescent lighting. Recommend upgrading the lamps in the fixtures to LED. The exterior lights are Mercury Vapor. Recommend upgrading the fixtures to LED.
2. Well 6. Interior lighting is fluorescent T8 lamp fixtures. No recommendations. The exterior fixtures are HID wall packs. Recommend upgrading fixtures to LED.
3. Well 9. Interior lighting is fluorescent possible T12 lamps. Recommend upgrading fixture when maintenance is performed. Exterior light is a HID wall pack fixture. Recommend upgrading to LED.
4. Well #11. Interior lighting is fluorescent T12 fixtures. Recommend upgrading fixtures when maintenance is performed. The exterior lighting is HID wall pack fixture. Recommend upgrading to LED.
5. Well #12. Interior lighting is an incandescent light fixture. Recommend upgrading to a fluorescent light fixture. Exterior light fixture is a HID wall pack. Recommend upgrading to LED.
6. Well #13. Interior light is fluorescent T12 light fixtures. Recommend upgrading fixtures as maintenance is performed. Exterior lighting is HID wall packs. Recommend upgrading to LED.
7. Well #14. Interior lighting is fluorescent T12 light fixtures. Recommend upgrading fixture as maintenance is performed. Exterior lighting is HID wall packs. Recommend upgrading fixtures to LED.
8. Well #15. Interior lighting is fluorescent T8 lighting. No recommendations. The exterior lighting is HID wall packs. Recommend upgrading to LED.
9. Pilot Booster Station. Interior lighting is fluorescent T8 lighting. No recommendations. There is no exterior lighting at this site.
10. 3rd Street Booster Station. Interior lighting is fluorescent T8 lighting. No recommendations. Exterior lighting taken care of by a street light. No recommendations.

POWER FACTOR RECOMMENDATIONS

1. Well 1. The 200 hp motor is running at a power factor of 0.76. Recommend installing a capacitor bank with a rating of 50 kVARs to correct the power factor to 0.95.
2. Well 6. The 500 hp motor is running at a power factor of 0.90. No recommendations.
3. Well 9. The 200 hp motor is controlled by a Variable Frequency Drive with a power factor of 0.90. No recommendations.
4. Well 11. The 500 hp motor is operating at a power factor of 0.91. No recommendations.
5. Well 12. The 200 hp motor is operating at a power factor of 0.74. Recommend installing a capacitor bank with a rating of 50 kVARs to correct the power factor to 0.95.
6. Well #13. The 500 hp motor is operating at a power factor of 0.86. Recommend installing a capacitor bank with a rating 120 kVARs to correct the power factor to 0.95.
7. Well #14. The 200 hp motor is operating at a power factor of 0.87. Recommend installing a capacitor bank with a rating of 50 kVARs to correct the power factor to 0.95.
8. Well #15. The 500 hp motor is operating at a power factor of 0.92. No recommendations.
9. Pilot Booster Station. Pump #1, 40 hp motor with a power factor of 0.88. Pump #2, 40 hp motor is operating at a power factor of 0.90. Pump #3 is operating at a power factor of 0.90. No recommendations.

APPENDIX D

Hansen, Allen, and Luce Data

KELLER associates

214010-013/r/16-218

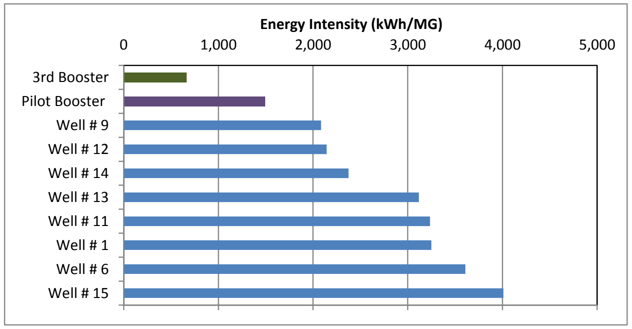
City of Mountain Home
Energy Map
3/30/2016

Facility	Water[1] (gal)			Energy[2] (kWh)			Energy Intensity (kWh/MG)			Energy Intensity (kWh/MG)
	2012	2013	2014	2012	2013	2014	2012	2013	2014	3-Year Equivalent
Well # 1	193,825,641	190,970,178	261,143,680	628,080	623,280	847,760	3,240	3,264	3,246	**3,250**
Well # 6	255,363,000	238,819,000	167,702,000	967,320	822,240	599,560	3,788	3,443	3,575	**3,610**
Well # 9	78,011,000	9,421,000	9,260,000	135,840	35,600	30,120	1,741	3,779	3,253	**2,085**
Well # 11	245,588,000	295,797,258	337,670,000	775,440	1,025,640	1,042,920	3,157	3,467	3,089	**3,235**
Well # 12	142,184,200	92,255,900	81,563,700	298,720	200,920	177,600	2,101	2,178	2,177	**2,143**
Well # 13	289,744,000	314,107,900	448,691,016	896,560	985,760	1,398,560	3,094	3,138	3,117	**3,117**
Well # 14	93,737,000	140,014,000	124,216,000	216,040	332,360	301,520	2,305	2,374	2,427	**2,374**
Well # 15	278,902,000	309,726,000	205,992,000	1,074,040	1,244,160	869,480	3,851	4,017	4,221	**4,012**
Pilot Booster	65,679,000	67,816,000	72,462,000	95,300	107,980	104,180	1,451	1,592	1,438	**1,493**
3rd Booster	169,758,169	152,204,227	151,954,510	112,695	101,592	100,365	664	667	660	**664**
							2,869	**3,025**	**2,941**	

1. Water data obtained from the City
2. Energy data provided by Cascade Energy.

Gallons	kWh
75,000,000	243728.709
62,500,000	225598.443
9,260,000	19302.9992
75,000,000	242646.862
398,040,000	853054.962
580,898,396	1810717.55
398,040,000	945065.207
37,500,000	150434.17

Total Efficient Wells	4490548.9
Total (2014)	5,267,520
Potential Savings (kWh)	776,971
	14.8%



Well # 15	4,012
Well # 6	3,610
Well # 1	3,250
Well # 11	3,235
Well # 13	3,117
Well # 14	2,374
Well # 12	2,143
Well # 9	2,085
Pilot Booster	1,493
3rd Booster	664