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MARYSVALE TOWN WATER MASTER PLAN REPORT



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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Introduction

Marysvale Town is a rural community located in Piute County, Utah. Marysvale was settled in the 1860's as mining community. Marysvale currently has a population of 442 people according to the most recent census data (GOMB 2010 census and growth projections). Marysvale Town provides culinary water for residential, commercial, industrial and institutional purposes. This document will discuss the existing culinary water system and make recommendations for the system to meet State requirements and the future needs of the community.

Use of this Water Master Plan Report

This master plan document and the calculations included were performed using known and accepted methods. Actual information (usage numbers, water rate fees, population baselines) were used when available. If such information was not found, engineering estimates and assumptions were made. All such estimates or assumptions are duly noted throughout the document. Estimated figures are specific to the region, Piute County, and water systems of comparable size within the region.

It is anticipated that this master plan document will be used as a prominent planning tool when considering the future growth of Marysvale Town. The information herein will allow Marysvale Town to be informed and aware of the current overall functionality of their culinary water system and any existing deficiencies.

Sources & Facilities

Marysvale Town owns two wells and a spring. (Park Well & Bullion Canyon Well), however only one well is active. The source production from the town's active well is approximately 225 gallons per minute. The town also owns two springs (Big Spring & Lower Bullion Canyon Spring). However, only one spring is active. The source production from the town's active spring is approximately 200 gallons per minute. The combined source production between the well and spring is 425 gallons per minute.

Marysvale Town owns a total of 7 water rights totaling 380.95 acre-feet in active water rights.

Marysvale Town owns four water tanks with a combined storage of 0.7 million gallons. The tanks are all concrete and above ground. The elevations of the tanks are 6,028 feet, 6,514 feet and 6,666 feet. The tanks are located across three pressure zones.

Water is delivered from the tanks to Marysvale Town residents through a total of 115,349 feet of pipe ranging in size from 10" to 2". There is an estimated 5,917 feet of 10" diameter pipe, 35,768 feet of 8" diameter pipe, 36,065 feet of 6" diameter pipe, 33,844 feet of 4" diameter pipe and

3,755 feet of 2" diameter pipe. Currently, 64% of the distribution system is 6-inch diameter or smaller.

Existing and Future Connections

Marysville Town provides culinary water for approximately 318 residential, 12 commercial, 0 industrial, and 4 institutional connections for a total of 334 connections. All connections utilize culinary water for indoor and outdoor use. Each residential connection was counted as a single Equivalent Residential Connection (ERC). The number of each non-residential connection and their respective usage were used in comparison to the residential usage to convert non-residential connection to ERCs. The total ERCs for residential and non-residential connections were estimated as follows; residential 318, commercial 6, industrial 0, and institutional 3. The total number of existing ERCs for Marysville Town is 327.

Based on the Governor's Office of Management and Budget (GOMB) and the 2010 Census, Marysville Town serves an estimated population of 442 individuals¹. The average growth rate for Marysville Town over the next 40 years is 1.0%. Based on the ratio of connections to population, by the year 2060 the total residential and non-residential ERCs were estimated as follows: residential 459, commercial 9, industrial 1 and institutional 6. The total future Equivalent Residential Connections based on future connections is 474 ERCs.

Water Demand Criteria

According to State requirements, the existing system must be able to provide 415.4 gallons per minute to meet peak day demand for indoor and outdoor purposes. The combined source production from Marysville's springs and well is 425 gallons per minute. Marysville Town has sufficient source production to add an additional 7 ERCs.

The average yearly demand for Marysville Town is 249.8 acre-feet. Marysville Town owns 380.95 acre-feet of active water rights designated for municipal use. Marysville Town has sufficient active water rights to add an additional 100 ERCs.

State storage requirements for public water systems must be able to provide fire flow storage and peak day demand storage. Typical fire flow demands are 1,500 gpm for 2 hours for residential building. Existing peak day plus fire flow storage demands for Marysville Town are approximately 0.46 million gallons. Marysville Town currently has a four concrete tanks with a combined storage of 0.7-million-gallon tanks. Marysville Town has sufficient storage capacity to add an additional 276 ERCs.

By the year 2060 Marysville Town will be required to provide 601.5 gpm for peak day demand for the entire system. Marysville will need to add an additional 200 gpm of source to meet future

¹ 5,417 individuals based on 2010 census and growth projects.

peak day demands. The average yearly demand required will be 362.1 acre-feet. The town has sufficient water rights to meet the future average yearly demand requirements. The future storage capacity required will be approximately 0.59 million gallons. Marysville Town will have sufficient storage capacity to meet the future peak day plus fire flow demands for storage.

Hydraulic Model Analysis and Results

Bentley WaterCAD was used to analyze and model the existing and future water system of Marysville Town. The scenarios modeled are Peak Day Demand, Peak Instantaneous Demand, and to see if Fire Flow constraints were met during Peak Day Demand. These scenarios were analyzed on the existing system for existing demands and future demands. These scenarios were also analyzed for the proposed improvements to the system with future demands.

The town was unable to provide as built drawings for their system. A pipe network used in the 1999 Water Master Plan was used as a starting point. Ensign met with past and present system operators to create a distribution system as accurate as possible. Several attempts to calibrate the model resulted in conflicting model vs field measurements. It was later discovered that the system had been interconnected across pressure zones at various undocumented locations bypassing existing PRVs. It was also discovered that the existing PRVs are not equipped to handle high and low flows, causing large headloss affecting the fire flow tests used to calibrate the model. The results of the model show that the water system meets Peak Day and Peak Instantaneous pressures, but does not meet Fire Flow throughout the system.

Proposed System Improvements

Marysville Town currently meets the State requirements for peak day demand for source production. However, the town is right at the limit for the existing source's production and cannot provide adequate source for the immediate future. Over the past four years, the town has enacted a building moratorium due to the limited available source production. In addition, the town's well is only equipped to provide water to the lower two tanks, if the town's spring should ever fail or become contaminated, approximately 24% of the system would be without out water. It is recommended that the town develop an additional source at the top of the system to meet the immediate and future peak day demands.

The town did drill a well in 2012 located at Firemen's Park up Bullion Canyon. The well was never brought into production because of issues with the surface seal. Further investigation of the well log showed that the total depth of the well was 340 feet. During the test pumping of the well the well was pumped at 350 gpm and experienced a drawdown of 300 feet, indicating that the well, as is, would be a very poor producing well. It is recommended that the town abandon this well and salvage what parts they can to drill a new well. There is currently power to the site and a pump installed in the well column that could be utilized. These are typically significant expenses when drilling a well. If the town could drill another well in proximity to the Fireman's

Park well, the town could salvage the power source and pump from the existing well to make the proposed well more economical.

Marysvale Town has a total of four concrete water tanks with a combined storage of 0.7 million gallons. All four tanks are above ground. Three of the four tanks have visible cracking/spalling on the lids as well as some sagging. The tanks are configured in series at varying elevations. Because the tanks have been constructed at varying elevations, if the lower two tanks had to be taken off line, the remaining two tanks would not be able to provide the existing peak day plus fire flow demands. In addition, if the upper two tanks were to be taken off line, the lower tanks would be unable to provide water to the upper zones, approximately 24% of the system. It is recommended that the town construct a new 0.5-million-gallon water tank near the existing middle tank. The tank would provide storage to meet future demands as well as allow the town to take the existing tanks off line as needed for extended maintenance.

Marysvale Town was unable to provide any as built drawings for the water distribution system. The distribution system that was modeled was based off of the system modeled in the 1999 Water Master Plan done by Jones and DeMille Engineering and past water operators' knowledge. Based on the amount of uncertainty in relation to the system characteristics, conflicting model results and infield fire flow tests, it was determined that the town is experiencing issue with their pressure reducing valves (PRVs). As a first step in addressing the distribution system issues, it is recommended that the town reconfigure their PRV stations and pressure zones. This will resolve several of the low flow and pressure issues witnessed during infield fire flow tests.

Based off of the hydraulic model, the town meets peak day demand and peak instantaneous demand. However, only 5% of the existing system meets the required fire flow demands. One concern with the hydraulic model results is that the hydraulic model assumes the PRVs are functioning properly. Due to the issues with the existing PRVs, the model was never able to be calibrated exactly which does create some uncertainty with the model results. Based off of the low flows and pressures experienced during the infield fire flow test, it is likely that the town is experiencing issues with peak day and peak instantaneous demands. Even with the uncertainty in the model, the fire flow issues were apparent in both the model and the field test fire flows. It is recommended that the town upsize certain pipes as well as loop existing dead-end lines were feasible. As a fix all fire flow solution, the town should replace all pipes 6-inch diameter and smaller.

Water Conservation

Utah has a goal of reducing the total per capita usage 25%. Currently, the total per capita usage for Marysvale Town is 365 gallons/day (total use). This value is more than double the average state usage of 167 gpd per capita. In order to reduce per capita water, use in the future,

Marysvale should consider further conservation practices. This can be accomplished through education and promotion of best management practices for both indoor and outdoor use.

Water Rate Study

A water rate study was performed utilizing actual water usage data provided by Marysvale Town for the year 2021. Based on the current water rate structure and billing practices the average monthly water bill for 2021 was \$21.62. The maximum affordable bill for Marysvale Town is \$47.97.

The current water rate structure was analyzed according to its effectiveness in promoting water conservation and also the effectiveness of providing revenue for the system to stay self-sustaining and operational. Marysvale Town's average water bill is 43% of the maximum affordable bill.

It is recommended that Marysvale Town restructure their water rates in conjunction with upgrading their system to auto read meters. The proposed water rate structure would increase the town average monthly water bill to \$46.70 and generate \$187,163.94 of annual revenue.

Impact Fee

Marysvale Town currently does not charge an impact fee. They do charge a connection fee of \$2,000 for small connections and \$2,500 for large connection. An impact fee study was performed to determine the appropriate amount to cover impact costs for the system.

It is recommended that Marysvale Town adopt an impact fee to help cover the cost and impacts to their system as result of development. Based off the existing system valuation and the proposed capital improvements projects, the town could justifiably adopt an impact fee as high as \$9,127.00. The town can choose to adopt an impact fee less than the \$9,127.00. Impact fees are not meant to discourage development or inhibit growth. However, in small rural communities, the cost of the infrastructure based on the number of users is very high. Likewise, the costs to cover the impacts to the system associated with new development are typically very high.

SECTION 1

INTRODUCTION

1 PROJECT OVERVIEW

In cooperation with Marysvale Town, Ensign Engineering was selected to evaluate the town's public water system including supply, storage, and distribution. Based on the information and analysis of the system, Ensign Engineering prepared this Water Master Plan Report. This water master plan will provide Marysvale Town the necessary information for upgrading and improving the existing water system. It will also help the town plan and budget for future growth and expansion as more demand is placed on the water system.

Marysvale Town is located in Piute County in south central Utah. Marysvale Town was settled in 1863 by silver and iron ore miners. Based on the Governor's Office of Management and Budget (GOMB) and the 2010 Census, the current population for Marysvale Town is 442² individuals. Based on the GOMB, the projected growth rates over the next 4 decades for Marysvale Town are as follow: 1.51% 2020 – 2030, 0.95% 2030 – 2040, 0.54% 2040 – 2050, and 0.99% 2050 – 2060. This equates to an average growth rate of 1.0% over the next 40 years.

This water master plan will discuss water management options that will encourage conservation within the town (the State water conservation goal is to reduce usage by 25% by 2050). Furthermore, this water master plan will help identify system deficiency as well as discuss corrective measures that promote sustainable design for future projects.

This master plan document will provide system improvement recommendations to remedy any existing system deficiencies. The plan will also provide system improvement recommendations to address future system deficiencies. Future system deficiencies are based on how the existing system will perform as population and growth increase. All system improvement recommendations will be based on meeting the minimum State requirements. The system improvement recommendations are included as part of a Capital Improvements Plan (CIP). The CIP will help the town prioritize system improvement projects based on necessity and cost. The master plan will provide several funding options as well as water rate adjustment recommendations to cover the cost of the recommended system improvements

Ensign began the master plan by collecting all pertinent data required to develop the base map and water system model. Marysvale Town was unable to provided hardcopy as-built drawings for the town's water system. However, Ensign surveyed the entire water system and with operator knowledge, was able to create a hydraulic model. The hydraulic

² Population estimates based on Governor's Office of Management and Budget and water connection data.

model results were exported and used to create model results maps for the Marysvale Town water system. The final produced maps should prove valuable to the town, as they will now have an up-to-date complete system mapping. The base map development also creates a method to digitally store the water system data in a GIS database. Utilization of GIS allows for a “living” record of information for the water system. Future analyses are expedited since all data will be stored in the database.

The majority of the data collected for this study was obtained from the town and county records. Descriptions of the data collected for the study is summarized in the following list:

- Population data (U.S. Census Bureau website)
- Population projection (Utah Governor’s office website)
- Water use data (obtained from Marysvale Town billing records)
- Water system details (obtained from walk through with system operator and previous water master plan)
 - Locations of pipes
 - Length of each pipe
 - Beginning and ending elevations
- Water valve locations (survey points for this study were collected by Ensign Engineering)
- Aerial map (obtain from Automated Geographic Reference Center (AGRC))
- Current water rates (provided by Marysvale Town)
- Land use data (obtained from the Utah Automated Geographic Reference Center (AGRC))

The pipes for the water system were digitized to produce the maps shown. Modeling was performed using Bentley’s WaterCAD, modeling data was imported into a GIS database. The GIS database was further expanded to contain system specific attributes.

SECTION 2

SOURCES AND FACILITIES

2 EXISTING SYSTEM

There are three basic components to every public water system. This water master plan will provide an in depth look at each system component and make sure Marysvale Town is meeting the minimum State requirements for each. The first system component is source. This will take into consideration the town's water rights and source production. The second component is storage. This will take into consideration the town's water tank/storage capacity. The third is the distribution system. This will take into consideration pipe sizing and capacity. Maps showing the existing system are include in the appendix of this report.

Periodically, the state conducts inspections of existing water systems and assesses the system's condition and management practice's. During the course of an inspection a water system is given Improvement Priority System (IPS) points based on the need for improvement. Marysvale Town's existing system currently has a total of 85 IPS points.

2.1 Existing Source Production

Marysvale Town's water system is fed by a spring and a well. The spring is located up Bullion Canyon at the top of the water system and is able to provide water to all four water tanks below. The source production from the spring is 200 gpm. This is measured by a meter just above the town's upper tank.

The well is located in town near at the rodeo grounds and is only equipped to pump water to the lower two tanks of the system. This well does not have a proper surface seal. However, Division of Drinking Water has allowed the town to use the well as an emergency supplemental source. The well has a 6-inch diameter casing approximately 350 feet deep and produces 225 gpm. This is measured by a meter near the well head. The combined source production for the spring and well is 0.612 Mgpd or 425gpm (see Table 2-1 Existing Source Production below). If there was ever an issue with the springs, approximately 24% of the system would not have water.

Table 2-1 Existing Source Production

Source Type	Status	Production (Mgpd)	Production (gpm)
Big Spring	Active	0.288	200
Rodeo Ground Well	Active	0.324	225
Total		612,000	425

The town does have another well that is currently inactive. The well is located at Firemen's Park up Bullion Canyon. It was drilled in 2012 and is a total of 340 feet deep

with an 8-inch diameter casing. The well is inactive because the surface seal does not extend 100-feet below the surface nor was it witnessed by the Division of Drinking Water.



Image 1 Rodeo Grounds Well



Image 3 Bullion Canyon Spring



Image 2 Fireman's Park Well

2.2 Water Rights

2.2.1 Methods

The other component of source demand is water rights. Water rights research began by searching the Utah State Division of Water Rights web page for Marysvale Town. This resulted in a list of the water rights owned by the town. The list contains water right

numbers, the total annual volume allotted to the water right and for what use the water right was given.

2.2.2 Current Rights

Marysvale Town owns a total of 6 active water rights. The total water rights are 0.0734 cfs or 380.95 acre-feet. The designated use for the water rights includes irrigation, stock watering, domestic and municipal use. The water rights are for underground and surface sources and they have varying periods of use depending on the designated use. A list of all the town's water rights and changes are shown in Table 2-2 Current Water Rights and Table 2-3 Current Water Rights Place of Use and Points of Diversion.

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Table 2-3 Current Water Rights Place of Use and Points of Diversion

Owner	Source	Base WR #	Points of Diversion
Marysvale Town	Well	63-107	(1) N 2792 ft. W 241 ft. from SE corner, Sec 32 T 27S R 3W SLBM
Town of Marysvale	Spring & Well	63-2835	(1) S 1019 ft. E 52 ft. from W4 corner, Sec 34 T 27S R 3W SLB (2) N 3681 ft. W 255 ft. from S4 corner, Sec 20 T 27S R 3W SLBM
Marysvale Town	Well	63-3967	(1) N 42 ft. W 687 ft. from SE corner, Sec 29 T 27S R 3W SLB (1) N 3681 ft. W 255 ft. from S4 corner, Sec 20 T 27S R 3W SLBMM
Marysvale Town	Calloway Spring	63-4016	(1) N 400 ft. W 650 ft. from SE corner, Sec 32 T 27S R 3W SLBM
Marysvale Town	Spring & Well	63-4280	(1) S 1077 ft. E 47 ft. from E4 corner, Sec 34 T 27S R 4W SLBM
Town of Marysvale	Spring & Well	63-4606	(1) S 1019 feet E 52 feet from W4 corner, Sec 34 T 27S R 3W SLBM (1) N 3681 feet W 255 feet from S4 corner, Sec 20 T 27S R 3W SLBM
Town of Marysvale	Beaver Creek	63-4843	(1) N 1215 ft. W 3413 ft. from SE corner, Sec 18 T 27S R 3W SLBM (2) N 1670 ft. W 1950 ft. from SE corner, Sec 18 T 27S R 3W SLBM (3) S 2650 ft. W 1320 ft. from NE corner, Sec 18 T 27S R 3W SLBM

2.2.3 *Water Right Dedication Policy*

One acre-foot of water is insufficient to satisfy the state’s water requirements for lots larger than ½ acre. Table 2-4 State Requirements shows the state’s water right requirements for different lot sizes. For each of the lot sizes, the indoor use requirement remains the same. The required volume for outdoor irrigation increases as the availability of land to be irrigated increases. A user on a larger lot will likely use more water than one acre-foot of water. Water right dedications should be correlated to the possible amount of water that will be used, based on the size of the lot. Otherwise, users in the water service boundary may use more water than the town has available.

Table 2-4 State Requirements

Lot Size (acres)	5	2	1	0.5
Irrigated Acreage (acres)	4	1.6	0.8	0.4
Outdoor Use (AF)	6.64	2.66	1.33	0.66
Indoor Use (AF)	0.45	0.45	0.45	0.45
Total Required Water Right	7.09	3.11	1.78	1.11

All water rights have a depletion amount. Depletion is the amount of water that can be consumed from a water right. The depletion amount depends on the use of the water. Uses like stock watering have 100% depletion and uses like irrigation have around a 50% depletion amount³. The depletion amount for municipal use water varies. In the past, water companies and municipalities have been able to convert irrigation water to municipal use by specifying that the depletion amount of the municipal right will remain the same as the depletion for the irrigation.

2.2 *Existing Storage*

Marysvale Town has total of four water tanks all of which are concrete and above ground. All four tanks are fed by the town’s springs. When necessary, the Rodeo Ground well is used to pump water up to the lower tanks. The capacity of the town’s tanks are 0.2 million gallons, 0.15-million-gallon, 0.25 million gallons and 0.10 million gallons. The total water storage capacity is 0.70 million gallons. The 0.2- and 0.15-million-gallon tanks can be seen to the west of town along Bullion Canyon Road. The 0.25-million-gallon tank is located approximately 2.25 miles up Bullion Canyon Road. The 0.10 million galloon tank is located approximately 3.38 miles up Bullion Canyon Road. Three of the four tanks have lids that have begun to crack/sag and are now

³ The remainder of the water right is assumed to return to the aquifer

ponding storm water. Table 2-5 Existing Storage shows the various tank sizes, elevation, and materials.

Table 2-5 Existing Storage

Tank ID	Material	Year Constructed	Elevation (ft)	Size (Million Gallons)
Lower	Concrete		6028	0.20
Lower	Concrete		6028	0.15
Middle	Concrete	2010	6514	0.10
Upper	Concrete	1987	6666	0.25
Total				0.70



Image 4 – 0.20 and 0.15 million Gallon Lower Concrete Tanks



Image 5 - 0.25-million-gallon Middle Concrete Tank



Image 6 – 0.1-million-gallon Upper Concrete Tank

2.3 Existing Distribution System

Marysvale Town was unable to provide any as built drawing for their system. The distribution system layout for the water model is based on a 1999 Water Master Plan done by Jones and DeMille Engineering and past water operator knowledge. Marysvale Town's distribution system consists of pipe sizes ranging from 10" – 2". The distribution system in the town is looped well but it does have several long dead-end sections to the north and south of town. These long dead-end sections are a cause for concern as they can create significant head loss and reduce flows. There is also a significant amount of small diameter pipe within the system. Small diameter pipes create issues with high velocities and cavitation during high flow demand such as fire flow. Exhibit EX-011 Existing Pressure Zones and Water System in the appendix shows the existing distribution system. Table 2-6 Existing Distribution System summarizes the diameter and length of all pipelines within the system, including transmission and supply lines to and from the tank.

Table 2-6 Existing Distribution System

Existing Pipes	
Diameter (in)	Length (ft)
10"	5,917
8"	35,768
6"	36,065
4"	33,844
2"	3,755
Total Length	115,349

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SECTION 3

EXISTING AND FUTURE CONNECTIONS

3 EXISTING AND FUTURE CONNECTIONS

3.2 Service Area

Marysville Town limits include an area of 17.9 square miles. Marysville Town serves a total of 334 connections, 318 single family residential, 12 commercial, 0 industrial, and 4 institutional connections. Included in the 334 connections are approximately 63 standby/non-use connections. Marysville Town is a small rural community that, historically, has experienced minimal growth. The primary occupations of residents in the area are agricultural, hospitality and tourism. Marysville sees a high influx of tourist during the summer months. The majority of the area within the town boundary is currently zoned as agricultural. However, if future housing demands and zoning changes occurred, the town would have the space available to handle increased growth.

3.3 ERC Evaluation

3.3.1 Existing ERC Evaluation

Marysville Town serves a total of 334 connections, 318 single family residential, 12 commercial, 0 industrial, and 4 institutional connections. Typically, the majority of connection within a water system are residential. For that reason, residential connections are used as a baseline to size water system components and calculate system demands. All other connections within a given system are converted to Equivalent Residential Connections (ERCs) based on their specific usage and demands in comparison to residential usage and demands. Based on the usage for each connection type, they were converted to ERCs. Table 3-1 below shows the Existing ERCs for each connection type residential and non-residential connections. The total number of ERCs for the system is 327 ERCs.

Table 3-1 Existing ERCs

Connection Type	Connections	2020 - 2021 Usage	Equivalent Residential Connection Conversion		
		Mgal	gal/con	ERC Factor	ERCs
Residential - Single Family	318	74.4	234,097	1.00	318
Commercial	12	1.38	115,583	0.49	6
Industrial	0	0	0	0.00	
Institutional	4	0.79	199,250	0.85	3
Total	334	76.63			327

3.3.2 Future ERC Evaluation

Based on the Governor’s Office of Management and Budget (GOMB) 2010 Census data, Marysvale Town currently serves an estimated population of 442 individuals. The growth rates for Marysvale over the next 40 years are expected to be relatively low, ranging from 0.54% to 1.51% (see Table 3-2 below).

Table 3-2 Marysvale Town GOMB Projected Growth Rates

Decade	Growth Rate
2010-2020	0.50%
2020-2030	1.51%
2030-2040	0.95%
2040-2050	0.54%
2050-2060	0.99%
Average Rate between 2020-2060	1.00%

Based on the Marysvale Town growth rates, Table 3-3 below shows the projected population by decade. It is estimated that by the year 2060 Marysvale Town will have an estimated population of 639 people.

Table 3-3 Adjusted Population Projection

Year	Population Projection
2010	408
2020	429
2022	442
2030	499
2040	548
2050	579
2060	639

The ratio of population to service connection was used to project future connections. The same ERCs factors that were used for the existing ERCs were used to calculate future ERCs. Based on

these assumptions, the future Equivalent Residential Connections for Marysville Town will be 473 ERCs by the year 2060 (see Table 3-4 below).

Table 3-4 Marysville Town Future ERC Projections

Future Connections/ERCs										
Year	Residential		Commercial		Industrial		Institutional		Total	
	Connections	ERCs	Connections	ERCs	Connections	ERCs	Connections	ERCs	Connections	ERCs
2022	318	318	12	5.9	0	0	4	3.4	334.0	327.3
2030	359	358.9	14	6.7	1	0	5	3.8	378.0	369.4
2040	395	394.6	15	7.4	1	0	5	4.2	415.5	406.1
2050	416	416.5	16	7.8	1	0	5	4.5	438.6	428.7
2060	460	459.7	17	8.6	1	0	6	4.9	484.2	473.2

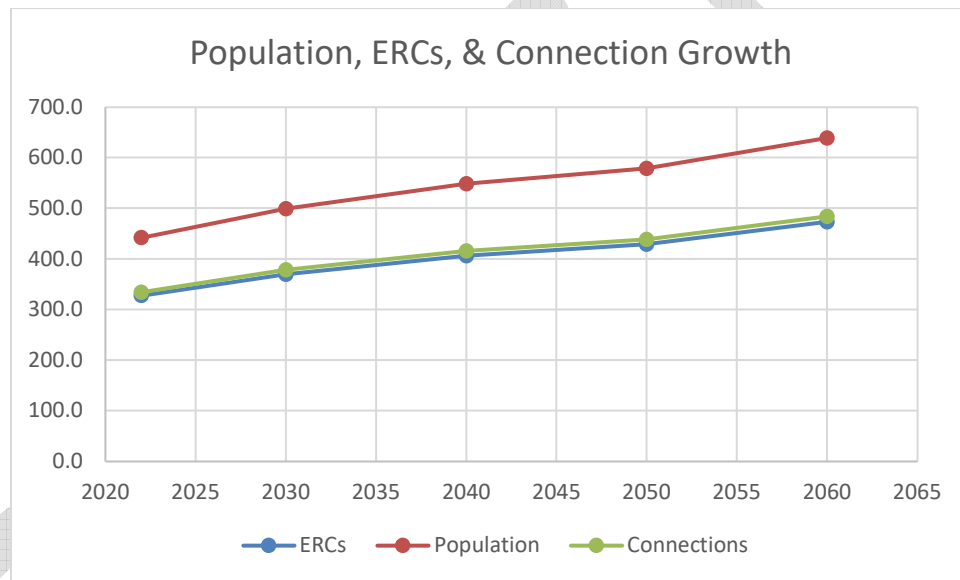


Figure 3-1 Population, ERCs & Connection Growth

SECTION 4

WATER DEMAND CRITERIA

4 WATER DEMAND CRITERIA

There are three main state requirements⁴ that must be considered when evaluating a system for compliance with state regulations. The first requirement is source capacity, which considers water rights and source production. Second is storage, which considers water tank capacity. The third requirement is the distribution system which considers the pipe size capacity. It is essential that all three requirements are satisfied to meet state requirements. This section of the master plan will examine each requirement individually.

4.1 Source Demand

In order to have adequate source sizing, a system must have capacity to deliver on the day of the highest water consumption (**peak day demand**) and have sufficient water rights to supply water (**average yearly demand**). First, this report will look at the capacity to deliver water under peak day demand and the required water rights for the average yearly demand.

4.1.1 Existing Peak Day Demand

The state requires that a minimum of 800 gallons per day per Equivalent Residential Connection⁵ (gpd/ERC) be used in determining indoor peak day demand. If there is a high confidence that more or less water is used and proof through past usage data, this number can be adjusted accordingly. In this case, the town did not have enough data to confidently decrease the states minimum peak day requirement. Therefore, Ensign Engineering choose to use the 800 gpd/ERC for peak day demand indoor use.

Peak day outdoor is based on the number of connections and an estimated average green space for all users. For Marysville Town, the estimated green space per connection was estimated at 0.25 acres. This includes lawns, gardens and small pastures adjacent to primary residential structures. In addition, the State uses a consumptive use map to determine the amount of water used for outdoor use based on climate and soil types. Marysville Town is located in map zone 2 which requires a peak day demand of 2.80 gallon per minute per irrigated acre.

Based on these indoor and outdoor peak day demand requirements, Marysville Town is required to provide 0.59 Mgalpd or 415.4 gpm. The town is able to provide 0.61 Mgalpd or 425 gpm. (see Table 4-1 Existing Peak Day Demand). The combined peak day source demand for both indoor

⁴ State of Utah Drinking water system requirements are found in the Administrative Rules R309-510.

⁵ One Equivalent Residential Connection (ERC) refers to the amount of water used in a typical residence for both indoor and outdoor use. Each connection in a system is assigned a number of ERCs based on the amount of water that is used. A typical residence connection will be assigned one ERC. A connection that uses more than a typical residence (such as a laundromat) will be assigned more than one ERC. A connection that uses less than a typical residence (such as a townhome) will be assigned less than one ERC.

and outdoor use is approximately 1.25 gpm/ERCs. Based on this, Marysvale Town has enough source production to add 7 more ERCs to their system.

Table 4-1 Existing Peak Day Demand

Indoor Peak Day Demand	800 gal/day/ERC
Existing ERCs	327
Outdoor Peak Day Demand	2.80 gal/min/irri acre
Irrigated Acres / Connection	0.25 Acres
Existing Connections	334
TOTAL INDOOR REQUIRED	0.26 Mgpd or 181.6 gpm
TOTAL OUTDOOR REQUIRED	0.33 Mgpd or 233.8 gpm
TOTAL REQUIRED	0.59 Mgpd or 415.4 gpm
TOTAL AVAILABLE	0.61 Mgpd or 425 gpm
ERCs AVAILABLE	7 ERCs

4.1.2 Future Peak Day Demand

Marysvale Town is projected to reach a population of 639 people by the year 2060. This would result in a total of 497 water connects and 473 ERCs by the year 2060. Based on the State requirements for indoor and outdoor peak day demands, the town must be able to provide 0.38 Mgpd or 262.7 gpm to meet the future peak day demand for indoor use. In addition, the town must be able to provide 0.50 Mgpd or 347.9 gpm to meet the future peak day demand for indoor use (see Table 4-2 Future Indoor Peak Day Demand).

Table 4-2 Future Peak Day Demand

Indoor Peak Day Demand	800 gal/day/ERC
Future ERCs	473
Outdoor Peak Day Demand	2.80 gal/min/irri acre
Irrigated Acres / Connection	0.25 Acres
Future Connections	484
TOTAL INDOOR REQUIRED	0.38 Mgpd or 262.7 gpm
TOTAL OUTDOOR REQUIRED	0.49 Mgpd or 338.8 gpm
TOTAL REQUIRED	0.87 Mgpd or 601.5
TOTAL AVAILABLE	0.61 Mgpd or 425 gpm
ERCs AVAILABLE	ERCs

Based on the projected source demand, Marysvale Town will need additional source production as soon as possible to meet future peak day indoor and outdoor demands (see Figure 4-1).

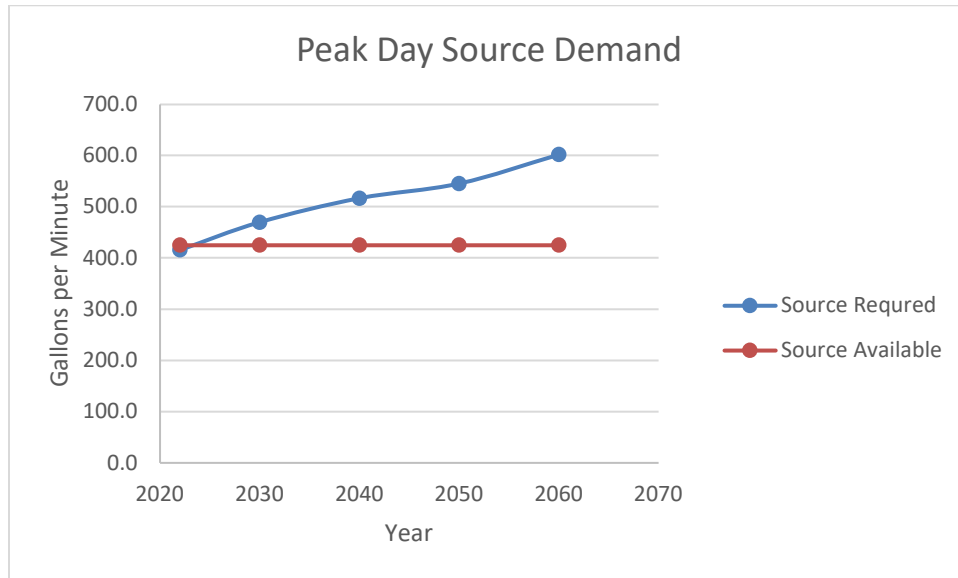


Figure 4-1 Projected Source Demand

4.1.3 Average Yearly Demand

The average yearly demand for Marysvale Town is based on State rule which requires 0.45 ac-feet of water rights per ERC for indoor use. Average yearly demand for outdoor use is based on the consumptive use map zone which requires 1.23 ac-feet per irrigated acre. For Marysvale Town, the estimated green space per connection was estimated at 0.25 acres. This includes lawns, gardens and small pastures adjacent to primary residential structures. The average yearly demand for Marysvale Town for indoor and outdoor use per state requirements is 249.8 acre-feet per year of water rights. Reference Table 4-3 Existing Average Yearly Demand.

Table 4-3 Existing Average Yearly Demand

Indoor Average Yearly Demand	0.45 af/ERC
Existing ERCs	327
Outdoor Average Yearly Demand	1.23 af/irri acre
Green Space Per Connection	0.25 acres/conn
Existing Connections	334
TOTAL REQUIRED	249.8 acre-feet
TOTAL AVAILABLE	380.95 acre-feet
ERCs AVAILABLE	100 ERCs

Based on the future ERCs and connections, the future average yearly demand for Marysville Town for indoor and outdoor use will be approximately 362.13 acre-feet per year of water rights for indoor and outdoor use. Reference Table 4-4 Future Average Yearly Demand.

Table 4-4 Future Average Yearly Demand

Indoor Average Yearly Demand	0.45 af/ERC
Future ERCs	474
Outdoor Average Yearly Demand	1.23 af/irri acre
Green Space Per Connection	0.25 acres/conn
Future Connections	484
TOTAL REQUIRED	362.13 acre-feet
TOTAL AVAILABLE	380.95 acre-feet
ERCs AVAILABLE	14 ERCs

Marysville Town currently meets the state requirement for existing yearly demand. However, if the growth trends continue at their current rates, the town will need to start acquire additional water rights around the year 2060 (see Figure 4-2 below). It is recommended that town adopt an ordinance requiring new users to bring 1.0 acre-feet of water rights for the town as part of the impact / connection fees which will be discussed later in this report.

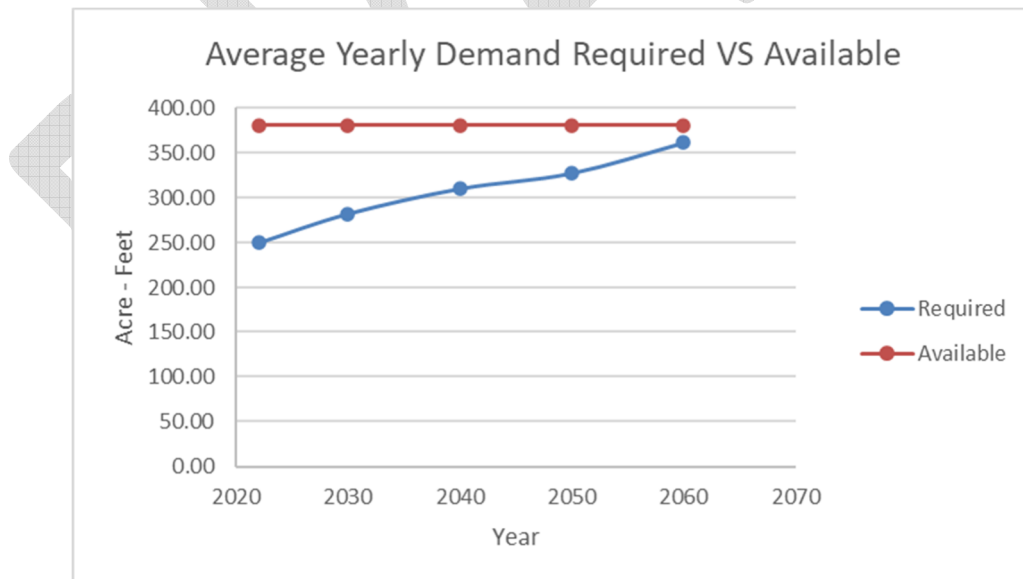


Figure 4-2 Projected Average Yearly Demand

4.2 Distribution System Requirements

4.2.1 Fire Flow

Marysvale Town has existing fire hydrants that cover all of the connections within town limits. Marysvale Town has its own fire department, which serves all of the users within the town boundaries. Typical fire flow requirements are 2,000 gpm for residential buildings. Ensign Engineering reached out to the local fire authority (John Christensen) for Marysvale Town to confirm the fire flow requirements. Per the local fire authority requirements, Marysvale Town is required to provide 1,500 gpm and maintain a minimum residual pressure of 20 pounds per square inch (psi) during peak day demand throughout the system.

4.2.2 State Requirements for Distribution System

The distribution system must be sized to meet three requirements. First, the system must be able to deliver fire flows (1,500 gpm) at a minimum pressure of 20 pounds per square inch (psi) during peak day demand throughout the system⁶. Second, the system must be able to deliver the estimated peak instantaneous demand at a minimum pressure of 30 psi. This is an estimate of the maximum amount of water that will be used in the system at one time. The peak instantaneous demand is two times the peak day demand for indoor use. Marysvale Town does not have daily usage data to determine the actual peak instantaneous demand and peaking factor so two was used as a conservative peaking factor value. Third, the system must be able to deliver the peak day demand and maintain a minimum pressure of 40 psi (see Table 4-5 below).

Table 4-5 State Requirements for Distribution System

Peak Day Pressure	40 psi
Peak Instantaneous Pressure	30 psi
Fire Flow Pressure	20 psi
Fire Flow Required	1,500 gpm

A hydraulic model of Marysvale Town's existing system was created and calibrated to determine whether the town is able to meet the existing distribution requirements. The results of the hydraulic model are included in the appendix. The same model was used to determine whether the town would be able to meet future distribution demands. The town provided input on where the system may experience added demands related to future growth and probable development. These results are also included in the appendix.

⁶ 1,500 gpm is based on the maximum flow the Big Water Fire Department is capable of producing.

4.3 Storage Sizing

For adequate storage sizing, the state requires that the town be able to provide 50% of the peak day source demand in the form storage. In addition, the storage should be sized according to the local fire authority, which requires 1,500 gpm of fire flow for two hours for residential connections. Based state requirement, Marysvale Town is required to provide 400 gallons per ERC of storage for peak day indoor use. Based on the consumptive use map zone, the town must be able to provide 1,873 gallons of storage per irrigated acre for outdoor peak day demand. As stated before, the estimated green space for Marysvale Town is 0.25 acres per connection. The State requirement for existing storage for Marysvale Town is 0.46 million-gallons. Marysvale Town currently provides 0.7 million-gallons of storage (see Table 4-6 Existing Storage Demands).

Table 4-6 Existing Storage Demands

Fire Storage	1,500 gal/min
Duration	2 hrs (120 min)
Indoor Storage Demand	400 gal/ERC
Existing ERCs	327
Outdoor Storage Demand	1,873 gal/irri acre
Irrigated Acres per Conn	0.25 acre/conn
Existing Connections	334.0
TOTAL REQUIRED	0.46 Million Gallons
TOTAL AVAILABLE	0.70 Million Gallons
ERCs AVAILABLE	276 ERCs

Based Marysvale Town’s projected growth and the future ERCs and connections, the future storage requirement for Marysvale Town is 0.59 million-gallons. Marysvale Town currently provides 0.7 million-gallons of storage (see Table 4-7 Future Storage Demands).

Table 4-7 Future Storage Demands

Fire Storage	1,500 gal/min
Duration	2 hrs (120 min)
Storage Demand	400 gal/ERC
Future ERCs	474
Outdoor Storage Demand	1,873 gal/irri acre
Irrigated Acres per Conn	0.25 acre/conn
Future Connections	484
TOTAL REQUIRED	0.59 Million Gallons

TOTAL AVAILABLE	0.7 Million Gallons
ERCs AVAILABLE	123 ERCs

Based on the projected storage demand, Marysvale Town will have sufficient storage to meet future storage requirements. However, some of the town’s existing tanks are beginning to fail and will likely need to be replaced with the next 10 - 15 years and would likely be replaced with a larger tank (see Figure 4-3).

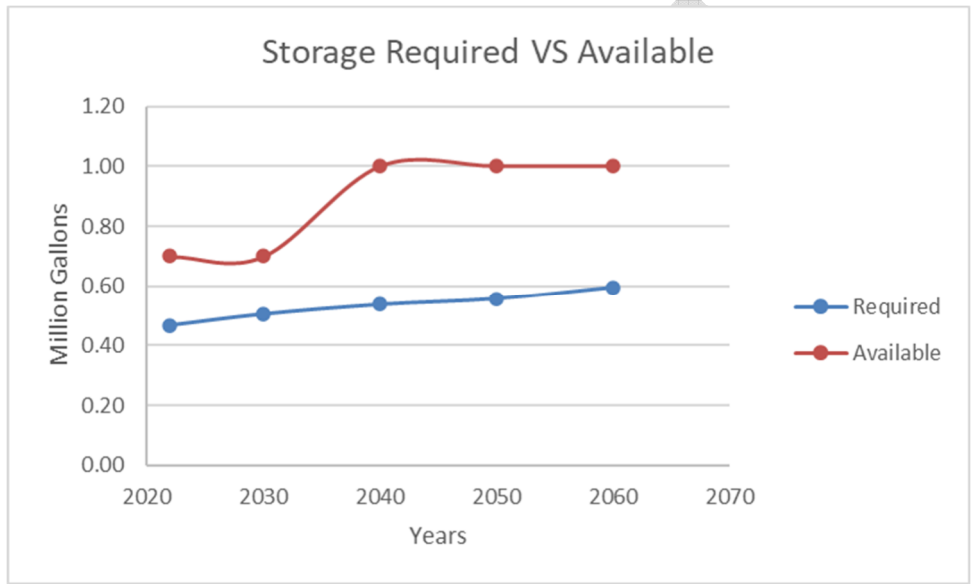


Figure 4-3 Available Storage vs Projected Storage Demand

Marysvale’s tanks are located at different elevations, the lower tanks are not able to provide water storage to upper pressure zones. Based on the tank elevations and the surveyed meters and fire hydrants, the system dependency on each tank could be determined. Currently, the Upper tank is able to provide water to 100% of the system, the Middle tank can provide water to 97% of the system and the Lower tanks can provide water to 76% of the system.

Based on the projected growth and areas of high potential growth within the town, the future tank dependency by the year 2060 is as follows: the Upper tank will be able provide water to 100% of the system, the Middle tank will be able to provide water to 91% of the system and the Lower tanks will be able provide water to 57% of the system.

SECTION 5
HYDRAULIC MODEL
METHODOLOGY AND ANALYSIS

5 HYDRAULIC MODEL METHODOLOGY AND ANALYSIS

5.1 Hydraulic Model Used

The distribution system computer model was developed in Bentley WaterCAD 2022 which allowed the water system to be graphically input into the program. Once the system pipes, and storage tanks were in the model, the attributes of each individual component were entered. The details included pipe material, length of pipes, elevation of the ends of each pipe, slope of each pipe. The storage tank location, size, and elevation were based on survey data collected by Ensign Engineering. Marysville Town water system was analyzed using the Hazen-Williams method. This method allowed for the head loss (friction loss) for each pipe, valve, and fitting to be calculated, and is a commonly used method for water system master planning. Once the model was fully developed, the existing, future and proposed systems were then analyzed to determine the current systems performance and assess problem areas and potential weaknesses as well as proposed solutions.

5.2 Hydraulic Model Input

The entire water system for Marysville Town was input into the Hydraulic Model. A summary of the pipe sizes is shown in Section 2 of this report. See Attached maps in Appendix for spatial locations of items input into model. Most of the pipes in the system are PVC and were assigned a Hazen-Williams coefficient of friction of 150.

The demand for the model and each node is the Total Demand (both indoor and outdoor) for Peak Day and Peak Instantaneous demands. Nodes were assigned to every intersection of pipe where a fire hydrant was nearby, as well as other locations that may be of concern. Each Node was assigned the demand according to how many ERCs would be serviced from said node. Each node received demands for Peak Day and Peak Instantaneous for existing conditions and for future demand requirements. The model was calibrated using field measured fire flows and pressures from fire hydrants.

5.3 Hydraulic Model Analysis

The existing system was analyzed according to the peak day demand (which included fire flow analysis), peak instantaneous demand, future peak day, future peak instantaneous demand scenarios. After identifying the problem areas in the system, proposed system improvements were incorporated to address the problem areas and future peak day (including fire flow) and peak instantaneous demand were analyzed again. Each of these scenarios were analyzed to see if the required pressures were maintained throughout the system and if any additional deficiencies were noticeable.

SECTION 6

HYDRAULIC MODEL RESULTS

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6 HYDRAULIC MODEL RESULTS

6.1 Existing System Model Results

Three different scenarios were ran in the model: first, peak day demand, second, fire flow, and third, instantaneous peak demand. To add these demands to the system, nodes were inserted at valve and fire hydrant locations with elevations and assigned ERCs. Peak day demand includes flows for both indoor and outdoor use and models how the system functions during peak demand months. The water system will function at or below peak day demand 80% of the time. Peak instantaneous demand is the highest water demand that the system will see during a year. Fire flows assumes a fire occurs during peak day demand and the design of a water distribution system is typically controlled by either peak instantaneous demand or fire flows. The model was calibrated based on an onsite fire flow test conducted on July 12, 2022. Maps of the existing system are shown in the maps located in the Appendix of this report. A table of individual node pressures and flows and a map showing node locations for all three scenarios is located in the Appendix as well.

The first scenario analyzed was peak day demand. A peak day demand of 800 gal per day per ERC was used. Peak day demand shows the pressures in the system that would occur for water demands during a peak day. Flows for the peak day demand are in gallons per day and match the peak day demands provided by the town (Reference Section 4 Water Demand Criteria). The resulting pressures from the peak day demand scenario are shown on drawing EX-202 and EX-203 Existing Peak Day Demand sheet in the Appendix. For peak day demand, the pressures in the system are in the acceptable range of greater than 40 psi. The average pressure for the system is 83 psi with a max pressure of 181 psi with a min of 30 psi. Some of the model nodes were located near the existing tank and therefore had lower pressures. These nodes were removed from the average calculation to better represent the actual system. Approximately 2% of the system does not provide peak day pressure, due to being located near the tank. A few of the nodes had pressures greater than 150 psi which can cause issues to the system over time.

The second scenario was for fire flows. Local fire authority requires a minimum flow of 1,500 gpm at a minimum pressure of 20 psi during a peak day demand and a max velocity through any pipe in the system of less than 10 feet per second. The purpose of these constraints is to insure that at the required fire flow, the system doesn't experience a negative pressure or vacuum at any location and to prevent damage to system as a result of high velocities and cavitation. If the fire flow available is within the 1,200 to 1,500 gpm range, or within 300 gpm of the required fire flow, these were considered acceptable, but cautionary. Drawing EX-204 and EX-205 shows the calibrated fire flow results. Based on the calibrated model results, minimum pressure and max velocity constraints, most of the existing system does not meet the required fire flow. The existing system has very long lines and undersized pipes which contributes to the lack of fire flow availability. The average fire flow from the calibrated model was 815 gpm. Approximately

5% of the system has the capacity to provide the required fire flow, with 8% being in the acceptable but cautionary range, and 87% of the system does not meet fire flow requirements.

The third scenario was for peak instantaneous demand. The peak instantaneous demand is in gallons per minute and is 2 times the peak day demand for indoor use and 2 times peak day demand for outdoor use. Marysville Town does not monitor their peak instantaneous usage and so it is difficult to determine the actual peaking factor for the system. The peaking factor of 2 is a conservative estimate and for this purpose was used for the town. The resulting pressure from the peak instantaneous demand scenario is shown in drawing EX-200 and EX-201 Peak Instantaneous Demand in the Appendix. In this scenario all pressures exceeded the minimum pressure constraint of 30 psi. The average pressure for the system is 82 psi with a max pressure of 180 and a minimum pressure of 29.

6.2 Future and Proposed System Model Results

The same scenarios were modeled on the existing system with the projected future demand. Based on the adjusted growth rate and future growth projections (see Section 3 above), Marysville Town will experience significant growth over the next 40 years. The majority of this growth was assumed to occur on the outskirts of town with a small portion occurring in town filling in vacant lots. Therefore, the majority of the future demands were added to the hydraulic model at nodes located on the outskirts of town. Obviously, as growth and development occur the existing system will grow and expand as well. However, it is difficult to determine exactly how and where that growth and development will occur. For that reason, the focus of the future hydraulic model is to determine how the existing system will perform with the added growth and increased demand and not to assume future development layouts and performance. The future model results proved to be similar in terms of peak day demand and peak instantaneous demand. However, since the existing system does not meet fire flow requirements, the fire flow would only get worse. Due to the increased flow, the model could not calibrate due to the size of the existing pipes and would not provide fire flow results. Because of this, fire flow was not analyzed for the future condition, but it can be assumed that the existing deficiencies would continue and would be amplified. The results of the model for the future system are included in the maps in the Appendix and are located on drawings EX-300, EX-301, EX-302, and EX-303.

Future peak day demand results show the pressures in the system are still in the acceptable range of greater than 40 psi. The average pressure for the system is 83 psi with a max pressure of 179 psi with a min of 30 psi.

Future peak instantaneous demand results show the pressures in the system are still in the acceptable range of greater than 30 psi. The average pressure for the system is 80 psi with a max pressure of 173 psi with a min of 29 psi.

6.3 Proposed System Recommend Improvements

There are several issues with the existing system that the Town will need to strategically address to improve the overall water distribution, and in particular the fire flow conditions. See section 8 for the proposed recommendations. These proposed recommendations have been modeled with the future demand scenario to analyze the impact of these recommendations and how they improved the system. See sheets EX-400 to EX-405 for model results for proposed recommendations.

The peak day results showed the pressures for the system are close to existing, however some of the higher-pressure nodes have been reduced. The average peak day pressure for the proposed recommendations is 84 psi, with a max pressure of 148 psi and a min pressure of 30 psi.

The peak instantaneous results showed the pressures for the system are close to existing conditions. The average peak instantaneous pressure for the proposed recommendations is 83 psi, with a max pressure of 146 psi and a min pressure of 30 psi

Fire flow results for the proposed recommendations show a large improvement from the existing conditions. The average fire flow for the system with the recommendations is approximately 1322 gpm. Approximately 41% of the system meet fire flow requirements, 23% of the system is in the cautionary category, and only 36% does not meet the requirements which is a substantial improvement to the system. The final recommendation in Section 8 is that the town replace all existing waterlines 6" and less with 8" water line. If these changes are made then 76% of the system would meet fire flow requirements and 92% of the system would be in the acceptable or good range.

6.4 Conclusion

Marysville Town's water system currently is providing sufficient pressure for all peak day and peak instantaneous scenarios within the system for all connections.

Based on the model, the main deficiency in the system is that fire flow is not met for most of the system. If the proposed actions are not implemented the system will not be able to provide proper fire protection to the town without risk of damaging their system in the process.

The town would still be able to provide the future peak day and future peak instantaneous demands which is good. However, the system will be unable to provide the required future fire flow protection to the vast majority of the system. The existing deficiencies of fire flow will remain unless further action is taken. The proposed actions to the existing system described in section 8 of this report were modeled and showed that these improvements satisfy the hydraulic requirements and improve the performance of the water system.

SECTION 7

WATER CONSERVATION PLAN

7 WATER CONSERVATION PLAN

7.1 Introduction

Water conservation plans are to be updated every five years. This water conservation plan is prepared to meet the Utah Board of Water Resources requirements and to address the goals of Marysvale Town. Water conservation is a key element to provide for future water needs. Conservation can delay the need for expensive water projects, preserve the environment, and save taxpayers money. It is necessary for the town to implement a water conservation plan in order to receive funds from various funding agencies.

The State of Utah has proposed a goal to reduce the per capita water demand of the public systems by 25% from 1995 to 2050. For the year 2021, the total water usage for Marysvale Town was 59 million gallons. On average, the existing water system delivers 484.20 gpd per connection and 365.89 gpd per capita.⁷ This value is more than double the average state usage of 167 gpd per capita. To meet the 25% reduction per capita, Marysvale Town would need to be at 274.41 gpd/capita which is still well over the state average. The purpose of this plan is to present a planning document for the town, which will guide its water conservation activities for the future to help achieve the 25% reduction requirement. Water conservation will benefit the town, the users, and the environment. The possible benefits include:

- Improved water service and more effective use of available water supply.
- Reduced operation and maintenance (O & M) costs, including lowering pumping costs.
- Development of additional water supply capabilities and diminished groundwater overdraft.
- Postponed need for new or expanded water supplies and infrastructure.
- Reduced impact of drought.

It is important to mention here that conservation can suppress water sales and lower water revenues. The revenue loss impacts can be mitigated by periodic rate adjustments if reduction occurs slowly. These adjustments would be handled similarly to operating cost increases and can be integrated into financial planning.

7.2 Water Conservation Goals

The town can reduce per capita consumption by promoting and expanding water conservation. Currently there are many homes that do not have landscaping, but as landscaping is added water consumption per capita will increase substantially. As conservation goals and standards are integrated within the town, increase in per capita consumption can be avoided.

The State of Utah has proposed a goal to reduce the per capita water demand of the public systems by 25% from 1995 to 2050. To achieve this Ensign proposes several conservation goals:

⁷ These values were computed using data from the period January 2019 through December 2019.

1. **Goal #1: Reduce current consumption per capita by 25% by the year 2050.** This would mean Marysvale Town would have to maintain per capita consumption below 167 gpd per capita. This can be accomplished by providing proper information to the community on good water conservation practices for both indoor and outdoor usage.
2. **Goal # 2: Maintain a financially viable water system.** This can be done by adopting a conservation-oriented rate structure. A conservation-oriented rate structure will have the largest effect on conservation.
3. **Goal #3: Promote xeriscaping for landscapes, open spaces and yards.** Improved irrigation practices and water-efficient landscaping can enhance the appearance of the town and save water. Also promote a town ordinance that prevents users from watering during the hotter times of day during the summer months.

7.2.1 Past Water Conservation Efforts

Marysvale Town has not adjusted their water rates in past thirteen years nor do they have separate rate structures based on connection type. Currently, all water connection regardless of connection type are billed based on a single tiered rate structure. Implementing aggressive rate structures based on connection type will deter users from using more excess water each month. This is one way the town could help conserve water and fund future water infrastructure project.

7.2.2 Water Conservation Efforts in Surrounding Communities

Kingston, Antimony, and Siguird have also implemented aggressive rate structures that deter users from using excessive water.

7.3 Recommended Water Conservation Measures for Marysvale Town

The latest water conservation measures are known as “Best Management Practices (BMPs)” and many of these measures are discussed in this section. The intent of all the measures is the same: to encourage utilities to use these measures as the cornerstone of their water conservation program. The following programs are proposed:

7.3.1 Rate Structure

Implementing an aggressive rate structure based on connection type. This will help with water conservation by deterring users from using an excessive amount of water.

7.3.2 Public Information Program

The water users of Marysvale should be informed of specific measures to establish or enhance a water conservation ethics among users. The programs could include:

- Poster contests.
- T-shirt design contests.
- Presentations and tours with hands-on demonstrations.
- Advertisements on the radio and television.

Printed educational material such as bill inserts (providing information on the customer's bills showing water usage for the last billing period compared to the same period the year before), and coordinating with other towns, agencies, industry groups, public interest groups, and the media. The following steps could be used to design a public information program:

- Develop a clean and persuasive statement of purpose.
- Choose an appropriate theme.
- Identify key target groups.
- Select citizens for a water conservation committee.
- Identify communication paths, resource materials, and volunteers.
- Design and implement specific campaigns.
- Ensure effective coordination and follow-through.

The program will target all customers inside and outside town boundaries. Part of the public information program is to choose a water conservation theme. Examples of possible themes and slogans are:

- Save Water.
- Use Water Wisely.
- Save Water, Save Money, Save Energy.
- Save Water, It's Your Future.
- Save Water Today for Tomorrow.
- Water is Life, Don't Waste It.

A program logo reflecting the theme then can be selected or use the State's existing logo. The image could be realistic, stylized, or a friendly caricature with a suitable name. This theme can be retained or modified as needed in the future.

7.3.3 Public/Consumer Education Program

Public education can ensure long-term water conservation. Through public involvement, people become more aware of the hydrologic cycle and the limitations nature places on water availability. Public education can provide examples of practical ways for more efficient use. This can result in public realization of the value of water, reasons to conserve water and the benefits of implementing long term water conservation efforts. Consequently, significant water use reductions can be achieved and more public support for the conservation program can be generated.

The town can develop plans for a consumer education program focusing on the need for water conservation, community water problems, and feasible alternatives. The potential for water conservation programs will be discussed, including the rationale behind proposed actions and monetary benefits to the customers.

The free distribution of water conservation kits consisting of leak detection dye tablets, shower and faucet flow restrictors and faucet aerators kits can assist in reducing indoor domestic water use.

A water conservation program will be initiated in institutions (such as public buildings) including a leak detection program, metering and refitting of public facilities with water saving devices, and training seminars for public employees.

Public education programs on water conservation prove to be the best way of bringing about substantial water savings. Long term, on-going programs will promote a conservation ethics, making people more receptive to the idea of reducing water use to conserve limited water resources.

7.3.4 Identify High Water Users

The high-water users should be identified. The high-water users should be approached with specific water conservation plans for their facilities.

7.3.5 Refitting Program with Water Saving Devices

A refitting program using water saving devices such as toilet displacement bottles, flow control-aerators and shower flow control should be planned. A pilot test program should be started before a large-scale program is begun.

7.3.6 Water Survey Programs for Single and Multifamily Residential Customers

The town could offer an indoor and outdoor water survey of single- and multi-family residential customers. Specific activities for each indoor and outdoor survey should include the following:

- Indoors
 - Check for leaks including toilets, faucets, and meter check.
 - Check flow rates for showerheads and faucets and offer to replace or recommend replacement with low flow models as appropriate.
 - Check toilet flow rates and offer to install or recommend installation of displacement devices or direct customer to Ultra Low Flush Toilet (ULFT) replacement program, as appropriate; replace leaking toilet flapper, as necessary.
- Outdoors
 - Check irrigation system and timer
 - Review or develop customer irrigation schedule in minutes of watering time per week for spring, summer, and fall.
 - Provide a rain shut-off device (optional)
 - Measure currently landscaped area (optional).
 - Measure total irrigation area (optional).

7.3.7 Conservation-Oriented Billing Rate Structures

Marysvale Town currently reads their meter monthly from April to September. The April reading is averaged over the previous 7 months. The town has a single tiered rate structure with a base rate of 20,000 gallons per connection and base rate of \$17.00 for all connections. After the base amount is used an average rate of \$0.35 per 1,000 gallons for the next 20,000 gallons. After 40,000 the rate increases to \$0.50 per 1,000 gallons for the next 10,000 gallons. Beyond 50,000 gallons the rate is \$1.00 per 1,000 gallons. This rate structure is extremely dated and does not promote water conservation. A water rate structure based on connection type and water conservation should be implemented. This would promote conservation by affecting users financially if water is used carelessly.

7.3.8 Landscaping Schemes with Low Water Consumption Rates

Since landscaping creates one of the greatest impacts on current water supplies, the town should promote water conservation through landscape planning by education and through the use of xeriscaping, the use of no- or low-water plants. See relevant Internet links. Xeriscaping has the greatest potential for water saving where new construction is involved.

7.3.9 High Efficiency Washing Machine Rebate

The town could start a rebate program to encourage residents using a more conservation-oriented higher-efficiency washing machine than their existing one. Front-loading washing machines typically use half as much water as top-loading machines. The town could set goals, criteria, objectives, and timetables for implementation of a program.

7.3.10 Linking With Useful Internet Sites

Marysvale Town could create an internet website that could be used for posting monthly community-wide water consumption, recommended lawn-watering rates and times, and other water conservation-related information. The town's website could display links to the following useful sites, which town residents could visit to learn about different strategies for water conservation.

- <http://extension.usu.edu/waterquality/htm/conservation>: Utah State University Extension provides many useful educational tools and links for water conservation.
- (<http://www.conservewater.utah.gov>): Utah Division of Water Resources site.
- (<http://utahrivers.org/2015/08/20/saving-water-tips/>): Utah River Council site. The site includes information on strategy to reduce water use, xeriscaping, other water conservation links and books on water conservation.
- (www.watereducation.utah.gov/conservation/default.asp): Sites for Water Conservation for Kids
- (<http://www.awra.org>): The American Water Resources District is an excellent source of water-related information and literature.
- (<http://www.slcgov.com/waterconservation>): Salt Lake Town conservation website.
- (<http://www.epa.gov/watersense>): How to Conserve Water and Use It Effectively (EPA).

7.3.11 The Water Conservation Checklist

The following list of 23 “Water Conservation Tips” could be posted to town’s bulletin to educate residents:

- **Check your toilet for leaks:** A leak in your toilet may be wasting more than 100 gallons of water a day. To check, put a little food coloring in your toilet tank. If, without flushing, the coloring begins to appear in the bowl, you have a leak. Adjust or replace the flush valve or call a plumber.
- **Stop using your toilet as a wastebasket:** Every time you flush a piece of lint, facial tissue or other small bit of trash down the toilet, you waste five to seven gallons of water.
- **Put one or two plastic bottles in your five-gallon or larger toilet tank:** Your toilet can flush just as efficiently with less water than it now uses. To cut down on waste, put an inch or two of sand or pebbles in each of one or two plastic quart bottles to weigh them down. Fill them with water, screw on the lid and put them in your toilet tank, safely away from the operating mechanisms. Better yet, replace your old toilet with a new low-flush toilet. They are readily available in a variety of styles and colors.
- **Take shorter showers:** Long hot showers waste five to ten gallons of water every unneeded minute. Limit your showers to the time it takes to soap up, wash down and rinse off.
- **Install water-saving shower heads or flow restrictors:** Most shower heads put out five to ten gallons of water each minute, while three gallons is actually enough for a refreshing cleansing shower. Your local hardware or plumbing supply store stocks inexpensive water-saving shower heads that you can install yourself. For even less money, you can purchase a small plastic insert that will limit flow through your present shower head.
- **Turn off the water after you wet your toothbrush:** After you have wet your toothbrush and filled a glass for rinsing your mouth, there is no need to keep water pouring down the drain. The savings are small but frequent, and the message you send your children or grandchildren is huge.
- **Rinse your razor in the sink:** Before shaving, partially fill your sink with a few inches of warm water. This will rinse your blade just as efficiently as running water, and far less wastefully.
- **Check faucets and pipes for leaks:** Even the smallest drip from a worn washer can waste 50 or more gallons of water a day. Larger leaks can waste hundreds of gallons a day, enough to supply a whole family.
- **Use your automatic dishwasher only for full loads:** Every time you run your dishwasher, you use about 25 gallons of water. Consider replacing your older model with a newer water- and energy-efficient dishwasher. You would be surprised at the savings.
- **If you wash dishes by hand, don't leave the water running for rinsing:** If you have two sinks, fill one with soapy water and one with rinse water. If you have but one sink, gather all the washed dishes in the dish rack and rinse them with an inexpensive spray device.
- **Don't let the faucet run while you clean vegetables:** You can serve the same purpose by putting a stopper in the sink and filling the sink with clean water.

- **Keep a jug of drinking water in the refrigerator:** This ends the wasteful practice of running tap water to cool it off for drinking.
- **Use your automatic washing machine only for full loads:** Your automatic washer uses 30 to 35 gallons of water in a cycle. That's a lot of water for three T-shirts. Consider replacing your older model with a newer water- and energy-efficient machine.
- **Plant drought-resistant trees and plants:** There are many beautiful trees and plants that thrive in Utah with far less watering than other species. See Appendix for lists of trees, shrubs, grasses and flowers that are suitable for our area, but require less water.
- **Put a layer of mulch around trees and plants:** A layer of mulch will slow the evaporation of moisture.
- **Use a broom to clean driveways, sidewalks and steps:** Using a hose to push around a few leaves and scraps of paper can waste hundreds and hundreds of gallons of water.
- **Don't run the hose while washing your car:** Soap down your car with a pail of soapy water. Then use a hose just to rinse it off.
- **Teach your children that your hose and sprinklers are not toys:** There are a few things more cheerful than the sound of happy children playing under a hose or sprinkler on a hot day. Unfortunately, there are also few things more wasteful of precious water.
- **Water your lawn and other plants only when they need it:** Watering frequently can be very wasteful as it doesn't allow for cool spells or rainfall that can reduce the need for watering. A good way to see if your lawn needs watering is to step on some grass. If the grass springs back up when you move, it doesn't need water. Look at links on the town's website for Agricultural Extension sites that provide lawn-watering guides, to make sure you are applying enough and only enough water on your landscaping.
- **Deep-soak your lawn:** When you do water your lawn, do it just long enough for water to seep down to the roots, where it won't evaporate quickly and where it will do the most good. A light sprinkling which sits on the surface, will simply evaporate and be wasted. In addition it encourages shallow inefficient root systems. A slow steady fall of water is the best way to irrigate your lawn.
- **Water during the cool parts of the day:** Less water is lost to evaporation when the ground and the air are cool. Early mornings are better than at dusk, since it helps preventing the growth of fungus.
- **Don't water the gutter:** Adjust your sprinkler patterns in such a way that water lands on your lawn or garden, not on concrete or asphalt, where it does no good. Avoid watering on windy days when much of your water may be carried off before it ever hits the ground.
- **Check for leaks in pipes, hoses, faucets and couplings:** Leaks outside the house may not seem as unbearable since they don't mess up the floor or drive you crazy at night. But they can be just as wasteful as leaks in the line from the water meter, even more wasteful. Excess watering and leaks around foundations can cause subsidence and damage walls.

7.3.12 Additional Best Management Practices (BMPs) as Conservation Measures

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In addition to the water conservation measures that the town currently employs, the following best management practices (BMPs) are recommended (Utah's M & I Water Conservation Plan, July 2003):

- BMP 1 – Water Conservation Ordinances
 - Adopt an ordinance requiring water-efficient landscaping which include irrigation system efficiency standards and an acceptable plant material list.
 - Adopt an ordinance prohibiting the general waste of water. Then encourage citizens to call in reports of any water running down the street, so that leaks can be identified, and owners notified for repair action.
- BMP 2 – Water Conservation Coordinator
 - Designate a water conservation coordinator to facilitate water conservation programs.
- BMP 3 – System Water Audits, Leak Detection and Repair
 - Set specific goals to reduce unaccounted for water to an acceptable level.
 - Set standards for annual water system accounting that will quantify system losses and trigger repair and replacement programs, using methods consistent with American Water Works Town's Water Audit and Leak Detection Guidebook.
- BMP 4 – Large Landscape Conservation Programs and Incentives
 - Encourage all large landscape facility managers and workers to attend specialized training in water conservation.
 - Provide outdoor water audits to customers with large amenity landscapes.
- BMP 5 – Water Survey Programs for Residential Customers
 - Implement residential indoor and outdoor water audits to educate residents on how to save water.
- BMP 6 – Plumbing Standards
 - Review existing plumbing codes and revise them as necessary to ensure water-conserving measures in all new construction.
 - Identify homes, office building and other structures built prior to **1992** and develop a strategy to require, distribute or install high-efficiency plumbing fixtures such as ultra low-flow toilets, showerheads, faucet aerators, etc.
- BMP 7 – Conservation Programs for Commercial and Agricultural users.
 - Change business license requirements to require water reuse and recycling in new commercial and industrial facilities where feasible.

- Provide comprehensive site water audits to those customers known to be large water users. Install separate meters for secondary irrigation water.
- BMP 9– Reclaimed Water Use
 - Use reclaimed or recycled water where feasible.
 - Encourage or enforce water-wise landscaping.

7.4 Progressive Water User Rates to Achieve Conservation

A recent completed study by the Utah Town of Conservation Districts with the Utah Division of Water Resources, Utah State University Center for Water Efficient Landscape and USU Extension investigated using an “increasing block” price structure. The study found significant reductions in water usage when an increasing price block was used with a base fee. The town’s current rate structure follows the states recommendations. The town’s current Water Rate Schedule is shown in Table 9-1 Current Water Rate Structure and described above.

Currently, the average monthly bill in Marysville Town is approximately \$21.62. Which is only 45% of the maximum affordable water bill recommended by the State. The average monthly bill should promote water conservation. The assumption for the rates is that the majority of water users will not want their bills to increase and will reduce their water use to keep the cost the same under the new rate schedule. To keep their water bill from increasing, users will have to use less water by reducing the amount of area that is irrigated.

It is likely that as Marysville Town continues to grow, they will see an increase in outdoor use from culinary water rather than secondary. Marysville Town can help assure that there is sufficient water for future residents by promoting aggressive outdoor conservation. Using a more conservation minded rate schedule will push water users to landscape more efficiently, using xeriscaping and drought resistant grass. The reductions do not have to occur immediately but can take place over a period of time to allow users to adjust to the conservation rates. Conservation is the least expensive means of assuring there will be sufficient water for future needs.

7.5 Water Conservation Program to Meet Goals

To ensure that the water conservation goals outlined in this report are achieved, the town should plan to participate in the following programs in the future.

- Public Information and Education Campaign
- Water Conservation Demonstration Garden
- Model Water-Efficient Residential and Commercial Landscape Ordinances
- Ultra-Low Flush Toilet Replacement Program
- Residential, Commercial and Industrial Water Audits
- Water-Wise Landscaping Classes
- Large Water User Workshops

- Water Quest: Saving Water by the Yard
- Town Facilities Re-Landscaping
- Water-Wise Landscape Awards
- Member Agency Assistance Program
- Water Conservation Plan Update
- Efficient use of surface water to reduce pumping groundwater.

7.6 Water Conservation Plan Implementation Considerations

Water conservation planning is a good investment for the Town. The cost to develop an equivalent amount of water, treat it, and deliver it to residents is likely to be much higher.

7.7 Staffing

If these responsibilities have not already been assigned, they would need to be given to a member or members of the current staff to conduct the following tasks:

- Implement public information program as described above.
- Conduct leak detection and repair.
- Coordinate water conservation program.

7.8 Method to Track Water Conservation Progress

The town should implement the following procedure to track water conservation progress:

- After first year of water conservation campaign, the town will compare monthly water supply data for each category of usage.
- The water supplied data and metered data will be compared to identify any leaks in the system. The detection and repair of the leaks will assist in estimating actual volume of water conservation.

Add more conservation measures when and if necessary.

SECTION 8
PROPOSED SYSTEM
IMPROVEMENTS

8 PROPOSED SYSTEM IMPROVEMENTS

8.1 System Recommendations

Marysville Town currently meets the State requirements for peak day demand for source production. However, the town is right at the limit for the existing source's production and cannot provide adequate source for the immediate future. Over the past four years, the town has enacted a building moratorium due to the limited available source production. In addition, because the town's well is only equipped to provide water to the lower two tanks, if the town's spring should ever go down, approximately 24% of the system would be without out water. It is recommended that the town develop an additional source at the top of the system to meet the immediate and future peak day demands.

The town did drill a well in 2012 located at Firemen's Park up Bullion Canyon. The well was never brought into production because of issues with the surface seal. Further investigation of the well log showed that the total depth of the well was 340 feet. During the test pumping of the well the well was pumped at 350 gpm and experienced a drawdown of 300 feet, indicating that the well, as is, would be a very poor producing well. It is recommended that the town abandon this well and salvage what parts they can to drill a new well. There is currently power to the site and a pump installed in the well column that could be utilized. These are typically significant expenses when drilling a well. If the town could drill another well in proximity to the Fireman's Park well, the town could salvage the power source and pump from the existing well to make the proposed well more economical.

Marysville Town has a total of four concrete water tanks with a combined storage of 0.7 million gallons. All four tanks are above ground. Three of the four tanks have visible cracking/spalling on the lids as well as some sagging. The tanks are configured in series at varying elevations. Due to the tanks having been constructed at varying elevations, if the lower two tanks had to be taken off line, the remaining two tanks would not be able to meet the existing peak day plus fire flow demands. In addition, if the upper two tanks were to be taken off line, the lower tanks would be unable to provide water to the upper zones, approximately 24% of the system. It is recommended that the town construct a new 0.5-million-gallon water tank near the existing middle tank. The tank would provide storage to meet future demands as well as allow the town to take the existing tanks off line as needed for extended maintenance.

Marysville Town was unable to provide any as built drawings for the water distribution system. The distribution system that was modeled based off of the system modeled in the 1999 Water Master Plan done by Jones and DeMille Engineering and past water operators' knowledge. Based on the amount of uncertainty in relation to the system characteristics, conflicting model results and infield fire flow tests, it was determined that the town is experiencing issue with their pressure reducing valves (PRVs). As a first step in addressing the distribution system issues, it is

recommended that the town reconfigure their PRV stations and pressure zones. This will resolve several of the low flow and pressure issues witnessed during infield fire flow tests.

Based off of the hydraulic model, the town meets peak day demand and peak instantaneous demand. However, only 5% of the existing system meets the required fire flow demands. One concern with the hydraulic model results is that the hydraulic model assumes the PRVs are functioning properly. Due to the issues with the existing PRVs, the model was never able to be calibrated exactly which does create some uncertainty with the model results. Based off of the low flows and pressures experienced during the infield fire flow test, it is likely that the town is experiencing issues with peak day and peak instantaneous demands. Even with the uncertainty in the model, the fire flow issues were apparent in both the model and the field test fire flows. It is recommended that the town upsize certain pipes as well as loop existing dead-end lines were feasible. As a fix all fire flow solution, the town should replace all pipes 6-inch diameter and smaller.

The above recommendations have been prioritized below. In addition, a more detailed description of each recommendation has also been provided.

8.1.1 1st Priority-PRV Replacement

Marysvale Town's existing distribution system has a total of six PRVs. PRVs are typically equipped with a high flow/low flow configuration to allow the PRV to regulate pressures during a wide range of flow demands. Marysvale's existing PRVs are not equipped with a high flow/low flow configuration which results in massive head-loss during high flow demands. During the infield fire flow tests, pressures of near or below 0 psi were encountered often times at less than 50% of the expected fire flow. This occurred in several locations throughout the system. As mentioned before, the town was unable to provide as built drawings for the system but based on the information that was provided and the hydraulic model, the system should have been capable of performing better than the fire flow tests indicated. The town currently has a 6-inch and 8-inch line that parallel each from the upper tank. The 6-inch line is used as a "high pressure transmission line" and feeds directly into town. The 8-inch line is used as distribution line for users in the upper zone and feeds the middle and lower tanks. Past water operators indicated that the high and low pressure lines had been interconnected at various location to assist with low pressures in some areas, potentially bypassing existing PRVs. Because the locations of these interconnections are not known or documented it is recommended that town purposefully interconnect the existing high pressure and lower pressure lines, remove the existing PRVs and install new PRVs with the high flow/low flow configuration. This would require removing all six exiting PRVs, interconnecting the existing high pressure and low-pressure lines and installing four new PRV's.

The total estimated cost for the PRV replacement is \$354,000.00 (see cost estimate table 8-1 below).

8.1.2 2nd Priority- Source Development

The combined source production for Marysville Town is sufficient to meet the towns peak day source demand. However, because over 50% (225gpm) of their source is provided by the Rodeo Grounds well and the well is only equipped to provide water to the lower tanks, there is the potential that 24% of the town could be without water if the springs were to be taken off line. In addition, the town would be unable to provide the peak day demand for the remaining 76% of the system with the well alone. In contrast, if the well were to be taken off line, the town would still be able to provide water to the entire system but would not meet peak day demands. In addition, the well does have an approved surface seal. Division of Drinking Water has allowed the town to use the well as an emergency source. However, the town relies on it quite heavily in peak summer months. It is recommended that the town acquire an additional 300 gpm of source via spring or well located near the top of their system.

The total estimated cost for the source development is \$970,000.00 (spring), or \$1,279,000.00 (well), see cost estimate Table 8-2 below.

8.1.3 3rd Priority – 0.5 Million Gallon Storage Tank

Marysville Town has a total of four concrete tanks with a combined storage of 0.7 million gallons. The combined storage meets the peak day plus fire flow storage demand. However, because the tanks are at different elevations, if the lower tanks were to be taken off line for maintenance, the upper two tanks would not have the storage capacity to meet the peak day plus fire flow storage demand. In contrast, if the upper tanks were taken off line for maintenance, the lower tanks would not have the storage capacity to meet the peak day plus fire flow demand, nor would it be able to provide water to approximately 24% of the towns system fed by the upper tanks. These are concerns due to the fact that three of the four tanks show cracking, spalling, lid sagging, and other signs of failure. Based on the elevations of the tanks and the existing services, water storage to 97% system can be provided at the middle tank location. In addition, the town owns a parcel of land in close proximity to the existing middle tank where they could potentially add more storage. It is recommended that the town construct a new 0.5 million gallon concrete storage tank near the middle tank.

The total estimated cost for the 0.5 million gallon concrete storage tank is \$2,138,000.00 (see cost estimate Table 8-3 below).

8.1.4 4th Priority – Fire Flow Improvements Option A

Marysville Town is only able to provide fire flows to 5% of their existing system. This is due to a combination of poor PRV performance, small pipe diameters, and long dead-end section of pipe. Once the town has addressed the PRV issues recommended above, it is recommended that the

town begin to target section of small diameter pipe to be replaced. In addition, the town should look for opportunities to eliminate long dead-end sections by looping the system. The proposed distribution improvements can be seen in the exhibit section of the appendix. To address the small pipe diameters and dead-ends section, the town will need to install approximately 20,600 liner feet of 8-inch pipe. These improvements will allow the town to provide fire flow to 65% of the system.

The total estimated cost for the Fire Flow Improvements – Option A is \$1,900,000.00 (see cost estimate Table 8-4 below).

8.1.5 5th Priority – Fire Flow Improvements Option B

In order for the town to meet fire flow requirements throughout the system, they would need to make the recommended PRV improvements as well as eliminate long dead-end sections as recommended above and replace all 6-inch and smaller pipes within town. This would require installing approximately 32,755 liner feet of 8-inch diameter pipe.

The total estimated cost for the Fire Flow Improvements – Option B is \$4,973,000.00 (see cost estimate Table 8-5 below).

8.1 Funding Options

Funding for these improvements can be obtained from the funds collected from billing and through loans and grants from various funding agencies. A cost estimate for the recommended improvements is shown in Tables 8-1 and 8-5.

8.1.1 Owner Funded

If the town chose to pursue any of the recommended projects, they would need to adjust their rate schedule. The recommend rate structure to fund the proposed improvements will be discussed in Section 9 of this report.

8.1.2 Funding Agencies

There are many different funding agencies available for the town to receive financial help to complete these projects. This water master plan report will provide the necessary information when submitting applications and preparing reports to receive funding. Agencies include: United States Department of Agriculture Rural Utility Service (USDA RUS), and Division of Drinking Water.

To address the town's source issues, it is recommended that the town pursue a USDA Emergency Community Water Assistance Grant (ECWAG). USDA-ECWAG grants are used to

redeveloped water source that have been impacted by the current drought. These funds can only be used to redevelop an existing source whether that be a well or a spring. The town could use these funds to redevelop the Fireman's Park well up Bullion Canyon. While this well is not currently in production due to issues with the surface seal, it may still qualify for the ECWAG funding. ECWAG offers up to a million dollars in funding and is typically very favorable if the town can provide evidence of a drop in source production. ECWAG funding packages still require a contribution from town but are typically more grant than loan.

To address the storage issues, it is recommended that the town pursue funding from the Division of Drinking Water (DDW). DDW offers funding packages based on need and the town's average monthly water bill. Given the condition of the towns existing tanks and their inability to provide the required water to the entire system, the need for a new tank is warranted. Typically, DDW likes to see the average monthly water bill at around 1.75% of the Mean Annual Gross Income (MAGI), this is discussed in greater detail in Section 9. Marysvale Town, is currently at 0.43% of their maximum affordable water bill. DDW would likely offer a funding package that would force the town to raise their rates via loan repayment to an average monthly water bill of close to 1.75% of their MAGI. This is not to say that the funding offer would be all loan, but it could likely be more loan than grant. In addition, DDW typically does not fund projects whose primary objective is to address fire flow issues. For this reason, it is recommended that the town couple their distribution projects with the storage tank project to optimize the potential grant amount being offered.

Table 8-1 1st Priority – PRV Replacement

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
1ST PRIORITY - PRV REPLACEMENT					
001	Mobilization	1	LS	\$ 60,000.00	\$ 60,000.00
002	Remove Existing Pressure Reducing Valves	6	EA	\$ 7,500.00	\$ 45,000.00
003	Install New 8" Pressure Reducing Valve and Concrete Vault	2	EA	\$ 45,000.00	\$ 90,000.00
004	Install New 6" Pressure Reducing Valve and Concrete Vault	2	EA	\$ 35,000.00	\$ 70,000.00
Sub-Total					\$ 265,000.00
	Engineering Design/Survey	1	LS	\$ 30,000.00	\$ 30,000.00
	Construction Management	1	LS	\$ 12,000.00	\$ 12,000.00
	Legal and Bonding	1	LS	\$ 20,000.00	\$ 20,000.00
	Construction Contingency 10%	1	LS	\$ 26,500.00	\$ 26,500.00
	Environmental Assessment	0	LS	\$ 60,000.00	\$ -
TOTAL (ROUNDED)				\$	354,000.00

Table 8-2 2nd Priority – Source Development

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2ND PRIORITY - SPRING SOURCE DEVELOPMENT					
001	Develop New Spring Source	1	EA	\$ 750,000.00	\$ 750,000.00
Sub-Total					\$ 750,000.00
	Engineering Design/Survey	1	LS	\$ 75,000.00	\$ 75,000.00
	Construction Management	1	LS	\$ 25,000.00	\$ 25,000.00
	Legal and Bonding	1	LS	\$ 20,000.00	\$ 20,000.00
	Construction Contingency 10%	1	LS	\$ 75,000.00	\$ 75,000.00
	Environmental Assessment	1	LS	\$ 25,000.00	\$ 25,000.00
TOTAL (ROUNDED)				\$	970,000.00

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2ND PRIORITY - WELL DEVELOPMENT					
001	Mobilization	1	LS	\$ 75,000.00	\$ 75,000.00
002	Drill 6" Diameter Test Hole	900	LF	\$ 50.00	\$ 45,000.00
003	Ream Test Hole to 16" Diameter	900	LF	\$ 75.00	\$ 67,500.00
004	Install 12" Diameter Production Casing	100	LF	\$ 200.00	\$ 20,000.00
005	Install 8" Diameter Mild Steel Casing	650	LF	\$ 175.00	\$ 113,750.00
006	Install 8" Diameter Perforated Mild Steel Casing	250	LF	\$ 175.00	\$ 43,750.00
007	Install 110' Grouted Surface Seal	50	CF	\$ 176.00	\$ 8,800.00
008	Install 1/4" Gravel Pack Filter Media	350	CF	\$ 177.00	\$ 61,950.00
009	Install 2" Gravel Feed Tube	360	LF	\$ 178.00	\$ 64,080.00
010	Install 1.5" Sounding Tube	750	LF	\$ 179.00	\$ 134,250.00
011	Construct Well Building	1	LS	\$ 200,000.00	\$ 200,000.00
012	Install Well Building Plumbing	1	LS	\$ 70,000.00	\$ 70,000.00
013	Step Test	12	HR	\$ 300.00	\$ 3,600.00
014	Constant Rate Test	24	HR	\$ 300.00	\$ 7,200.00
015	Water Samples	2	EA	\$ 500.00	\$ 1,000.00
016	Install Existing Pump	1	LS	\$ 25,000.00	\$ 25,000.00
017	Install SCADA	1	LS	\$ 45,000.00	\$ 45,000.00
Sub-Total					\$ 985,880.00
	Engineering Design/Survey	1	LS	\$ 100,000.00	\$ 100,000.00
	Construction Management	1	LS	\$ 50,000.00	\$ 50,000.00
	Legal and Bonding	1	LS	\$ 20,000.00	\$ 20,000.00
	Construction Contingency 10%	1	LS	\$ 98,588.00	\$ 98,588.00
	Environmental Assessment	1	LS	\$ 25,000.00	\$ 25,000.00
TOTAL (ROUNDED)				\$	1,279,000.00

Table 8-3 3rd Priority – 0.5 Million Gallon Concrete Storage Tank

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
3rd PRIORITY - 0.5 MILLION GALLON CONCRETE TANK					
001	Mobilization	1	LS	\$ 150,000.00	\$ 150,000.00
002	Site Preparation	1	LS	\$ 25,000.00	\$ 25,000.00
003	Construct 0.5 Million Gallon Concrete Tank	1	LS	\$ 1,500,000.00	\$ 1,500,000.00
Sub-Total					\$ 1,675,000.00
	Engineering Design/Survey	1	LS	\$ 175,000.00	\$ 175,000.00
	Construction Management	1	LS	\$ 75,000.00	\$ 75,000.00
	Legal and Bonding	1	LS	\$ 20,000.00	\$ 20,000.00
	Construction Contingency 10%	1	LS	\$ 167,500.00	\$ 167,500.00
	Environmental Assessment	1	LS	\$ 25,000.00	\$ 25,000.00
TOTAL (ROUNDED)				\$	2,138,000.00

Table 8-4 4th Priority – Fire Flow Improvements Option A

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
4th PRIORITY - FIRE FLOW OPTION A					
001	Mobilization	1	LS	\$ 150,000.00	\$ 150,000.00
002	Install 8" C900 DR18 PVC Pipe	20,600	LF	\$ 45.00	\$ 927,000.00
003	Reconnect Existing Services	10	EA	\$ 3,000.00	\$ 30,000.00
004	Roadway Patch - 3" Asphalt & 8" Base (5' Wide Trench)	29,500	SF	\$ 5.00	\$ 147,500.00
005	Import Trench Fill Under Roadways (130 lbs/cf)	4,000	TN	\$ 20.00	\$ 80,000.00
006	Import Pipe Bedding (110 lb/cf)	11,330	TN	\$ 15.00	\$ 169,950.00
Sub-Total					\$ 1,504,450.00
	Engineering Design/Survey	1	LS	\$ 150,000.00	\$ 150,000.00
	Construction Management	1	LS	\$ 50,000.00	\$ 50,000.00
	Legal and Bonding	1	LS	\$ 20,000.00	\$ 20,000.00
	Construction Contingency 10%	1	LS	\$ 150,445.00	\$ 150,445.00
	Environmental Assessment	1	LS	\$ 25,000.00	\$ 25,000.00
TOTAL (ROUNDED)				\$	1,900,000.00

Table 8-5 5th Priority – Fire Flow Improvements Option B

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5th PRIORITY - FIRE FLOW OPTION B					
001	Mobilization	1	LS	\$ 150,000.00	\$ 150,000.00
002	Install 8" C900 DR18 PVC Pipe	32,755	LF	\$ 45.00	\$ 1,473,975.00
003	Reconnect Existing Services	250	EA	\$ 3,000.00	\$ 750,000.00
004	Roadway Patch - 3" Asphalt & 8" Base (5' Wide Trench)	163,775	SF	\$ 5.00	\$ 818,875.00
005	Import Trench Fill Under Roadways (130 lbs/cf)	21,300	TN	\$ 20.00	\$ 426,000.00
006	Import Pipe Bedding (110 lb/cf)	18,015	TN	\$ 15.00	\$ 270,225.00
Sub-Total					\$ 3,889,075.00
	Engineering Design/Survey	1	LS	\$ 325,000.00	\$ 325,000.00
	Construction Management	1	LS	\$ 150,000.00	\$ 150,000.00
	Legal and Bonding	1	LS	\$ 20,000.00	\$ 20,000.00
	Construction Contingency 10%	1	LS	\$ 563,915.88	\$ 563,915.88
	Environmental Assessment	1	LS	\$ 25,000.00	\$ 25,000.00
TOTAL (ROUNDED)				\$	4,973,000.00

SECTION 9

WATER USAGE & REVENUE-USER RATES & CONNECTION FEES

9 WATER USAGE & REVENUE-USER RATES & CONNECTION FEES

9.1 Purpose of Study

This water rate study analyzes the revenue from water user rates and recommends modifications that should be made to Marysville Town's water user rates to enable the town to continue to serve water to their customers. This study projects operating expenses and debt service and determines the rates to produce operating revenues required to properly offset these expenses. Based upon the Water Master Plan Report (see previous Sections), the town needs to plan for future capital improvements. These improvements will address source issues and improve distribution facilities to support the future growth and serve existing customers.

The *AWWA Manual of Water Supply Practices M1* describes seven objectives that are common to most water utilities. Marysville's water rate structure was analyzed according to these objectives which are listed below.

- Yielding necessary revenue in a stable and predictable manner
- Minimizing unexpected changes to customer bills
- Discouraging wasteful use and promoting justified uses
- Promoting fairness and equity
- Avoiding discrimination
- Maintaining simplicity, certainty, convenience, feasibility, and freedom from controversy
- Compliance with all applicable laws

This rate study is prepared as a part of this Water Master Plan Report but can be extracted to stand alone to satisfy State requirements. Based upon the recommended capital improvements from the master planning process, several capital improvements have been identified. To finance these proposed projects, this study determined the indebtedness that will be incurred, and the annual operating and capacity revenues that will be required to offset projected operational and capital expenditures.

9.2 Study Assumptions

The basis of this study is the Capital Improvements Plan. The following were assumed in order to complete this study:

Growth and Capital Improvements:

- Equivalent Residential Connections (ERCs) will be added to the system annually beginning in FY2022 as predicted by the Governor's Office of Planning and Budget's

population forecast. Assumed growth were also considered in the section as explained in previous section.

- New accounts will contribute operational revenue for six months of the first fiscal year of their existence and for 12 months per year thereafter.
- The town's preference of financing capital projects is grants, followed by cash reserves, and finally debt.
- Marysvale Town reads water meters monthly from May – September, meter readings from October - April are averaged over the 7 months period.

The following were used as bases for this study and are included in the appendix:

- Resolutions outlining water user rates and impact fees
- 2021 Water usage records from the town.

Ensign researched the town's current water rate structure based on 2021 usage records, and looked at various rate structures, selected and recommend a method of analysis. After research into the standard American Water Works Association (AWWA) methods of structuring a rate schedule, it was determined that the town's current rate structure format is deficient in terms of variable rates based on connection type and location (in town limits vs outside town limits). In addition, the rate structure has not been adjusted in the last 15-20 years. The current rate structure consists of base rate and three different tiers based on the amount of water consumption regardless of connection type or location.

9.3 Disclosure Statement

Numerous assumptions were made to project future revenue, expenses, and debt for Marysvale Town over the length of the study period for this rate study. These assumptions were based on several documents and sources, including those listed at the beginning of the master plan. Several factors may influence the projected revenue, expense, and debt of the town's Water Budget. These include:

- The interest rate on bond issuances;
- The actual number, type, and schedule of additional accounts during the study period;
- Unforeseen regulatory and water quality requirements;
- Abnormal weather that affects water consumption and irrigation;
- Projected expenses, such as utility, permitting, and pumping costs;
- Variation in the population projections: and the possible reaction, and changing conservation practices of existing customers in response to rises in water rates;

The financial projections presented in this report, may prove inaccurate as time passes and should be reviewed in comparison to the changes in the above factors.

9.4 Description of Current Water Rates

Water usage charges for Marysvale Town are based on the current water rate schedule and usage records from 2021. Table 9-1 Marysvale Town Rate Structure shows the town’s current water rate structure. The rate structure is a tiered rate structure. This type of rate structure can, when properly designed, incentivize conservation.

Table 9-1 Marysvale Town Rate Structure

Marysvale Town Rate Structure			
Schedule	Gallons/Month	Charges	Revenue
Tier 1 (Base)	0 - 20,000	\$17.00	\$17.00
Tier 2	20,001 – 40,000	Tier 1 + \$0.35/1,000 gal	\$24.00
Tier 3	40,001 – 50,000	Tier 2 + \$0.50/1,000 gal	\$29.00
Tier 4	50,001 – Above	Tier 3 + \$1.00 /1,000 gal	

9.5 Monthly Bill

9.5.1 Average Monthly Bill

Based on 2021 water usage records, the average monthly bill for all users is \$21.62.

9.5.2 Maximum Affordable Water Bill

The Division of Drinking Water determines funding and grant eligibility based upon the State Average Water Bill and an entities average water bill compared to what the state deems to be a “maximum affordable water bill” for the water system. This is calculated as 1.75% of the local MAGI (Median Adjusted Gross Income) for the service area. The MAGI is taken from the most recent data from the Utah State Tax Commission. It was determined that:

1. The State Average Water Bill is \$47.03
2. The MAGI during 2020 for Marysvale is \$32,900
 - a. The “maximum affordable monthly water bill” = 1.75% of \$32,900 / 12 months = \$47.97

9.6 Water Rate Comparison

The current Marysvale Town water rate structure was compared to existing rate schedules of nearby communities. Some neighboring communities have created a separate rate structure for residents living outside town limits to help recoup lost property taxes. An alternative to this would be to require all future connection outside town limits to annex into the town before a

water connection would be granted. This would remove the incentive to live outside town limits as well as simplify the billing process.

Table 9-2 Water Rate Comparison

Kingston Town Water Rate Structure			
Schedule	Gallons/Month	Charge	Revenue
Tier 1 (Base)	0 - 20,000	\$30.50	\$30.50
Tier 2	20,001 - 30,000	Tier 1 + \$1.00/1,000 gal	\$40.50
Tier 3	30,001 – 40,000	Tier 2 + \$1.25/1,000 gal	\$53.00
Tier 4	40,001 – 50,000	Tier 3 + \$1.50/1,000 gal	\$68.00
Tier 5	50,001 – 100,000	Tier 4 + \$1.75/1,000 gal	\$155.50
Tier 6	100,000 - Above	Tier 5 + \$2.00/1,000 gal	

Circleville Rate Structure			
Schedule	Gallons/Month	Charges	Revenue
Tier 1 (Base)	0-20,000	\$33.00	\$33.00
Tier 2	20,001 and above	Base + \$0.45/1000 gal	

Sigurd Town			
Schedule	Gallons/Month	Charges	Revenue
Tier 1 (Base)	0 to 17,000	\$49.00	\$49.00
Tier 2	17,001 to 50,000	Tier 1 + \$1.35/1,000 gal	\$93.55
Tier 3	50,001 to 100,000	Tier 2 + \$1.65/1,000 gal	\$176.05
Tier 4	100,001 and above	Tier 3 + \$2.00/1,000 gal	

Junction Town			
Schedule	Gallons/Month	Charges	Revenue
Tier 1 (Base)	0 to 15,000	\$25.00	\$25.00
Tier 2	15,001 to 30,000	Tier 1 + \$0.75/1,000 gal	\$36.25
Tier 3	30,001 to 50,000	Tier 2 + \$1.25/1,000 gal	\$61.25
Tier 4	50,001 to 100,000	Tier 3 + \$1.75/1,000 gal	\$148.75
Tier 5	100,001 and above	Tier 4 + \$2.25/1,000 gal	

Panguitch City			
Schedule	Gallons/Month	Charges	Revenue
Tier 1 (Base)	0 to 12,000	\$29.20	\$29.20
Tier 2	12,001 and above	Tier 1 + \$1.00/1,000 gal	

It can be difficult to see exactly how the different rates compare due to the differing tiers and rates so to draw a more accurate comparison the above water rates were compared at an assumed usage of 50,000 gallons. Table 9-3 shows how much each community would charge based on their respective rates for 50,000 gallons of water.

Table 9-3 Rate Comparison for 50,000 gallons

Town	Water Usage Gallons	Estimated Bill
Kingston	50,000	\$ 68.00
Circleville	50,000	\$ 46.50
Sigurd	50,000	\$ 93.55
Junction	50,000	\$ 61.25
Panguitch	50,000	\$ 67.20
Marysvale	50,000	\$ 29.00

9.7 Proposed Water Rate Structures

Based off of the 2021 water usage data, Marysvale Town’s average water bill is \$21.62 per user. This is 43% of the maximum affordable water bill based off of Marysvale’s MAGI. Based on the 2021 Utah State Auditors Report, after operating and maintenance expenses, Marysvale Town loses \$20,778 per year with the existing rate structure.

If the Marysvale Town were to pursue a funding package to fund a project, it is assumed they would receive a combination grant loan. The grant to loan amount varies for each of the proposed projects based on need and cost of the project. Given the town’s current financial situation, it is assumed the town would receive a 60% grant and 40% loan for 40 years at 2.5%. This results in annual loan payments as shown in the Table 9-4 Project Cost Summary below.

Table 9-4 Projected Cost Summary

Project	Terms					
	Project Cost	Gant (60%)	Loan (40%)	Interest	Years	Annual Payment
Priority 1 - PRV Replacement	\$ 354,000.00	\$ 212,400.00	\$ 141,600.00	2.5%	30	(\$6,765.31)
Priority 2 - Spring Development	\$ 970,000.00	\$ 582,000.00	\$ 388,000.00	2.5%	30	(\$18,537.72)
Priority 2 - Well Development	\$1,279,000.00	\$767,400.00	\$511,600.00	2.5%	30	(\$24,443.04)

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Priority 3 - 0.5 Million Gallon Tank	\$2,138,000.00	\$1,282,800.00	\$855,200.00	2.5%	30	(\$40,859.44)
Priority 4 - Fire Flow Option A	\$1,900,000.00	\$1,140,000.00	\$ 760,000.00	2.5%	30	(\$36,311.01)
Priority 5 - Fire Flow Option B	\$4,973,000.00	\$2,983,800.00	\$1,989,200.00	2.5%	30	(\$95,039.28)

Based on Marysville Town’s maximum affordable water bill and the average water bill, the town could justify raising their water rates to fund capital improvement projects. Currently, Marysville Town’s average water bill is 43% of the maximum affordable water bill. Based on the assumed funding packages and estimated annual payments, Marysville Town would need to restructure their billing rates. The proposed billing rate structure shown below in Table 9-5 would generate enough revenue to cover the cost of several of the recommended projects. The average monthly water bill would increase to \$46.70 per month and the town would be able to generate an additional \$103,451.20 per year from water revenues.

The proposed rate structure was based on the usage and billing records provided by Marysville Town during the 2021 year. The proposed rate structures analyzed the usage over the year 2021 to calculate the revenue that could be potentially developed. It is recommended that the town implement the rate structure over a five-year period, adjusting the tiers and overage rate in year one and increasing the base rate \$3.00 each year for the next five years.

Table 9-5 Proposed Rate Structure

Marysville Town Rate Structure			
Connection	Schedule	Gallons/Month	Charges
Residential / Other	Tier 1 (Base)	0 - 10,000	\$32.00
	Tier 2	10,001 - 20,000	Tier 1 + \$1.00/1,000 gal
	Tier 3	20,001 – 40,000	Tier 1 + Tier 2 + \$1.50/1,000 gal
	Tier 4	40,001 – Above	Tier 1 + Tier 2 + Tier 3 + \$2.00/1,000 gal
Average Monthly Water Bill			\$46.70
Added Annual Revenue			\$103,451.20
Maximum Affordable Water Bill			\$47.90

A comparison of the existing and proposed water rates based on the 2021 water usage can be seen in Figure below.

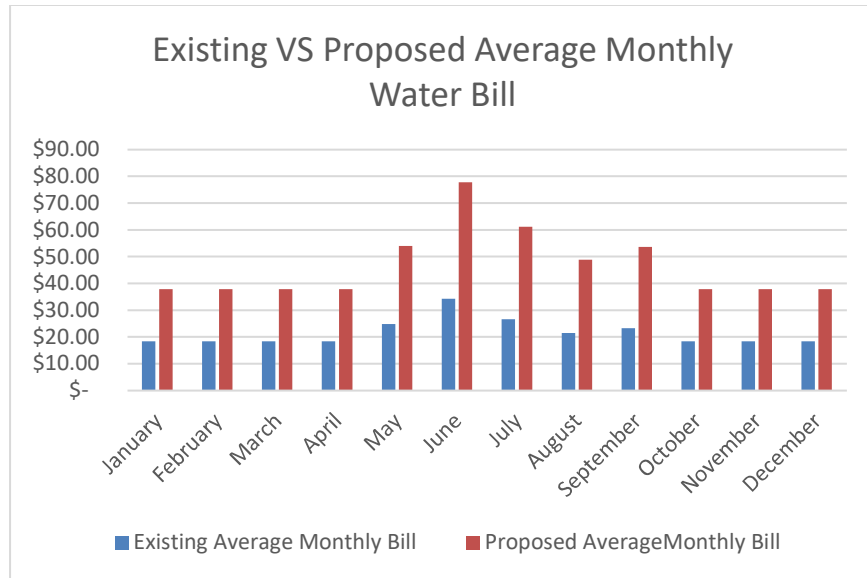


Figure 9-1 Existing VS Proposed Rate Structure

9.8 Current Water Usage

Using the water usage data provided by the town, average water usage and water usage trends were analyzed. Figure 9-1 Marysville Town Monthly Usage shows the monthly water usage taken from the towns billing records. The usage trend is as expected with peak usage occurring in summer months.

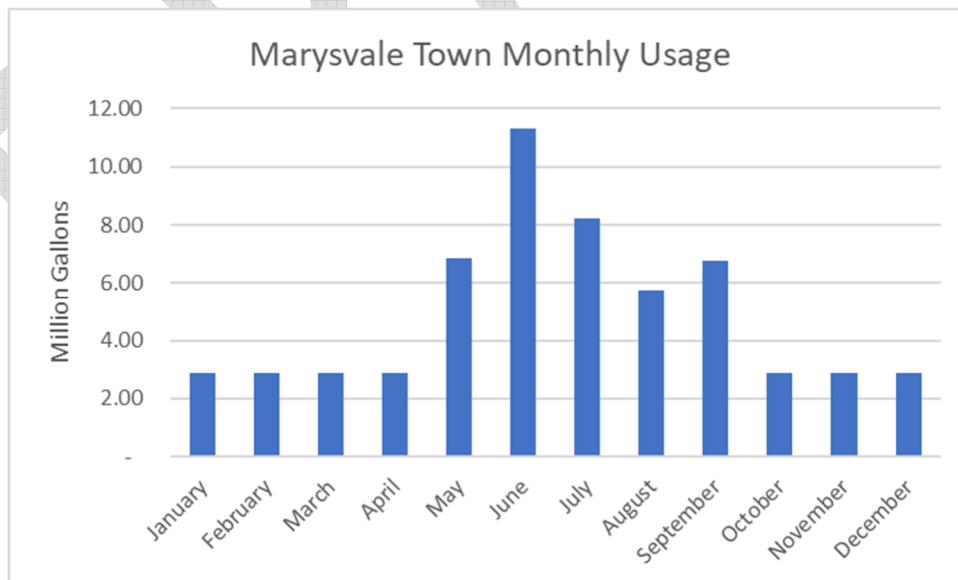


Figure 9-2 Marysville Town Monthly Usage

9.9 Connection Fee

A typically residential service connection includes corporation stop, service line, curb stop, meter box, lid, meter and miscellaneous fittings. It is common practice for utilities to be installed in the road right-of-way up to the customer's property line. This delineates a clear point of cost responsibility and establishes a level of consistency relative to the average cost of a service connection.

9.9.1 Current Connection Fee

Marysvale Town currently charges a total of \$2,000.00 for smaller connections and \$2,500.00 for larger connections. This includes new meter, meter box, and lid. The customer is also responsible to purchase parts and pay for labor.

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SECTION 10
STATUTORY IMPACT FEE STUDY

10 Impact Fee Analysis

10.1 Introduction

The use of impact fees to finance public facilities is a concept that has already gained wide acceptance. The impact fee is frequently used as a source of capital financing in large and medium sized urban areas for system expansion. The theory, practical models, and legislation for determining growth-related costs and calculating impact-fees for new construction are well developed.

The Marysville Town Water Master Plan incorporates the town's ability to facilitate future growth. These projects will be needed in order for the town to facilitate the anticipated growth. Impact fees will help economically sustain these projects. An evaluation of this impact fee compared to impact fees in surrounding communities will be included.

This study discusses the framework for estimating an impact fee. It also quantifies the maximum amount that a developer or builder will be required to contribute to pay for the costs of the proposed water system.

The proposed water infrastructure improvement projects are expected to be funded by various state and federal agencies, in addition to the water service charges and impact fees.

10.2 Definition of Impact Fee

According to the Utah State Legislative Code 11-36a-102, "Impact fee is a payment of money imposed upon development activity as a condition of development approval. Impact fee does not mean a tax, a special assessment, a building permit fee, a hookup fee, a fee for project improvements, or other reasonable permit or application fee."

An impact fee is a one-time charge on new development, typically collected at the time of building permit issuance or connection to the water system. Impact fees are designed to ensure that new development contributes a fair share of the cost of the capital improvements needed to serve growth. The premise on which impact fees are based is that development should pay for the cost of providing the facilities necessary to accommodate growth. The costs of projects needed to support growth are financed with impact fees based on a development's impact on the existing system.

10.3 Purpose of Impact Fees

Impact fees are designed to cover the costs associated with providing new facilities and to allow new users to connect to the town's water system. The broad purpose of impact fees is to protect the public health, safety and general welfare by providing an adequate, safe, and reliable water supply. The specific purpose of the impact fees calculated in this study is to fund the construction of the proposed capital improvement project. This report documents the data, methodology, and results of the impact fee study.

10.4 Legal Framework and Regulatory Requirement

The methods used to calculate impact fees in this study are intended to satisfy all legal requirements governing such fees, including provisions of the U. S. Constitution, and Utah State Legislative Statutes.

1. U. S. Constitution: Like all land use regulations, impact fees are subject to the Fifth Amendment prohibition on taking of private property for public use without compensation. Both state and federal courts have recognized the imposition of impact fees on development as a legitimate form of land use regulation, provided the fees meet standards intended to protect against regulatory takings. To comply with the Fifth Amendment, development regulations must be shown to substantially advance a legitimate governmental interest. In the case of impact fees, that interest is in the protection of public health, safety, and welfare by ensuring that development is not detrimental to the quality of essential public services.

2. Utah State Legislative Statutes: Based on the Utah Impact Fee Act, a political entity such as county, municipality, or a special service district imposing impact fees must prepare a written analysis of each impact fee that:

- Identifies the impact on system improvements required by the development activity.
- Demonstrates how those impacts on system improvements are reasonably related to the development activity.
- Estimates the proportionate share of the costs of the impacts on system improvements that are reasonably related to the new development activity; and identifies how the impact fee was calculated.

Utah Impact Fee Act includes the following Utah State Legislative Codes:

Utah State Legislative Codes	Subject
11-36a-101	Title
11-36a-102	Definitions
11-36a-201	Impact Fees – Impact Fees
11-36a-301	Establishing an Impact Fee - Impact Fee Facility Plan
11-36a-302	Establishing an Impact Fee - Impact Fee Facility Plan Requirements
11-36a-303	Establishing an Impact Fee - Impact Fee Analysis
11-36a-304	Establishing an Impact Fee - Impact Fee Analysis Requirements
11-36a-305	Establishing an Impact Fee – Calculating Impact Fees
11-36a-306	Establishing an Impact Fee – Certification of Impact Fee Analysis
11-36a-401	Enactment of Impact Fees - Impact Fee Enactment

11-36a-402	Enactment of Impact Fees – Required Provision of Impact Fee Enactment
11-36a-501	Notice – Notice of Intent to Prepare an Impact Fee Facilities Plan
11-36a-503	Notice – Notice of Intent to Preparation of an Impact Fee Analysis
11-36a-504	Notice – Notice of Intent to Adopt Impact Fee Enactment – Hearing - Protections
11-36a-601	Impact Fee Proceeds – Accounting of Impact Fees
11-36a-602	Impact Fee Proceeds – Expenditures of Impact Fees
11-36a-603	Impact Fee Proceeds - Refunds
11-36a-701	Challenges - Impact Fees Challenges
11-36a-703	Challenges – Procedure for Challenging an Impact Fee
11-36a-704	Challenges – Mediation
11-36a-705	Challenges – Arbitration

Based on the Utah Impact Fee Act (Utah State Legislative Code 11-36a-102), an impact fee study is a prerequisite for a capital facility plan for a political entity such as county, municipality, or a special service district. The political entity may only impose impact fees on development activities when its plan for financing system improvements establishes that impact fees are necessary to achieve equitable allocation to the costs borne in the past and to be borne in the future, in comparison to the benefits already received and yet to be received. The capital facility plan should include impacts that the proposed facility may have on the affected entity.

In calculating the impact fee, the following cost items may be included (Utah Impact Fee Act, Utah State Legislative Code 11-36a-305):

- The construction contract price;
- The cost of acquiring land, improvements, materials, and fixtures;
- The planning, surveying, and engineering fees for services provided for and directly related to the construction of the system improvements; and
- The debt service charges, if the political subdivision might use impact fees as a revenue stream to pay the principal and interest on bonds, notes, or other obligations issued to finance the system improvements.

10.5 Legal Issues Related to Impact Fee Analysis Methodology

An Impact Fee Analysis (IFA) for Marysville Town was conducted to determine the anticipated impacts new development will have on the existing water system (per Utah Code 11-36a-303).

10.5.1 Anticipated Impact

As development occurs within the town, the town will see an increased demand or a drop in the level of service on their system. System demands are determined based on the number of Equivalent Residential Connections (ERCs) the system serves (see Section 3 of this report).

Marysvale Town currently serves 327 ERCs. It is anticipated that within the next 10 years there will be significant growth occurring inside and outside Marysvale Town limits. Based on the population growth rate and the existing ratio of connection to ERCs, it is estimated that Marysvale Town will reach 376 ERCs by 2032.

10.5.2 Existing Level of Service (LOS)

Section 4 of this report (Water Demand Criteria) establishes the existing LOS for Marysvale Town per Utah Administrative Code 309-510. This code provides demand requirements and a LOS for source, storage and distribution. A summary of the water demand criteria and existing LOS for Marysvale Town is shown below in Table 10-1. It is important to note that impact fee funds cannot be used to increase the LOS, rather to restore the existing LOS.

Table 10-1 Water Demand Criteria / Existing LOS

Existing Level of Service		
Existing ERCs	327	ERCs
Source		
Existing Source Production	425	gpm
Required Source Production	415	gpm
Existing LOS	1.27	gpm/ERC
Existing Average Yearly Demand	380	Acre-Feet
Required Yearly Demand	362	Acre-Feet
Existing LOS	1.11	Acre-Feet/ERC
Storage		
Existing Storage	0.7	Million Gallons
Required Peak Day + Fire Flow Storage	0.46	Million Gallons
Existing LOS	1406.7	Gallons/ERC
Distribution		
Peak Day Demand	40	PSI
Peak Instantaneous Demand	30	PSI
Fire Flow + Peak Day Demand	20	PSI

Currently, Marysvale Town meets all of the existing water demand criteria and LOS with the exception of fire flow plus peak day demands in the distribution system. The areas not meeting the existing water demand criteria and LOS would be considered existing deficiencies.

10.5.3 Water System Valuation

The impact of development on the existing system is determined in part by the current value of the system. An inventory of the existing water system is contained in Section 2 of this report. The original cost of the existing system is not known, due to the constant evolution of the system

and the as needed maintenance project that occur over time. An estimated original cost of the system was used to determine the depreciated present value. The average age of the system was determined from the water operators estimate. Table 10-2 below provides an inventory of each system component, estimated original cost and the depreciated present value. Straight line depreciation was used to calculate the depreciated present value of the system.

Table 10-2 Existing System Valuation

System Components	Age	Service Life	Estimated Cost	Straight Line Depreciation	Depreciated Present Value
Source					
Rodeo Grounds Well	19	40	\$ 750,000.00	\$ 18,750.00	\$ 393,750.00
Bullion Canyon Spring	30	60	\$ 500,000.00	\$ 8,333.33	\$ 250,000.00
Water Rights (380 Acre-Feet)			\$2,850,000.00		\$ 2,850,000.00
Storage					
Upper Tank (0.25 Mgal)	35	60	\$ 500,000.00	\$ 8,333.33	\$ 208,333.33
Middle Tank (0.1 Mgal)	12	60	\$ 200,000.00	\$ 3,333.33	\$ 160,000.00
Lower Tank (0.1 Mgal)	50	60	\$ 200,000.00	\$ 3,333.33	\$ 33,333.33
Lower Tank (0.20 Mgal)	30	60	\$ 400,000.00	\$ 6,666.67	\$ 200,000.00
Distribution					
Distribution System (115,349 Feet)	35	50	\$5,250,000.00	\$105,000.00	\$ 1,575,000.00
Total			\$10,650,000.00		\$ 5,670,416.67

10.5.4 Existing and Excess System Capacity

As stated before, impact fee funds are designed to maintain the existing LOS and help offset the cost to maintain that LOS as a result of development. The portion of impact fee funds that can be used to maintain the existing LOS is based on the portion of existing excess capacity consumed by development. The existing and excess capacity of each system component was evaluated in terms of ERCs and system demands. It is anticipated that over the next 10 years Marysvale Town will add an additional 49 ERCs via new development. Table 10-3 shows the existing and excess system capacity and the anticipated portion of excess capacity to be consumed over the next 10 years. By the year 2032, 671% of the surplus source production, 27.6% of the surplus water rights, and 27.6% of the surplus storage will be consumed by development.

Table 10-3 Existing and Excess System Capacity

Capacity	Source Production		Water Rights		Storage	
Available	425	gpm	380	Acre-Feet	0.7	Mgal
Required	415	gpm	250	Acre-Feet	0.46	Mgal
Excess	10	gpm	130	Acre-Feet	0.24	Mgal
Surplus ERCs	7	ERCs	170	ERCs	170	ERCs
% Surplus Capacity	2.4%		34%		34%	
% Surplus Consumed by 2030 (47 ERCs Added)	100%		27.6%		27.6%	

The existing and excess distribution system capacity is based on the existing ERCs and the ERCs at the build-out state. The portion of excess capacity consumed over the next 10 years due to development. Marysvale Town currently serves 327 ERCs. By build out (the year 2060), Marysvale Town will have approximately 473 ERCs (see Section 3 of this report). The distribution system excess capacity is the difference between the existing ERCs and ERCs at buildout which is 146 ERCs. Over the next 10 years Marysvale Town is expected to add 49 ERCs due to anticipated development. The additional 49 ERCs will consume the approximately 33% of the existing excess capacity in the distribution system. Table 10-4 shows the existing excess capacity and expected excess capacity consumption over the next 10 years.

Table 10-4 Distribution System Excess Capacity and Consumption

Distribution	ERCs	%of Buildout	Development
Existing ERCs	327	69.1%	
ERCs by 2030	376.3	79.5%	
Build out ERCs by 2060	473.2	100%	
ERCs Added by 2032	49.3	10.4%	33.7%
ERCs Added by 2060	146.2	30.9%	100%

10.5.5 New Facilities/Capital Improvements VS Impact Analysis

Capital improvement projects are designed to address existing system deficiencies as well as growth/development related impacts. Capital improvement projects are funded through, grants, bonds/loans, usage fees etc. A list of proposed capital improvement projects is included in Section 8 of this report. Impact fee funds cannot be used to address existing system deficiencies. However, if added demands from new development causes an existing deficiency to drop further below the LOS, a portion of the impact fee funds can be used to fund new facilities to address the drop in LOS. The portion of impact fee funds that can be used on new facilities/capital improvement project is based on the percentage of excess capacity consumed through the new development.

10.6 Recommended Impact Fees

The proposed impact fees are based on equitable buy-in and new facility improvement methodology in relation to development. Equitable buy-in, provides a mean for developers to buy-in to an existing system that has been paid for by Marysvale Town. Equitable buy-in provides a means for developers to buy into a system which they stand to benefit from by paying for a portion of the existing infrastructure via impact fee. The fee associated to the equitable buy-in is based off of the existing system valuation. New facility improvements are considered facilities needed to meet the added demands created through development and to maintain the existing LOS. Future facility fees are based off of the portion of excess capacity consumed by developers in conjunction with future facility improvement cost required to maintain the existing LOS. The sum of the equitable buy-in fee and new facility fee is the recommended impact fee per ERC for Marysvale Town which is \$9,127.97 per ERC. Table 10-5 shows the breakdown of buy-in and new facility fees.

Table 10-5 Impact Fee Buy-in and New Facilities Fee

Buy in	Depreciated Present Value	Existing Surplus	% of Surplus Present Value	% Surplus Consumed 2032	Cost of Consumed Surplus	ERCs Added 2030	Cost per ERC
Source Production	\$ 643,750.00	2.4%	\$ 15,147.06	100%	\$ 15,147.06	49	\$ 309.12
Storage	\$ 601,666.67	34%	\$ 206,285.71	27.6%	\$ 57,031.93	49	\$ 1,163.92
Distribution	\$1,575,000.00	10.4%	\$ 164,127.04	33.7%	\$ 55,368.61	49	\$ 1,129.97
New Facilities	Estimated Cost	Existing Surplus	% of Surplus Present Value	% Surplus Consumed 2032	Cost of Consumed Surplus	ERCs Added 2030	Cost per ERC
Source Production	\$ 970,000.00	2.4%	\$ 22,823.53	100%	\$ 22,823.53	49	\$ 465.79
Storage	\$2,138,000.00	34.3%	\$ 733,028.57	28%	\$ 202,660.84	49	\$ 4,135.94
Distribution	\$2,254,000.00	10.4%	\$ 234,884.03	34%	\$ 79,238.63	49	\$ 1,617.11
Other							
Professional Exp	15000					49	\$ 306.12
						Total	\$ 9,127.97

Marysville Town can choose to charge less than the recommended impact fee. It is also recommended that Marysville Town require all new developments user to bring 1.0 acre-feet of municipal water rights to the system.

10.7 Impact Fee Facility Plan Certification

Ensign Engineering and Marysville Town jointly certify that the Impact Fee Facility Plan prepared for Marysville Town’s culinary water service:

1. Includes only the costs of public facilities that are:
 - a. Allowed under the Impact Fee Act.
 - b. Actually incurred; or
 - c. Projected to be incurred or encumbered within 10 years after the day on which the impact fee is paid.
2. Does not include:
 - a. Costs of operation and maintenance of public facilities
 - b. Costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees above the level of service that is supported by existing residents
 - c. An expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and methodological standards set forth by the

federal office of management and budget for federal grant
reimbursement and

3. Complies in each and every relevant respect with the Impact Fees Act.

10.8 Impact Fee Analysis Certification

Ensign Engineering and Marysville Town jointly certify that the Impact Fee Analysis prepared for Marysville Town's culinary water service:

1. Includes only the costs of public facilities that are:
 - d. Allowed under the Impact Fee Act.
 - e. Actually incurred; or
 - f. Projected to be incurred or encumbered within 10 years after the day on which the impact fee is paid.
2. Does not include:
 - a. Costs of operation and maintenance of public facilities
 - b. Costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees above the level of service that is supported by existing residents
 - c. An expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and methodological standards set forth by the federal office of management and budget for federal grant reimbursement and
3. Offsets costs with grants or other alternate source of payment; and
4. Complies in each and every relevant respect with the Impact Fees Act.

Ensign Engineering makes this certification with the following disclaimer:

1. All recommendations for implementation of the IFFP made in the IFFP or in the IFA documents are followed by the Town Staff and elected officials.
2. If all or a portion of the IFFP or IFA are modified or amended, this certification is no longer valid.

All information provided to Ensign Engineering is assumed to be correct, complete and accurate. This includes information provided by the Town as well as outside sources.

APPENDIX – A

MODEL RESULTS

DRAFT

11 APPENDIX – A
Exhibit 11-1 Existing Peak Day

Scenario: Existing Peak Day
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?	Demand Collection
34	J-1	6,585.09	<None>	0	6,657.27	31	True	<Collection: 1 item>
36	J-2	6,572.00	<None>	1	6,657.26	37	True	<Collection: 1 item>
38	J-3	6,567.17	<None>	3	6,657.26	39	True	<Collection: 1 item>
40	J-4	6,544.67	<None>	3	6,657.26	49	True	<Collection: 1 item>
42	J-5	6,525.46	<None>	3	6,657.26	57	True	<Collection: 1 item>
44	J-6	6,530.10	<None>	1	6,657.26	55	True	<Collection: 1 item>
46	J-7	6,485.13	<None>	1	6,657.26	74	True	<Collection: 1 item>
48	J-8	6,480.95	<None>	1	6,657.26	76	True	<Collection: 1 item>
50	J-9	6,434.00	<None>	3	6,657.26	97	True	<Collection: 1 item>
52	J-10	6,400.50	<None>	6	6,657.25	111	True	<Collection: 1 item>
57	J-11	6,400.50	<None>	0	6,653.14	109	True	<Collection: 1 item>
59	J-12	6,328.84	<None>	3	6,651.72	140	True	<Collection: 1 item>
61	J-13	6,324.24	<None>	1	6,651.62	142	True	<Collection: 1 item>
63	J-14	6,281.96	<None>	3	6,401.21	52	True	<Collection: 1 item>
65	J-15	6,253.53	<None>	3	6,400.65	64	True	<Collection: 1 item>
67	J-16	6,229.58	<None>	4	6,400.39	74	True	<Collection: 1 item>
71	J-18	6,154.25	<None>	3	6,399.48	106	True	<Collection: 1 item>
73	J-19	6,115.13	<None>	3	6,255.68	61	True	<Collection: 1 item>
75	J-20	6,093.00	<None>	3	6,255.47	70	True	<Collection: 1 item>
77	J-21	6,083.17	<None>	3	6,255.39	75	True	<Collection: 1 item>
79	J-22	6,072.66	<None>	5	6,255.34	79	True	<Collection: 1 item>
81	J-23	6,027.59	<None>	0	6,255.07	98	True	<Collection: 1 item>
83	J-24	5,976.75	<None>	5	6,159.10	79	True	<Collection: 1 item>
85	J-25	5,951.00	<None>	4	6,159.00	90	True	<Collection: 1 item>
87	J-26	5,955.46	<None>	5	6,158.96	88	True	<Collection: 1 item>
89	J-27	5,936.41	<None>	3	6,158.91	96	True	<Collection: 1 item>
91	J-28	5,925.91	<None>	5	6,158.90	101	True	<Collection: 1 item>
93	J-29	5,922.27	<None>	3	6,158.90	102	True	<Collection: 1 item>
95	J-30	5,919.06	<None>	1	6,158.90	104	True	<Collection: 1 item>
97	J-31	5,910.64	<None>	1	6,158.90	107	True	<Collection: 1 item>
99	J-32	5,910.42	<None>	4	6,158.90	108	True	<Collection: 1 item>
101	J-33	5,916.30	<None>	3	6,158.90	105	True	<Collection: 1 item>
103	J-34	5,927.86	<None>	4	6,158.93	100	True	<Collection: 1 item>
106	J-35	6,400.05	<None>	0	6,513.84	49	True	<Collection: 1 item>
108	J-36	6,328.84	<None>	0	6,513.64	80	True	<Collection: 1 item>
110	J-37	6,324.24	<None>	0	6,513.62	82	True	<Collection: 1 item>
112	J-38	6,271.97	<None>	0	6,513.45	104	True	<Collection: 1 item>
114	J-39	6,248.10	<None>	0	6,513.37	115	True	<Collection: 1 item>
116	J-40	6,229.58	<None>	0	6,513.33	123	True	<Collection: 1 item>
118	J-41	6,154.55	<None>	0	6,513.13	155	True	<Collection: 1 item>
120	J-42	6,137.89	<None>	0	6,513.09	162	True	<Collection: 1 item>
122	J-43	6,115.13	<None>	0	6,512.97	172	True	<Collection: 1 item>
126	J-45	6,072.66	<None>	0	6,203.94	57	True	<Collection: 1 item>
128	J-46	6,058.34	<None>	0	6,203.91	63	True	<Collection: 1 item>
130	J-47	6,048.74	<None>	0	6,203.88	67	True	<Collection: 1 item>
132	J-48	6,027.59	<None>	0	6,203.83	76	True	<Collection: 1 item>
134	J-49	6,008.17	<None>	0	6,203.78	85	True	<Collection: 1 item>
136	J-50	5,988.45	<None>	0	6,203.73	93	True	<Collection: 1 item>
138	J-51	5,951.00	<None>	0	6,203.73	109	True	<Collection: 1 item>
141	J-52	5,973.88	<None>	3	6,203.50	99	True	<Collection: 1 item>
143	J-53	5,954.39	<None>	4	6,064.76	48	True	<Collection: 1 item>
145	J-54	5,904.77	<None>	1	6,064.67	69	True	<Collection: 1 item>
147	J-55	5,877.56	<None>	3	6,064.64	81	True	<Collection: 1 item>
149	J-56	5,872.57	<None>	3	6,064.61	83	True	<Collection: 1 item>
151	J-57	5,862.78	<None>	5	6,064.60	87	True	<Collection: 1 item>
153	J-58	5,860.00	<None>	0	6,064.60	89	True	<Collection: 1 item>
155	J-59	5,879.55	<None>	3	6,064.53	80	True	<Collection: 1 item>
157	J-60	5,879.32	<None>	3	6,064.28	80	True	<Collection: 1 item>
159	J-61	5,879.13	<None>	3	6,064.16	80	True	<Collection: 1 item>
161	J-62	5,882.72	<None>	1	6,063.95	78	True	<Collection: 1 item>
163	J-63	5,888.00	<None>	1	6,063.95	76	True	<Collection: 1 item>
165	J-64	5,924.92	<None>	1	6,063.95	60	True	<Collection: 1 item>
167	J-65	5,941.88	<None>	0	6,063.95	53	True	<Collection: 1 item>
169	J-66	5,826.76	<None>	1	5,972.85	63	True	<Collection: 1 item>
170	J-67	5,817.64	<None>	3	5,972.85	67	True	<Collection: 1 item>
172	J-68	5,811.79	<None>	3	5,972.85	70	True	<Collection: 1 item>

174	J-69	5,805.87	<None>	1	5,972.85	72	True	<Collection: 1 item>
176	J-70	5,806.96	<None>	3	5,972.85	72	True	<Collection: 1 item>
178	J-71	5,799.05	<None>	5	5,972.86	75	True	<Collection: 1 item>
180	J-72	5,780.54	<None>	1	5,972.87	83	True	<Collection: 1 item>
182	J-73	5,858.17	<None>	3	6,063.94	89	True	<Collection: 1 item>
185	J-74	5,950.00	<None>	3	6,064.73	50	True	<Collection: 1 item>
188	J-75	5,941.28	<None>	4	6,064.72	53	True	<Collection: 1 item>
190	J-76	5,936.97	<None>	4	6,064.72	55	True	<Collection: 1 item>
192	J-77	5,931.08	<None>	4	6,064.71	58	True	<Collection: 1 item>
194	J-78	5,916.24	<None>	4	6,064.71	64	True	<Collection: 1 item>
196	J-79	5,903.17	<None>	3	6,064.71	70	True	<Collection: 1 item>
198	J-80	5,925.00	<None>	3	6,064.71	60	True	<Collection: 1 item>
200	J-81	5,930.89	<None>	3	6,064.71	58	True	<Collection: 1 item>
202	J-82	5,933.52	<None>	1	6,064.71	57	True	<Collection: 1 item>
206	J-83	5,936.41	<None>	0	6,158.92	96	True	<Collection: 1 item>
209	J-84	5,950.72	<None>	1	6,158.91	90	True	<Collection: 1 item>
211	J-85	5,948.23	<None>	3	6,158.87	91	True	<Collection: 1 item>
213	J-86	5,953.74	<None>	4	6,158.84	89	True	<Collection: 1 item>
215	J-87	5,916.48	<None>	4	6,158.84	105	True	<Collection: 1 item>
217	J-88	6,016.13	<None>	0	6,027.99	5	True	<Collection: 1 item>
221	J-89	5,951.95	<None>	0	6,027.35	33	True	<Collection: 1 item>
223	J-90	5,944.00	<None>	0	6,027.61	36	True	<Collection: 1 item>
225	J-91	5,925.37	<None>	0	6,027.22	44	True	<Collection: 1 item>
227	J-92	5,894.52	<None>	6	6,026.80	57	True	<Collection: 1 item>
229	J-93	5,868.52	<None>	4	6,026.36	68	True	<Collection: 1 item>
231	J-94	5,857.60	<None>	3	6,026.14	73	True	<Collection: 1 item>
233	J-95	5,843.55	<None>	3	6,025.85	79	True	<Collection: 1 item>
235	J-96	5,825.00	<None>	4	6,025.70	87	True	<Collection: 1 item>
237	J-97	5,815.52	<None>	1	6,025.59	91	True	<Collection: 1 item>
239	J-98	5,819.18	<None>	9	6,025.56	89	True	<Collection: 1 item>
241	J-99	5,823.40	<None>	1	6,025.53	87	True	<Collection: 1 item>
243	J-100	5,827.20	<None>	1	6,025.51	86	True	<Collection: 1 item>
245	J-101	5,835.39	<None>	4	6,025.51	82	True	<Collection: 1 item>
247	J-102	5,841.66	<None>	1	6,025.51	80	True	<Collection: 1 item>
249	J-103	5,823.84	<None>	1	6,025.51	87	True	<Collection: 1 item>
252	J-104	5,816.20	<None>	3	6,025.45	91	True	<Collection: 1 item>
254	J-105	5,824.82	<None>	4	6,025.51	87	True	<Collection: 1 item>
257	J-106	6,015.68	<None>	0	6,027.99	5	True	<Collection: 1 item>
260	J-107	5,951.95	<None>	0	6,027.76	33	True	<Collection: 1 item>
262	J-108	5,945.80	<None>	0	6,026.91	35	True	<Collection: 1 item>
264	J-109	5,946.15	<None>	1	6,026.86	35	True	<Collection: 1 item>
266	J-110	5,927.76	<None>	1	6,026.64	43	True	<Collection: 1 item>
268	J-111	5,912.79	<None>	3	6,026.51	49	True	<Collection: 1 item>
270	J-112	5,874.34	<None>	9	6,026.15	66	True	<Collection: 1 item>
272	J-113	5,856.84	<None>	5	6,025.99	73	True	<Collection: 1 item>
274	J-114	5,842.58	<None>	4	6,025.85	79	True	<Collection: 1 item>
276	J-115	5,832.80	<None>	4	6,025.76	83	True	<Collection: 1 item>
278	J-116	5,815.34	<None>	3	6,025.56	91	True	<Collection: 1 item>
280	J-117	5,804.18	<None>	6	6,025.48	96	True	<Collection: 1 item>
282	J-118	5,799.47	<None>	4	6,025.32	98	True	<Collection: 1 item>
284	J-119	5,793.19	<None>	5	6,025.27	100	True	<Collection: 1 item>
286	J-120	5,788.07	<None>	4	6,025.24	103	True	<Collection: 1 item>
288	J-121	5,769.78	<None>	0	6,025.21	111	True	<Collection: 1 item>
290	J-122	5,776.66	<None>	4	6,025.21	108	True	<Collection: 1 item>
292	J-123	5,783.82	<None>	5	6,025.21	104	True	<Collection: 1 item>
294	J-124	5,790.01	<None>	6	6,025.24	102	True	<Collection: 1 item>
297	J-125	5,813.17	<None>	7	6,025.42	92	True	<Collection: 1 item>
299	J-126	5,799.33	<None>	8	6,025.28	98	True	<Collection: 1 item>
302	J-127	5,909.96	<None>	6	6,026.49	50	True	<Collection: 1 item>
304	J-128	5,834.63	<None>	7	6,025.65	83	True	<Collection: 1 item>
306	J-129	5,824.31	<None>	6	6,025.63	87	True	<Collection: 1 item>
308	J-130	5,809.36	<None>	5	6,025.51	94	True	<Collection: 1 item>
310	J-131	5,805.74	<None>	6	6,025.33	95	True	<Collection: 1 item>
312	J-132	5,796.91	<None>	4	6,025.28	99	True	<Collection: 1 item>
314	J-133	5,796.24	<None>	5	6,025.27	99	True	<Collection: 1 item>
316	J-134	5,840.00	<None>	0	6,025.27	80	True	<Collection: 1 item>
318	J-135	5,787.80	<None>	1	6,025.27	103	True	<Collection: 1 item>
320	J-136	5,783.08	<None>	1	6,025.27	105	True	<Collection: 1 item>
322	J-137	5,786.44	<None>	4	6,025.27	103	True	<Collection: 1 item>
324	J-138	5,791.23	<None>	3	6,025.29	101	True	<Collection: 1 item>
326	J-139	5,795.38	<None>	4	6,025.31	99	True	<Collection: 1 item>
329	J-140	5,788.40	<None>	7	6,025.27	102	True	<Collection: 1 item>
332	J-141	5,791.63	<None>	7	6,025.29	101	True	<Collection: 1 item>
335	J-142	5,812.17	<None>	3	6,025.51	92	True	<Collection: 1 item>
338	J-143	5,797.94	<None>	8	6,025.35	98	True	<Collection: 1 item>
341	J-144	5,790.97	<None>	4	6,025.27	101	True	<Collection: 1 item>
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347	J-145	5,786.37	<None>	4	6,025.25	103	True	<Collection: 1 item>
349	J-146	5,786.71	<None>	3	6,025.27	103	True	<Collection: 1 item>
351	J-147	5,782.27	<None>	0	6,025.27	105	True	<Collection: 1 item>
355	J-148	5,864.31	<None>	5	6,023.70	69	True	<Collection: 1 item>
359	J-150	6,137.89	<None>	1	6,256.17	51	True	<Collection: 1 item>
377	J-151	5,988.45	<None>	6	6,159.15	74	True	<Collection: 1 item>
384	J-152	5,993.00	<None>	0	6,203.17	91	True	<Collection: 1 item>
407	J-153	5,815.52	<None>	1	6,025.59	91	True	<Collection: 1 item>
409	J-154	6,312.00	<None>	4	6,400.65	38	True	<Collection: 1 item>
411	J-155	6,312.24	<None>	3	6,400.65	38	True	<Collection: 1 item>
417	J-156	6,310.00	<None>	1	6,400.65	39	True	<Collection: 1 item>
420	J-159	6,102.77	<None>	0	6,255.55	66	True	<Collection: 1 item>
422	J-160	6,114.00	<None>	3	6,255.55	61	True	<Collection: 1 item>
424	J-161	6,112.45	<None>	3	6,255.55	62	True	<Collection: 1 item>
436	J-162	6,123.78	<None>	3	6,255.55	57	True	<Collection: 1 item>
438	J-163	6,008.00	<None>	0	6,158.84	65	True	<Collection: 1 item>
440	J-164	6,010.00	<None>	1	6,158.84	64	True	<Collection: 1 item>
457	J-165	6,004.00	<None>	0	6,158.84	67	True	<Collection: 1 item>
461	J-181	6,060.29	<None>	0	6,255.27	84	True	<Collection: 0 items>
461	J-182	6,089.82	<None>	0	6,203.98	49	True	<Collection: 0 items>
478	J-189	6,285.66	<None>	0	6,650.80	158	True	<Collection: 0 items>
481	J-190	6,285.66	<None>	0	6,513.53	99	True	<Collection: 0 items>
483	J-191	6,281.96	<None>	0	6,513.48	100	True	<Collection: 0 items>
488	J-192	6,588.82	<None>	0	6,657.26	30	True	<Collection: 0 items>
496	J-193	6,401.60	<None>	0	6,653.16	109	True	<Collection: 0 items>
528	J-202	6,021.60	<None>	0	6,255.03	101	True	<Collection: 0 items>
531	J-203	6,021.00	<None>	0	6,203.81	79	True	<Collection: 0 items>
534	J-204	6,019.34	<None>	0	6,159.34	61	True	<Collection: 0 items>
537	J-205	6,019.00	<None>	0	6,203.81	80	True	<Collection: 0 items>
558	J-208	6,208.98	<None>	0	6,400.14	83	True	<Collection: 0 items>
561	J-209	6,208.71	<None>	0	6,513.28	132	True	<Collection: 0 items>
564	J-210	6,206.80	<None>	0	6,400.11	84	True	<Collection: 0 items>
567	J-211	6,206.52	<None>	0	6,513.27	133	True	<Collection: 0 items>
583	J-215	6,141.46	<None>	0	6,399.33	112	True	<Collection: 0 items>
590	J-216	6,094.20	<None>	0	6,512.91	181	True	<Collection: 0 items>
607	J-224	5,956.42	<None>	0	6,203.03	107	True	<Collection: 0 items>
618	J-226	5,985.89	<None>	0	6,159.14	75	True	<Collection: 0 items>
621	J-227	5,985.88	<None>	0	6,203.73	94	True	<Collection: 0 items>
635	J-230	5,922.79	<None>	0	6,026.50	45	True	<Collection: 0 items>
649	J-235	5,951.91	<None>	0	6,203.73	109	True	<Collection: 0 items>

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Exhibit 11-2 Existing Peak Instantaneous

Scenario: Existing Peak Inst
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?	Demand Collection
34	J-1	6,585.09	<None>	0	6,656.97	31	True	<Collection: 1 item>
36	J-2	6,572.00	<None>	3	6,656.92	37	True	<Collection: 1 item>
38	J-3	6,567.17	<None>	5	6,656.92	39	True	<Collection: 1 item>
40	J-4	6,544.67	<None>	5	6,656.91	49	True	<Collection: 1 item>
42	J-5	6,525.46	<None>	5	6,656.91	57	True	<Collection: 1 item>
44	J-6	6,530.10	<None>	3	6,656.91	55	True	<Collection: 1 item>
46	J-7	6,485.13	<None>	3	6,656.91	74	True	<Collection: 1 item>
48	J-8	6,480.95	<None>	3	6,656.91	76	True	<Collection: 1 item>
50	J-9	6,434.00	<None>	5	6,656.90	96	True	<Collection: 1 item>
52	J-10	6,400.50	<None>	13	6,656.90	111	True	<Collection: 1 item>
57	J-11	6,400.50	<None>	0	6,642.04	105	True	<Collection: 1 item>
59	J-12	6,328.84	<None>	5	6,636.93	133	True	<Collection: 1 item>
61	J-13	6,324.24	<None>	3	6,636.55	135	True	<Collection: 1 item>
63	J-14	6,281.96	<None>	5	6,401.07	52	True	<Collection: 1 item>
65	J-15	6,253.53	<None>	5	6,399.05	63	True	<Collection: 1 item>
67	J-16	6,229.58	<None>	8	6,398.09	73	True	<Collection: 1 item>
71	J-18	6,154.25	<None>	5	6,394.81	104	True	<Collection: 1 item>
73	J-19	6,115.13	<None>	5	6,254.33	60	True	<Collection: 1 item>
75	J-20	6,093.00	<None>	5	6,253.57	69	True	<Collection: 1 item>
77	J-21	6,083.17	<None>	5	6,253.27	74	True	<Collection: 1 item>
79	J-22	6,072.66	<None>	10	6,253.10	78	True	<Collection: 1 item>
81	J-23	6,027.59	<None>	0	6,252.13	97	True	<Collection: 1 item>
83	J-24	5,976.75	<None>	10	6,158.44	79	True	<Collection: 1 item>
85	J-25	5,951.00	<None>	8	6,158.07	90	True	<Collection: 1 item>
87	J-26	5,955.46	<None>	10	6,157.96	88	True	<Collection: 1 item>
89	J-27	5,936.41	<None>	5	6,157.76	96	True	<Collection: 1 item>
91	J-28	5,925.91	<None>	10	6,157.73	100	True	<Collection: 1 item>
93	J-29	5,922.27	<None>	5	6,157.73	102	True	<Collection: 1 item>
95	J-30	5,919.06	<None>	3	6,157.73	103	True	<Collection: 1 item>
97	J-31	5,910.64	<None>	3	6,157.73	107	True	<Collection: 1 item>
99	J-32	5,910.42	<None>	8	6,157.73	107	True	<Collection: 1 item>
101	J-33	5,916.30	<None>	5	6,157.74	104	True	<Collection: 1 item>
103	J-34	5,927.86	<None>	8	6,157.85	100	True	<Collection: 1 item>
106	J-35	6,400.05	<None>	0	6,513.66	49	True	<Collection: 1 item>
108	J-36	6,328.84	<None>	0	6,512.93	80	True	<Collection: 1 item>
110	J-37	6,324.24	<None>	0	6,512.87	82	True	<Collection: 1 item>
112	J-38	6,271.97	<None>	0	6,512.25	104	True	<Collection: 1 item>
114	J-39	6,248.10	<None>	0	6,511.97	114	True	<Collection: 1 item>
116	J-40	6,229.58	<None>	0	6,511.83	122	True	<Collection: 1 item>
118	J-41	6,154.55	<None>	0	6,511.10	154	True	<Collection: 1 item>
120	J-42	6,137.89	<None>	0	6,510.95	161	True	<Collection: 1 item>
122	J-43	6,115.13	<None>	0	6,510.52	171	True	<Collection: 1 item>
126	J-45	6,072.66	<None>	0	6,203.83	57	True	<Collection: 1 item>
128	J-46	6,058.34	<None>	0	6,203.72	63	True	<Collection: 1 item>
130	J-47	6,048.74	<None>	0	6,203.61	67	True	<Collection: 1 item>
132	J-48	6,027.59	<None>	0	6,203.42	76	True	<Collection: 1 item>
134	J-49	6,008.17	<None>	0	6,203.25	84	True	<Collection: 1 item>
136	J-50	5,988.45	<None>	0	6,203.06	93	True	<Collection: 1 item>
138	J-51	5,951.00	<None>	0	6,203.06	109	True	<Collection: 1 item>
141	J-52	5,973.88	<None>	5	6,202.26	99	True	<Collection: 1 item>
143	J-53	5,954.39	<None>	8	6,064.74	48	True	<Collection: 1 item>
145	J-54	5,904.77	<None>	3	6,064.44	69	True	<Collection: 1 item>
147	J-55	5,877.56	<None>	5	6,064.31	81	True	<Collection: 1 item>
149	J-56	5,872.57	<None>	5	6,064.23	83	True	<Collection: 1 item>
151	J-57	5,862.78	<None>	10	6,064.17	87	True	<Collection: 1 item>
153	J-58	5,860.00	<None>	0	6,064.17	88	True	<Collection: 1 item>
155	J-59	5,879.55	<None>	5	6,063.92	80	True	<Collection: 1 item>
157	J-60	5,879.32	<None>	5	6,063.02	79	True	<Collection: 1 item>
159	J-61	5,879.13	<None>	5	6,062.60	79	True	<Collection: 1 item>
161	J-62	5,882.72	<None>	3	6,061.83	77	True	<Collection: 1 item>
163	J-63	5,888.00	<None>	3	6,061.82	75	True	<Collection: 1 item>
165	J-64	5,924.92	<None>	3	6,061.82	59	True	<Collection: 1 item>
167	J-65	5,941.88	<None>	0	6,061.82	52	True	<Collection: 1 item>
169	J-66	5,826.76	<None>	3	5,972.76	63	True	<Collection: 1 item>
170	J-67	5,817.64	<None>	5	5,972.76	67	True	<Collection: 1 item>
172	J-68	5,811.79	<None>	5	5,972.76	70	True	<Collection: 1 item>

174	J-69	5,805.87	<None>	3	5,972.77	72	True	<Collection: 1 item>
176	J-70	5,806.96	<None>	5	5,972.78	72	True	<Collection: 1 item>
178	J-71	5,799.05	<None>	10	5,972.79	75	True	<Collection: 1 item>
180	J-72	5,780.54	<None>	3	5,972.84	83	True	<Collection: 1 item>
182	J-73	5,858.17	<None>	5	6,061.79	88	True	<Collection: 1 item>
185	J-74	5,950.00	<None>	5	6,064.66	50	True	<Collection: 1 item>
188	J-75	5,941.28	<None>	8	6,064.62	53	True	<Collection: 1 item>
190	J-76	5,936.97	<None>	8	6,064.60	55	True	<Collection: 1 item>
192	J-77	5,931.08	<None>	8	6,064.58	58	True	<Collection: 1 item>
194	J-78	5,916.24	<None>	8	6,064.57	64	True	<Collection: 1 item>
196	J-79	5,903.17	<None>	5	6,064.57	70	True	<Collection: 1 item>
198	J-80	5,925.00	<None>	5	6,064.57	60	True	<Collection: 1 item>
200	J-81	5,930.89	<None>	5	6,064.57	58	True	<Collection: 1 item>
202	J-82	5,933.52	<None>	3	6,064.58	57	True	<Collection: 1 item>
206	J-83	5,936.41	<None>	0	6,157.79	96	True	<Collection: 1 item>
209	J-84	5,950.72	<None>	3	6,157.76	90	True	<Collection: 1 item>
211	J-85	5,948.23	<None>	5	6,157.63	91	True	<Collection: 1 item>
213	J-86	5,953.74	<None>	8	6,157.50	88	True	<Collection: 1 item>
215	J-87	5,916.48	<None>	8	6,157.49	104	True	<Collection: 1 item>
217	J-88	6,016.13	<None>	0	6,027.97	5	True	<Collection: 1 item>
221	J-89	5,951.95	<None>	0	6,025.65	32	True	<Collection: 1 item>
223	J-90	5,944.00	<None>	0	6,026.61	36	True	<Collection: 1 item>
225	J-91	5,925.37	<None>	0	6,025.19	43	True	<Collection: 1 item>
227	J-92	5,894.52	<None>	13	6,023.65	56	True	<Collection: 1 item>
229	J-93	5,868.52	<None>	8	6,022.08	66	True	<Collection: 1 item>
231	J-94	5,857.60	<None>	5	6,021.29	71	True	<Collection: 1 item>
233	J-95	5,843.55	<None>	5	6,020.26	76	True	<Collection: 1 item>
235	J-96	5,825.00	<None>	8	6,019.69	84	True	<Collection: 1 item>
237	J-97	5,815.52	<None>	3	6,019.31	88	True	<Collection: 1 item>
239	J-98	5,819.18	<None>	18	6,019.17	87	True	<Collection: 1 item>
241	J-99	5,823.40	<None>	3	6,019.08	85	True	<Collection: 1 item>
243	J-100	5,827.20	<None>	3	6,019.00	83	True	<Collection: 1 item>
245	J-101	5,835.39	<None>	8	6,019.00	79	True	<Collection: 1 item>
247	J-102	5,841.66	<None>	3	6,019.00	77	True	<Collection: 1 item>
249	J-103	5,823.84	<None>	3	6,019.01	84	True	<Collection: 1 item>
252	J-104	5,816.20	<None>	5	6,018.79	88	True	<Collection: 1 item>
254	J-105	5,824.82	<None>	8	6,019.02	84	True	<Collection: 1 item>
257	J-106	6,015.68	<None>	0	6,027.97	5	True	<Collection: 1 item>
260	J-107	5,951.95	<None>	0	6,027.13	33	True	<Collection: 1 item>
262	J-108	5,945.80	<None>	0	6,024.08	34	True	<Collection: 1 item>
264	J-109	5,946.15	<None>	3	6,023.90	34	True	<Collection: 1 item>
266	J-110	5,927.76	<None>	2	6,023.10	41	True	<Collection: 1 item>
268	J-111	5,912.79	<None>	5	6,022.62	48	True	<Collection: 1 item>
270	J-112	5,874.34	<None>	18	6,021.33	64	True	<Collection: 1 item>
272	J-113	5,856.84	<None>	10	6,020.73	71	True	<Collection: 1 item>
274	J-114	5,842.58	<None>	8	6,020.24	77	True	<Collection: 1 item>
276	J-115	5,832.80	<None>	8	6,019.91	81	True	<Collection: 1 item>
278	J-116	5,815.34	<None>	5	6,019.19	88	True	<Collection: 1 item>
280	J-117	5,804.18	<None>	12	6,018.92	93	True	<Collection: 1 item>
282	J-118	5,799.47	<None>	8	6,018.31	95	True	<Collection: 1 item>
284	J-119	5,793.19	<None>	10	6,018.13	97	True	<Collection: 1 item>
286	J-120	5,788.07	<None>	8	6,018.05	100	True	<Collection: 1 item>
288	J-121	5,769.78	<None>	0	6,017.92	107	True	<Collection: 1 item>
290	J-122	5,776.66	<None>	8	6,017.92	104	True	<Collection: 1 item>
292	J-123	5,783.82	<None>	10	6,017.95	101	True	<Collection: 1 item>
294	J-124	5,790.01	<None>	13	6,018.03	99	True	<Collection: 1 item>
297	J-125	5,813.17	<None>	13	6,018.68	89	True	<Collection: 1 item>
299	J-126	5,799.33	<None>	15	6,018.18	95	True	<Collection: 1 item>
302	J-127	5,909.96	<None>	13	6,022.56	49	True	<Collection: 1 item>
304	J-128	5,834.63	<None>	15	6,019.50	80	True	<Collection: 1 item>
306	J-129	5,824.31	<None>	13	6,019.45	84	True	<Collection: 1 item>
308	J-130	5,809.36	<None>	10	6,018.99	91	True	<Collection: 1 item>
310	J-131	5,805.74	<None>	13	6,018.34	92	True	<Collection: 1 item>
312	J-132	5,796.91	<None>	8	6,018.17	96	True	<Collection: 1 item>
314	J-133	5,796.24	<None>	10	6,018.15	96	True	<Collection: 1 item>
316	J-134	5,840.00	<None>	0	6,018.15	77	True	<Collection: 1 item>
318	J-135	5,787.80	<None>	2	6,018.15	100	True	<Collection: 1 item>
320	J-136	5,783.08	<None>	3	6,018.15	102	True	<Collection: 1 item>
322	J-137	5,786.44	<None>	8	6,018.15	100	True	<Collection: 1 item>
324	J-138	5,791.23	<None>	5	6,018.22	98	True	<Collection: 1 item>
326	J-139	5,795.38	<None>	8	6,018.30	96	True	<Collection: 1 item>
329	J-140	5,788.40	<None>	15	6,018.14	99	True	<Collection: 1 item>
332	J-141	5,791.63	<None>	14	6,018.22	98	True	<Collection: 1 item>
335	J-142	5,812.17	<None>	5	6,019.00	89	True	<Collection: 1 item>
338	J-143	5,797.94	<None>	15	6,018.43	95	True	<Collection: 1 item>
341	J-144	5,790.97	<None>	7	6,018.13	98	True	<Collection: 1 item>
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347	J-145	5,786.37	<None>	8	6,018.07	100	True	<Collection: 1 item>
349	J-146	5,786.71	<None>	5	6,018.13	100	True	<Collection: 1 item>
351	J-147	5,782.27	<None>	0	6,018.13	102	True	<Collection: 1 item>
355	J-148	5,864.31	<None>	10	6,012.46	64	True	<Collection: 1 item>
359	J-150	6,137.89	<None>	3	6,256.10	51	True	<Collection: 1 item>
377	J-151	5,988.45	<None>	13	6,158.64	74	True	<Collection: 1 item>
384	J-152	5,993.00	<None>	0	6,201.05	90	True	<Collection: 1 item>
407	J-153	5,815.52	<None>	3	6,019.30	88	True	<Collection: 1 item>
409	J-154	6,312.00	<None>	8	6,399.04	38	True	<Collection: 1 item>
411	J-155	6,312.24	<None>	5	6,399.04	38	True	<Collection: 1 item>
417	J-156	6,310.00	<None>	3	6,399.04	39	True	<Collection: 1 item>
420	J-159	6,102.77	<None>	0	6,253.87	65	True	<Collection: 1 item>
422	J-160	6,114.00	<None>	5	6,253.85	61	True	<Collection: 1 item>
424	J-161	6,112.45	<None>	5	6,253.85	61	True	<Collection: 1 item>
436	J-162	6,123.78	<None>	5	6,253.85	56	True	<Collection: 1 item>
438	J-163	6,008.00	<None>	0	6,157.50	65	True	<Collection: 1 item>
440	J-164	6,010.00	<None>	3	6,157.50	64	True	<Collection: 1 item>
457	J-165	6,004.00	<None>	0	6,157.50	66	True	<Collection: 1 item>
461	J-181	6,060.29	<None>	0	6,252.83	83	True	<Collection: 0 items>
461	J-182	6,089.82	<None>	0	6,203.98	49	True	<Collection: 0 items>
478	J-189	6,285.66	<None>	0	6,633.60	151	True	<Collection: 0 items>
481	J-190	6,285.66	<None>	0	6,512.53	98	True	<Collection: 0 items>
483	J-191	6,281.96	<None>	0	6,512.35	100	True	<Collection: 0 items>
488	J-192	6,588.82	<None>	0	6,656.93	29	True	<Collection: 0 items>
496	J-193	6,401.60	<None>	0	6,642.12	104	True	<Collection: 0 items>
528	J-202	6,021.60	<None>	0	6,252.00	100	True	<Collection: 0 items>
531	J-203	6,021.00	<None>	0	6,203.37	79	True	<Collection: 0 items>
534	J-204	6,019.34	<None>	0	6,159.32	61	True	<Collection: 0 items>
537	J-205	6,019.00	<None>	0	6,203.35	80	True	<Collection: 0 items>
558	J-208	6,208.98	<None>	0	6,397.19	81	True	<Collection: 0 items>
561	J-209	6,208.71	<None>	0	6,511.63	131	True	<Collection: 0 items>
564	J-210	6,206.80	<None>	0	6,397.10	82	True	<Collection: 0 items>
567	J-211	6,206.52	<None>	0	6,511.61	132	True	<Collection: 0 items>
583	J-215	6,141.46	<None>	0	6,394.25	109	True	<Collection: 0 items>
590	J-216	6,094.20	<None>	0	6,510.31	180	True	<Collection: 0 items>
607	J-224	5,956.42	<None>	0	6,200.56	106	True	<Collection: 0 items>
618	J-226	5,985.89	<None>	0	6,158.60	75	True	<Collection: 0 items>
621	J-227	5,985.88	<None>	0	6,203.06	94	True	<Collection: 0 items>
635	J-230	5,922.79	<None>	0	6,022.58	43	True	<Collection: 0 items>
649	J-235	5,951.91	<None>	0	6,203.06	109	True	<Collection: 0 items>

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Exhibit 11-3 Existing Fire Flow

Scenario: Existing Peak Day
Current Time Step: 0.000 h
Fire Flow Node FlexTable: Fire Flow Report

Label	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Pressure (System Lower Limit) (psi)	Pressure (Calculated System Lower Limit)
J-1	1	False	0	0	0	0	0	31	0	5	J-88	(NA)	
J-2	1	False	0	0	1	1	0	37	0	5	J-88	(NA)	
J-3	1	False	0	0	3	3	0	39	0	5	J-88	(NA)	
J-4	1	False	0	0	3	3	0	49	0	5	J-88	(NA)	
J-5	3	True	1,500	2,327	1,503	2,330	20	27	0	5	J-88	(NA)	
J-6	3	True	1,500	2,327	1,501	2,329	20	24	0	5	J-88	(NA)	
J-7	3	True	1,500	2,327	1,501	2,329	20	39	0	5	J-88	(NA)	
J-8	3	True	1,500	2,327	1,501	2,329	20	35	0	5	J-88	(NA)	
J-9	3	True	1,500	2,327	1,503	2,330	20	51	0	5	J-88	(NA)	
J-10	3	True	1,500	2,327	1,506	2,334	20	57	0	5	J-88	(NA)	
J-11	5	False	1,500	720	1,500	720	20	20	0	5	J-88	(NA)	
J-12	8	False	1,500	721	1,503	724	20	20	0	5	J-88	(NA)	
J-13	8	False	1,500	720	1,501	721	20	20	0	5	J-88	(NA)	
J-14	12	False	1,500	714	1,503	717	20	20	0	5	J-88	(NA)	
J-15	23	False	1,500	696	1,503	699	20	26	0	0	J-155	(NA)	
J-16	26	False	1,500	696	1,504	700	20	29	0	0	J-155	(NA)	
J-18	28	False	1,500	696	1,503	699	20	34	0	0	J-155	(NA)	
J-19	24	False	1,500	696	1,503	699	20	30	0	0	J-155	(NA)	
J-20	25	False	1,500	696	1,503	699	20	31	0	0	J-155	(NA)	
J-21	25	False	1,500	696	1,503	699	20	32	0	0	J-155	(NA)	
J-22	25	False	1,500	696	1,505	701	20	34	0	0	J-155	(NA)	
J-23	25	False	1,500	696	1,500	696	20	39	0	0	J-155	(NA)	
J-24	26	False	1,500	696	1,505	701	20	44	0	0	J-155	(NA)	
J-25	25	False	1,500	696	1,504	700	20	47	0	0	J-155	(NA)	
J-26	26	False	1,500	696	1,505	701	20	41	0	0	J-155	(NA)	
J-27	4	False	1,500	570	1,503	573	20	69	0	5	J-88	(NA)	
J-28	4	False	1,500	644	1,505	649	20	64	0	5	J-88	(NA)	
J-29	4	False	1,500	693	1,503	696	20	40	0	1	J-155	(NA)	
J-30	15	False	1,500	696	1,501	697	20	40	0	0	J-155	(NA)	
J-31	23	False	1,500	696	1,501	698	20	43	0	0	J-155	(NA)	
J-32	24	False	1,500	696	1,504	700	20	43	0	0	J-155	(NA)	
J-33	25	False	1,500	696	1,503	699	20	40	0	0	J-155	(NA)	
J-34	4	False	1,500	601	1,504	605	20	69	0	5	J-88	(NA)	
J-35	3	False	1,500	1,493	1,500	1,493	20	41	0	5	J-88	(NA)	
J-36	3	False	1,500	1,493	1,500	1,493	20	47	0	5	J-88	(NA)	
J-37	3	False	1,500	1,493	1,500	1,493	20	47	0	5	J-88	(NA)	
J-38	3	False	1,500	807	1,500	807	20	85	0	5	J-88	(NA)	
J-39	3	False	1,500	807	1,500	807	20	92	0	5	J-88	(NA)	
J-40	3	False	1,500	807	1,500	807	20	99	0	5	J-88	(NA)	
J-41	3	False	1,500	807	1,500	807	20	122	0	5	J-88	(NA)	
J-42	3	False	1,500	807	1,500	807	20	128	0	5	J-88	(NA)	
J-43	3	False	1,500	807	1,500	807	20	133	0	5	J-88	(NA)	
J-45	3	False	1,500	807	1,500	807	20	55	0	5	J-88	(NA)	
J-46	3	False	1,500	807	1,500	807	20	60	0	5	J-88	(NA)	
J-47	3	False	1,500	807	1,500	807	20	63	0	5	J-88	(NA)	
J-48	3	False	1,500	807	1,500	807	20	70	0	5	J-88	(NA)	
J-49	3	False	1,500	807	1,500	807	20	76	0	5	J-88	(NA)	
J-50	3	False	1,500	807	1,500	807	20	82	0	5	J-88	(NA)	
J-51	3	False	1,500	807	1,500	807	20	95	0	5	J-88	(NA)	
J-52	3	False	1,500	807	1,503	810	20	79	0	5	J-88	(NA)	
J-53	3	False	1,500	807	1,504	811	20	48	0	5	J-88	(NA)	
J-54	3	False	1,500	807	1,501	808	20	62	0	5	J-88	(NA)	
J-55	3	False	1,500	807	1,503	810	20	69	0	5	J-88	(NA)	
J-56	3	False	1,500	384	1,503	387	20	65	0	5	J-88	(NA)	
J-57	3	False	1,500	384	1,505	389	20	48	0	5	J-88	(NA)	
J-58	3	False	1,500	384	1,500	384	20	28	0	5	J-88	(NA)	
J-59	3	False	1,500	362	1,503	364	20	72	0	5	J-88	(NA)	
J-60	3	False	1,500	362	1,503	364	20	57	0	5	J-88	(NA)	
J-61	3	False	1,500	362	1,503	364	20	50	0	5	J-88	(NA)	
J-62	3	False	1,500	362	1,501	363	20	30	0	5	J-65	(NA)	
J-63	7	False	1,500	337	1,501	339	20	23	0	0	J-65	(NA)	
J-64	16	False	1,500	274	1,501	275	20	20	0	5	J-88	(NA)	
J-65	3	False	1,500	82	1,500	82	20	20	0	5	J-88	(NA)	
J-66	3	False	1,500	362	1,501	363	20	44	0	5	J-65	(NA)	
J-67	3	False	1,500	362	1,503	364	20	48	0	5	J-65	(NA)	
J-68	3	False	1,500	362	1,503	364	20	52	0	5	J-65	(NA)	
J-69	3	False	1,500	362	1,501	363	20	55	0	5	J-65	(NA)	
J-70	5	False	1,500	362	1,503	364	20	57	0	5	J-65	(NA)	
J-71	3	False	1,500	362	1,505	367	20	61	0	5	J-65	(NA)	
J-72	3	False	1,500	362	1,501	363	20	72	0	5	J-65	(NA)	
J-73	3	False	1,500	362	1,503	364	20	40	0	5	J-65	(NA)	
J-74	3	False	1,500	807	1,503	810	20	48	0	5	J-88	(NA)	
J-75	3	False	1,500	807	1,504	811	20	49	0	5	J-88	(NA)	
J-76	3	False	1,500	807	1,504	811	20	49	0	5	J-88	(NA)	
J-77	3	False	1,500	807	1,504	811	20	50	0	5	J-88	(NA)	
J-78	3	False	1,500	807	1,504	811	20	56	0	5	J-88	(NA)	
J-79	3	False	1,500	807	1,503	810	20	53	0	5	J-88	(NA)	
J-80	3	False	1,500	807	1,503	810	20	53	0	5	J-88	(NA)	
J-81	3	False	1,500	807	1,503	810	20	52	0	5	J-88	(NA)	
J-82	3	False	1,500	807	1,501	808	20	54	0	5	J-88	(NA)	
J-83	25	False	1,500	696	1,500	696	20	42	0	0	J-155	(NA)	
J-84	34	False	1,500	696	1,501	697	20	30	0	0	J-155	(NA)	
J-85	3	False	1,500	380	1,503	383	20	66	0	5	J-88	(NA)	
J-86	3	False	1,500	380	1,504	384	20	45	0	5	J-88	(NA)	
J-87	3	False	1,500	380	1,504	384	20	59	0	5	J-88	(NA)	
J-88	1	False	0	0	0	0	0	5	0	5	J-106	(NA)	
J-89	4	False	1,500	953	1,500	953	20	20	0	5	J-88	(NA)	
J-90	3	True	1,500	1,585	1,500	1,585	20	20	0	5	J-88	(NA)	
J-91	7	False	1,500	1,042	1,500	1,042	20	30	0	5	J-88	(NA)	
J-92	3	False	1,500	1,136	1,506	1,145	20	36	0	5	J-88	(NA)	
J-93	3	False	1,500	1,239	1,504	1,243	20	39	0	5	J-88	(NA)	
J-94	2	False	1,500	1,292	1,503	1,294	20	39	0	5	J-88	(NA)	
J-95	2	False	1,500	1,367	1,503	1,370	20	39	0	5	J-88	(NA)	
J-96	2	False	1,500	1,370	1,504	1,373	20	39	0	5	J-88	(NA)	
J-97	2	False	1,500	1,370	1,501	1,371	20	43	0	5	J-88	(NA)	
J-98	3	False	1,500	1,016	1,509	1,025	20	54	0	5	J-88	(NA)	
J-99	4	False	1,500	1,106	1,501	1,107	20	41	0	5	J-88	(NA)	
J-100	4	False	1,500	563	1,501	564	20	64	0	5	J-88	(NA)	
J-101	4	False	1,500	753	1,504	757	20	42	0	5	J-88	(NA)	

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J-102	4	False	1,500	390	1,501	392	20	59	0	5	J-88	(N/A)
J-103	7	False	1,500	669	1,501	670	20	65	0	5	J-88	(N/A)
J-104	7	False	1,500	767	1,503	770	20	56	0	5	J-88	(N/A)
J-105	4	False	1,500	628	1,504	632	20	59	0	5	J-88	(N/A)
J-106	1	False	0	0	0	0	0	5	0	5	J-88	(N/A)
J-107	3	True	1,500	1,701	1,500	1,701	20	20	0	5	J-88	(N/A)
J-108	4	False	1,500	877	1,500	877	20	20	0	5	J-88	(N/A)
J-109	4	False	1,500	858	1,501	859	20	20	0	5	J-88	(N/A)
J-110	4	False	1,500	1,049	1,501	1,050	20	20	0	5	J-88	(N/A)
J-111	3	False	1,500	1,186	1,503	1,188	20	20	0	5	J-88	(N/A)
J-112	3	False	1,500	1,477	1,509	1,486	20	20	0	5	J-88	(N/A)
J-113	5	False	1,500	1,448	1,505	1,453	20	28	0	5	J-88	(N/A)
J-114	2	False	1,500	1,374	1,504	1,377	20	39	0	5	J-88	(N/A)
J-115	3	False	1,500	1,216	1,504	1,219	20	46	0	5	J-88	(N/A)
J-116	3	False	1,500	963	1,503	965	20	63	0	5	J-88	(N/A)
J-117	3	False	1,500	1,065	1,506	1,071	20	58	0	5	J-88	(N/A)
J-118	4	False	1,500	927	1,504	931	20	61	0	5	J-88	(N/A)
J-119	4	False	1,500	855	1,505	860	20	60	0	5	J-88	(N/A)
J-120	4	False	1,500	943	1,504	946	20	50	0	5	J-88	(N/A)
J-121	6	False	1,500	666	1,500	666	20	42	0	0	J-148	(N/A)
J-122	4	False	1,500	598	1,504	601	20	57	0	5	J-88	(N/A)
J-123	4	False	1,500	518	1,505	523	20	72	0	5	J-88	(N/A)
J-124	4	False	1,500	782	1,506	789	20	58	0	5	J-88	(N/A)
J-125	4	False	1,500	949	1,507	956	20	47	0	5	J-88	(N/A)
J-126	4	False	1,500	715	1,508	722	20	57	0	5	J-88	(N/A)
J-127	4	False	1,500	385	1,506	392	20	29	0	5	J-88	(N/A)
J-128	7	False	1,500	617	1,507	625	20	61	0	5	J-88	(N/A)
J-129	4	False	1,500	385	1,506	392	20	63	0	5	J-88	(N/A)
J-130	3	False	1,500	1,040	1,505	1,045	20	58	0	5	J-88	(N/A)
J-131	7	False	1,500	633	1,506	639	20	70	0	5	J-88	(N/A)
J-132	16	False	1,500	691	1,504	695	20	61	0	5	J-88	(N/A)
J-133	4	False	1,500	694	1,505	699	20	58	0	5	J-88	(N/A)
J-134	3	False	1,500	86	1,500	86	20	20	0	5	J-88	(N/A)
J-135	4	False	1,500	695	1,501	696	20	62	0	5	J-88	(N/A)
J-136	7	False	1,500	697	1,501	698	20	65	0	5	J-88	(N/A)
J-137	16	False	1,500	699	1,504	703	20	65	0	5	J-88	(N/A)
J-138	4	False	1,500	710	1,503	713	20	70	0	5	J-88	(N/A)
J-139	4	False	1,500	1,014	1,504	1,018	20	57	0	5	J-88	(N/A)
J-140	4	False	1,500	693	1,507	701	20	58	0	5	J-88	(N/A)
J-141	4	False	1,500	632	1,507	640	20	72	0	5	J-88	(N/A)
J-142	3	False	1,500	1,036	1,503	1,038	20	57	0	5	J-88	(N/A)
J-143	4	False	1,500	713	1,508	721	20	70	0	5	J-88	(N/A)
J-144	4	False	1,500	832	1,504	836	20	62	0	5	J-88	(N/A)
J-145	4	False	1,500	755	1,504	759	20	62	0	5	J-88	(N/A)
J-146	4	False	1,500	832	1,503	835	20	58	0	5	J-88	(N/A)
J-147	4	False	1,500	832	1,500	832	20	55	0	5	J-88	(N/A)
J-148	13	False	1,500	46	1,505	51	20	21	0	5	J-88	(N/A)
J-149	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)	20	(N/A)	0	(N/A)	(N/A)	(N/A)
J-150	21	False	1,500	696	1,501	698	20	35	0	0	J-155	(N/A)
J-151	26	False	1,500	696	1,506	703	20	43	0	0	J-155	(N/A)
J-152	4	False	1,500	807	1,500	807	20	56	0	5	J-88	(N/A)
J-153	2	False	1,500	1,370	1,501	1,371	20	43	0	5	J-88	(N/A)
J-154	15	False	1,500	627	1,504	631	20	20	0	5	J-88	(N/A)
J-155	15	False	1,500	625	1,503	628	20	20	0	5	J-88	(N/A)
J-156	15	False	1,500	623	1,501	624	20	20	0	5	J-88	(N/A)
J-158	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)	20	(N/A)	0	(N/A)	(N/A)	(N/A)
J-159	20	False	1,500	696	1,500	696	20	31	0	0	J-155	(N/A)
J-160	15	False	1,500	694	1,503	696	20	20	0	1	J-155	(N/A)
J-161	15	False	1,500	689	1,503	691	20	20	0	3	J-155	(N/A)
J-162	14	False	1,500	673	1,503	676	20	20	0	5	J-88	(N/A)
J-163	5	False	1,500	378	1,500	378	20	20	0	5	J-88	(N/A)
J-164	4	False	1,500	370	1,501	372	20	20	0	5	J-88	(N/A)
J-165	4	False	1,500	380	1,500	380	20	21	0	5	J-88	(N/A)
J-181	24	False	1,500	696	1,500	696	20	36	0	0	J-155	(N/A)
J-182	3	False	1,500	807	1,500	807	20	49	0	5	J-88	(N/A)
J-189	8	False	1,500	713	1,500	713	20	20	0	5	J-88	(N/A)
J-190	3	False	1,500	1,493	1,500	1,493	20	52	0	5	J-88	(N/A)
J-191	3	False	1,500	807	1,500	807	20	82	0	5	J-88	(N/A)
J-192	3	True	1,500	1,832	1,500	1,832	20	20	0	5	J-88	(N/A)
J-193	5	False	1,500	720	1,500	720	20	20	0	5	J-88	(N/A)
J-202	24	False	1,500	696	1,500	696	20	40	0	0	J-155	(N/A)
J-203	3	False	1,500	807	1,500	807	20	72	0	5	J-88	(N/A)
J-204	27	False	1,500	696	1,500	696	20	40	0	0	J-155	(N/A)
J-205	3	False	1,500	807	1,500	807	20	73	0	5	J-88	(N/A)
J-208	26	False	1,500	696	1,500	696	20	30	0	0	J-155	(N/A)
J-209	3	False	1,500	807	1,500	807	20	105	0	5	J-88	(N/A)
J-210	26	False	1,500	696	1,500	696	20	30	0	0	J-155	(N/A)
J-211	3	False	1,500	807	1,500	807	20	106	0	5	J-88	(N/A)
J-212	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)	20	(N/A)	0	(N/A)	(N/A)	(N/A)
J-213	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)	20	(N/A)	0	(N/A)	(N/A)	(N/A)
J-215	25	False	1,500	696	1,500	696	20	35	0	0	J-155	(N/A)
J-216	3	False	1,500	807	1,500	807	20	139	0	5	J-88	(N/A)
J-224	7	False	1,500	807	1,500	807	20	66	0	5	J-88	(N/A)
J-226	26	False	1,500	696	1,500	696	20	43	0	0	J-155	(N/A)
J-227	3	False	1,500	807	1,500	807	20	83	0	5	J-88	(N/A)
J-228	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)	20	(N/A)	0	(N/A)	(N/A)	(N/A)
J-229	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)	20	(N/A)	0	(N/A)	(N/A)	(N/A)
J-230	4	False	1,500	385	1,500	385	20	31	0	5	J-88	(N/A)
J-231	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)	20	(N/A)	0	(N/A)	(N/A)	(N/A)
J-235	3	False	1,500	807	1,500	807	20	95	0	5	J-88	(N/A)
J-236	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)	20	(N/A)	0	(N/A)	(N/A)	(N/A)
J-237	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)	20	(N/A)	0	(N/A)	(N/A)	(N/A)

Z:\Richfield\Richfield 10000\11398 Marysville WMPCivilWater Model\Marysville Water Model_calibrated_KBM.wtg

Exhibit 11-4 Future Peak Day

Scenario: Future Peak Day
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?	Demand Collection
34	J-1	6,585.09	<None>	0	6,657.15	31	True	<Collection: 1 item>
36	J-2	6,572.00	<None>	1	6,657.12	37	True	<Collection: 1 item>
38	J-3	6,567.17	<None>	3	6,657.12	39	True	<Collection: 1 item>
40	J-4	6,544.67	<None>	3	6,657.12	49	True	<Collection: 1 item>
42	J-5	6,525.46	<None>	3	6,657.12	57	True	<Collection: 1 item>
44	J-6	6,530.10	<None>	1	6,657.12	55	True	<Collection: 1 item>
46	J-7	6,485.13	<None>	1	6,657.12	74	True	<Collection: 1 item>
48	J-8	6,480.95	<None>	1	6,657.12	76	True	<Collection: 1 item>
50	J-9	6,434.00	<None>	3	6,657.12	97	True	<Collection: 1 item>
52	J-10	6,400.50	<None>	6	6,657.11	111	True	<Collection: 1 item>
57	J-11	6,400.50	<None>	0	6,647.33	107	True	<Collection: 1 item>
59	J-12	6,328.84	<None>	3	6,643.97	136	True	<Collection: 1 item>
61	J-13	6,324.24	<None>	4	6,643.72	138	True	<Collection: 1 item>
63	J-14	6,281.96	<None>	3	6,401.14	52	True	<Collection: 1 item>
65	J-15	6,253.53	<None>	3	6,399.79	63	True	<Collection: 1 item>
67	J-16	6,229.58	<None>	4	6,399.19	73	True	<Collection: 1 item>
71	J-18	6,154.25	<None>	4	6,397.09	105	True	<Collection: 1 item>
73	J-19	6,115.13	<None>	4	6,254.99	61	True	<Collection: 1 item>
75	J-20	6,093.00	<None>	3	6,254.47	70	True	<Collection: 1 item>
77	J-21	6,083.17	<None>	3	6,254.26	74	True	<Collection: 1 item>
79	J-22	6,072.66	<None>	5	6,254.13	79	True	<Collection: 1 item>
81	J-23	6,027.59	<None>	5	6,253.36	98	True	<Collection: 1 item>
83	J-24	5,976.75	<None>	6	6,158.68	79	True	<Collection: 1 item>
85	J-25	5,951.00	<None>	5	6,158.39	90	True	<Collection: 1 item>
87	J-26	5,955.46	<None>	5	6,158.29	88	True	<Collection: 1 item>
89	J-27	5,936.41	<None>	3	6,158.11	96	True	<Collection: 1 item>
91	J-28	5,925.91	<None>	5	6,158.10	100	True	<Collection: 1 item>
93	J-29	5,922.27	<None>	3	6,158.10	102	True	<Collection: 1 item>
95	J-30	5,919.06	<None>	5	6,158.10	103	True	<Collection: 1 item>
97	J-31	5,910.64	<None>	5	6,158.11	107	True	<Collection: 1 item>
99	J-32	5,910.42	<None>	4	6,158.11	107	True	<Collection: 1 item>
101	J-33	5,916.30	<None>	3	6,158.12	105	True	<Collection: 1 item>
103	J-34	5,927.86	<None>	4	6,158.22	100	True	<Collection: 1 item>
106	J-35	6,400.05	<None>	0	6,513.55	49	True	<Collection: 1 item>
108	J-36	6,328.84	<None>	0	6,512.46	79	True	<Collection: 1 item>
110	J-37	6,324.24	<None>	0	6,512.37	81	True	<Collection: 1 item>
112	J-38	6,271.97	<None>	0	6,511.46	104	True	<Collection: 1 item>
114	J-39	6,248.10	<None>	0	6,511.04	114	True	<Collection: 1 item>
116	J-40	6,229.58	<None>	0	6,510.84	122	True	<Collection: 1 item>
118	J-41	6,154.55	<None>	0	6,509.75	154	True	<Collection: 1 item>
120	J-42	6,137.89	<None>	0	6,509.52	161	True	<Collection: 1 item>
122	J-43	6,115.13	<None>	0	6,508.89	170	True	<Collection: 1 item>
126	J-45	6,072.66	<None>	0	6,203.76	57	True	<Collection: 1 item>
128	J-46	6,058.34	<None>	0	6,203.59	63	True	<Collection: 1 item>
130	J-47	6,048.74	<None>	0	6,203.42	67	True	<Collection: 1 item>
132	J-48	6,027.59	<None>	0	6,203.15	76	True	<Collection: 1 item>
134	J-49	6,008.17	<None>	0	6,202.90	84	True	<Collection: 1 item>
136	J-50	5,988.45	<None>	0	6,202.61	93	True	<Collection: 1 item>
138	J-51	5,951.00	<None>	0	6,202.61	109	True	<Collection: 1 item>
141	J-52	5,973.88	<None>	3	6,201.43	98	True	<Collection: 1 item>
143	J-53	5,954.39	<None>	4	6,064.74	48	True	<Collection: 1 item>
145	J-54	5,904.77	<None>	11	6,064.33	69	True	<Collection: 1 item>
147	J-55	5,877.56	<None>	8	6,064.19	81	True	<Collection: 1 item>
149	J-56	5,872.57	<None>	8	6,064.02	83	True	<Collection: 1 item>
151	J-57	5,862.78	<None>	10	6,063.90	87	True	<Collection: 1 item>
153	J-58	5,860.00	<None>	5	6,063.88	88	True	<Collection: 1 item>
155	J-59	5,879.55	<None>	4	6,063.87	80	True	<Collection: 1 item>
157	J-60	5,879.32	<None>	5	6,063.11	80	True	<Collection: 1 item>
159	J-61	5,879.13	<None>	6	6,062.77	79	True	<Collection: 1 item>
161	J-62	5,882.72	<None>	6	6,062.19	78	True	<Collection: 1 item>
163	J-63	5,888.00	<None>	4	6,062.15	75	True	<Collection: 1 item>
165	J-64	5,924.92	<None>	6	6,062.15	59	True	<Collection: 1 item>
167	J-65	5,941.88	<None>	0	6,062.15	52	True	<Collection: 1 item>
169	J-66	5,826.76	<None>	1	5,972.85	63	True	<Collection: 1 item>
170	J-67	5,817.64	<None>	3	5,972.85	67	True	<Collection: 1 item>
172	J-68	5,811.79	<None>	3	5,972.85	70	True	<Collection: 1 item>

174	J-69	5,805.87	<None>	1	5,972.85	72	True	<Collection: 1 item>
176	J-70	5,806.96	<None>	3	5,972.85	72	True	<Collection: 1 item>
178	J-71	5,799.05	<None>	5	5,972.86	75	True	<Collection: 1 item>
180	J-72	5,780.54	<None>	1	5,972.87	83	True	<Collection: 1 item>
182	J-73	5,858.17	<None>	6	6,062.17	88	True	<Collection: 1 item>
185	J-74	5,950.00	<None>	9	6,064.63	50	True	<Collection: 1 item>
188	J-75	5,941.28	<None>	6	6,064.58	53	True	<Collection: 1 item>
190	J-76	5,936.97	<None>	8	6,064.54	55	True	<Collection: 1 item>
192	J-77	5,931.08	<None>	5	6,064.52	58	True	<Collection: 1 item>
194	J-78	5,916.24	<None>	5	6,064.50	64	True	<Collection: 1 item>
196	J-79	5,903.17	<None>	10	6,064.50	70	True	<Collection: 1 item>
198	J-80	5,925.00	<None>	6	6,064.50	60	True	<Collection: 1 item>
200	J-81	5,930.89	<None>	6	6,064.50	58	True	<Collection: 1 item>
202	J-82	5,933.52	<None>	11	6,064.51	57	True	<Collection: 1 item>
206	J-83	5,936.41	<None>	0	6,158.11	96	True	<Collection: 1 item>
209	J-84	5,950.72	<None>	1	6,158.05	90	True	<Collection: 1 item>
211	J-85	5,948.23	<None>	8	6,157.74	91	True	<Collection: 1 item>
213	J-86	5,953.74	<None>	5	6,157.39	88	True	<Collection: 1 item>
215	J-87	5,916.48	<None>	4	6,157.39	104	True	<Collection: 1 item>
217	J-88	6,016.13	<None>	0	6,027.99	5	True	<Collection: 1 item>
221	J-89	5,951.95	<None>	0	6,027.33	33	True	<Collection: 1 item>
223	J-90	5,944.00	<None>	0	6,027.60	36	True	<Collection: 1 item>
225	J-91	5,925.37	<None>	0	6,027.20	44	True	<Collection: 1 item>
227	J-92	5,894.52	<None>	6	6,026.76	57	True	<Collection: 1 item>
229	J-93	5,868.52	<None>	4	6,026.31	68	True	<Collection: 1 item>
231	J-94	5,857.60	<None>	3	6,026.09	73	True	<Collection: 1 item>
233	J-95	5,843.55	<None>	3	6,025.79	79	True	<Collection: 1 item>
235	J-96	5,825.00	<None>	4	6,025.63	87	True	<Collection: 1 item>
237	J-97	5,815.52	<None>	1	6,025.52	91	True	<Collection: 1 item>
239	J-98	5,819.18	<None>	9	6,025.48	89	True	<Collection: 1 item>
241	J-99	5,823.40	<None>	1	6,025.45	87	True	<Collection: 1 item>
243	J-100	5,827.20	<None>	1	6,025.42	86	True	<Collection: 1 item>
245	J-101	5,835.39	<None>	4	6,025.42	82	True	<Collection: 1 item>
247	J-102	5,841.66	<None>	5	6,025.41	80	True	<Collection: 1 item>
249	J-103	5,823.84	<None>	1	6,025.42	87	True	<Collection: 1 item>
252	J-104	5,816.20	<None>	3	6,025.37	90	True	<Collection: 1 item>
254	J-105	5,824.82	<None>	4	6,025.42	87	True	<Collection: 1 item>
257	J-106	6,015.68	<None>	0	6,027.99	5	True	<Collection: 1 item>
260	J-107	5,951.95	<None>	0	6,027.75	33	True	<Collection: 1 item>
262	J-108	5,945.80	<None>	0	6,026.88	35	True	<Collection: 1 item>
264	J-109	5,946.15	<None>	1	6,026.83	35	True	<Collection: 1 item>
266	J-110	5,927.76	<None>	1	6,026.61	43	True	<Collection: 1 item>
268	J-111	5,912.79	<None>	3	6,026.47	49	True	<Collection: 1 item>
270	J-112	5,874.34	<None>	9	6,026.10	66	True	<Collection: 1 item>
272	J-113	5,856.84	<None>	5	6,025.93	73	True	<Collection: 1 item>
274	J-114	5,842.58	<None>	4	6,025.79	79	True	<Collection: 1 item>
276	J-115	5,832.80	<None>	4	6,025.69	83	True	<Collection: 1 item>
278	J-116	5,815.34	<None>	3	6,025.49	91	True	<Collection: 1 item>
280	J-117	5,804.18	<None>	4	6,025.42	96	True	<Collection: 1 item>
282	J-118	5,799.47	<None>	4	6,025.24	98	True	<Collection: 1 item>
284	J-119	5,793.19	<None>	5	6,025.19	100	True	<Collection: 1 item>
286	J-120	5,788.07	<None>	4	6,025.17	103	True	<Collection: 1 item>
288	J-121	5,769.78	<None>	0	6,025.13	110	True	<Collection: 1 item>
290	J-122	5,776.66	<None>	4	6,025.13	108	True	<Collection: 1 item>
292	J-123	5,783.82	<None>	5	6,025.14	104	True	<Collection: 1 item>
294	J-124	5,790.01	<None>	6	6,025.16	102	True	<Collection: 1 item>
297	J-125	5,813.17	<None>	6	6,025.35	92	True	<Collection: 1 item>
299	J-126	5,799.33	<None>	8	6,025.21	98	True	<Collection: 1 item>
302	J-127	5,909.96	<None>	6	6,026.45	50	True	<Collection: 1 item>
304	J-128	5,834.63	<None>	7	6,025.57	83	True	<Collection: 1 item>
306	J-129	5,824.31	<None>	7	6,025.55	87	True	<Collection: 1 item>
308	J-130	5,809.36	<None>	5	6,025.43	93	True	<Collection: 1 item>
310	J-131	5,805.74	<None>	6	6,025.24	95	True	<Collection: 1 item>
312	J-132	5,796.91	<None>	4	6,025.19	99	True	<Collection: 1 item>
314	J-133	5,796.24	<None>	5	6,025.18	99	True	<Collection: 1 item>
316	J-134	5,840.00	<None>	0	6,025.18	80	True	<Collection: 1 item>
318	J-135	5,787.80	<None>	4	6,025.18	103	True	<Collection: 1 item>
320	J-136	5,783.08	<None>	1	6,025.18	105	True	<Collection: 1 item>
322	J-137	5,786.44	<None>	4	6,025.18	103	True	<Collection: 1 item>
324	J-138	5,791.23	<None>	3	6,025.21	101	True	<Collection: 1 item>
326	J-139	5,795.38	<None>	4	6,025.23	99	True	<Collection: 1 item>
329	J-140	5,788.40	<None>	7	6,025.18	102	True	<Collection: 1 item>
332	J-141	5,791.63	<None>	7	6,025.21	101	True	<Collection: 1 item>
335	J-142	5,812.17	<None>	3	6,025.43	92	True	<Collection: 1 item>
338	J-143	5,797.94	<None>	8	6,025.27	98	True	<Collection: 1 item>
341	J-144	5,790.97	<None>	4	6,025.19	101	True	<Collection: 1 item>
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347	J-145	5,786.37	<None>	4	6,025.17	103	True	<Collection: 1 item>
349	J-146	5,786.71	<None>	3	6,025.19	103	True	<Collection: 1 item>
351	J-147	5,782.27	<None>	0	6,025.19	105	True	<Collection: 1 item>
355	J-148	5,864.31	<None>	5	6,023.62	69	True	<Collection: 1 item>
359	J-150	6,137.89	<None>	1	6,256.13	51	True	<Collection: 1 item>
377	J-151	5,988.45	<None>	9	6,158.83	74	True	<Collection: 1 item>
384	J-152	5,993.00	<None>	15	6,199.57	89	True	<Collection: 1 item>
407	J-153	5,815.52	<None>	1	6,025.52	91	True	<Collection: 1 item>
409	J-154	6,312.00	<None>	10	6,399.78	38	True	<Collection: 1 item>
411	J-155	6,312.24	<None>	5	6,399.78	38	True	<Collection: 1 item>
417	J-156	6,310.00	<None>	4	6,399.78	39	True	<Collection: 1 item>
420	J-159	6,102.77	<None>	0	6,254.69	66	True	<Collection: 1 item>
422	J-160	6,114.00	<None>	3	6,254.68	61	True	<Collection: 1 item>
424	J-161	6,112.45	<None>	3	6,254.68	62	True	<Collection: 1 item>
436	J-162	6,123.78	<None>	3	6,254.68	57	True	<Collection: 1 item>
438	J-163	6,008.00	<None>	5	6,157.37	65	True	<Collection: 1 item>
440	J-164	6,010.00	<None>	8	6,157.37	64	True	<Collection: 1 item>
457	J-165	6,004.00	<None>	8	6,157.37	66	True	<Collection: 1 item>
461	J-181	6,060.29	<None>	0	6,253.92	84	True	<Collection: 0 items>
461	J-182	6,089.82	<None>	0	6,203.97	49	True	<Collection: 0 items>
478	J-189	6,285.66	<None>	0	6,641.79	154	True	<Collection: 0 items>
481	J-190	6,285.66	<None>	0	6,511.86	98	True	<Collection: 0 items>
483	J-191	6,281.96	<None>	0	6,511.59	99	True	<Collection: 0 items>
488	J-192	6,588.82	<None>	0	6,657.12	30	True	<Collection: 0 items>
496	J-193	6,401.60	<None>	0	6,647.39	106	True	<Collection: 0 items>
528	J-202	6,021.60	<None>	0	6,253.26	100	True	<Collection: 0 items>
531	J-203	6,021.00	<None>	0	6,203.08	79	True	<Collection: 0 items>
534	J-204	6,019.34	<None>	0	6,159.33	61	True	<Collection: 0 items>
537	J-205	6,019.00	<None>	0	6,203.04	80	True	<Collection: 0 items>
558	J-208	6,208.98	<None>	0	6,398.62	82	True	<Collection: 0 items>
561	J-209	6,208.71	<None>	0	6,510.54	131	True	<Collection: 0 items>
564	J-210	6,206.80	<None>	0	6,398.56	83	True	<Collection: 0 items>
567	J-211	6,206.52	<None>	0	6,510.50	132	True	<Collection: 0 items>
583	J-215	6,141.46	<None>	0	6,396.74	110	True	<Collection: 0 items>
590	J-216	6,094.20	<None>	0	6,508.58	179	True	<Collection: 0 items>
607	J-224	5,956.42	<None>	0	6,198.93	105	True	<Collection: 0 items>
618	J-226	5,985.89	<None>	0	6,158.80	75	True	<Collection: 0 items>
621	J-227	5,985.88	<None>	0	6,202.61	94	True	<Collection: 0 items>
635	J-230	5,922.79	<None>	0	6,026.46	45	True	<Collection: 0 items>
649	J-235	5,951.91	<None>	0	6,202.61	108	True	<Collection: 0 items>

Z:\Richfield\Richfield 10000\11398 Marysville WMP\CivilWater Model\Marysville Water Model_calibrated_KBM.wtg

Exhibit 11-5 Future Peak Instantaneous

Scenario: Future Peak Inst
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?	Demand Collection
34	J-1	6,585.09	<None>	0	6,656.51	31	True	<Collection: 1 item>
36	J-2	6,572.00	<None>	3	6,656.42	37	True	<Collection: 1 item>
38	J-3	6,567.17	<None>	5	6,656.41	39	True	<Collection: 1 item>
40	J-4	6,544.67	<None>	5	6,656.40	48	True	<Collection: 1 item>
42	J-5	6,525.46	<None>	5	6,656.40	57	True	<Collection: 1 item>
44	J-6	6,530.10	<None>	3	6,656.40	55	True	<Collection: 1 item>
46	J-7	6,485.13	<None>	3	6,656.40	74	True	<Collection: 1 item>
48	J-8	6,480.95	<None>	3	6,656.40	76	True	<Collection: 1 item>
50	J-9	6,434.00	<None>	5	6,656.40	96	True	<Collection: 1 item>
52	J-10	6,400.50	<None>	13	6,656.40	111	True	<Collection: 1 item>
57	J-11	6,400.50	<None>	0	6,621.07	95	True	<Collection: 1 item>
59	J-12	6,328.84	<None>	5	6,608.95	121	True	<Collection: 1 item>
61	J-13	6,324.24	<None>	8	6,608.04	123	True	<Collection: 1 item>
63	J-14	6,281.96	<None>	5	6,400.80	51	True	<Collection: 1 item>
65	J-15	6,253.53	<None>	5	6,395.93	62	True	<Collection: 1 item>
67	J-16	6,229.58	<None>	8	6,393.78	71	True	<Collection: 1 item>
71	J-18	6,154.25	<None>	8	6,386.20	100	True	<Collection: 1 item>
73	J-19	6,115.13	<None>	8	6,251.84	59	True	<Collection: 1 item>
75	J-20	6,093.00	<None>	5	6,249.97	68	True	<Collection: 1 item>
77	J-21	6,083.17	<None>	5	6,249.21	72	True	<Collection: 1 item>
79	J-22	6,072.66	<None>	10	6,248.74	76	True	<Collection: 1 item>
81	J-23	6,027.59	<None>	10	6,245.94	94	True	<Collection: 1 item>
83	J-24	5,976.75	<None>	13	6,156.94	78	True	<Collection: 1 item>
85	J-25	5,951.00	<None>	10	6,155.88	89	True	<Collection: 1 item>
87	J-26	5,955.46	<None>	10	6,155.53	87	True	<Collection: 1 item>
89	J-27	5,936.41	<None>	5	6,154.87	95	True	<Collection: 1 item>
91	J-28	5,925.91	<None>	10	6,154.85	99	True	<Collection: 1 item>
93	J-29	5,922.27	<None>	5	6,154.85	101	True	<Collection: 1 item>
95	J-30	5,919.06	<None>	10	6,154.85	102	True	<Collection: 1 item>
97	J-31	5,910.64	<None>	10	6,154.86	106	True	<Collection: 1 item>
99	J-32	5,910.42	<None>	8	6,154.87	106	True	<Collection: 1 item>
101	J-33	5,916.30	<None>	5	6,154.90	103	True	<Collection: 1 item>
103	J-34	5,927.86	<None>	8	6,155.28	98	True	<Collection: 1 item>
106	J-35	6,400.05	<None>	0	6,512.60	49	True	<Collection: 1 item>
108	J-36	6,328.84	<None>	0	6,508.68	78	True	<Collection: 1 item>
110	J-37	6,324.24	<None>	0	6,508.36	80	True	<Collection: 1 item>
112	J-38	6,271.97	<None>	0	6,505.06	101	True	<Collection: 1 item>
114	J-39	6,248.10	<None>	0	6,503.55	111	True	<Collection: 1 item>
116	J-40	6,229.58	<None>	0	6,502.82	118	True	<Collection: 1 item>
118	J-41	6,154.55	<None>	0	6,498.90	149	True	<Collection: 1 item>
120	J-42	6,137.89	<None>	0	6,498.07	156	True	<Collection: 1 item>
122	J-43	6,115.13	<None>	0	6,495.80	165	True	<Collection: 1 item>
126	J-45	6,072.66	<None>	0	6,203.16	56	True	<Collection: 1 item>
128	J-46	6,058.34	<None>	0	6,202.57	62	True	<Collection: 1 item>
130	J-47	6,048.74	<None>	0	6,201.96	66	True	<Collection: 1 item>
132	J-48	6,027.59	<None>	0	6,200.97	75	True	<Collection: 1 item>
134	J-49	6,008.17	<None>	0	6,200.07	83	True	<Collection: 1 item>
136	J-50	5,988.45	<None>	0	6,199.04	91	True	<Collection: 1 item>
138	J-51	5,951.00	<None>	0	6,199.04	107	True	<Collection: 1 item>
141	J-52	5,973.88	<None>	5	6,194.75	96	True	<Collection: 1 item>
143	J-53	5,954.39	<None>	8	6,064.67	48	True	<Collection: 1 item>
145	J-54	5,904.77	<None>	23	6,063.20	69	True	<Collection: 1 item>
147	J-55	5,877.56	<None>	15	6,062.70	80	True	<Collection: 1 item>
149	J-56	5,872.57	<None>	15	6,062.07	82	True	<Collection: 1 item>
151	J-57	5,862.78	<None>	20	6,061.64	86	True	<Collection: 1 item>
153	J-58	5,860.00	<None>	10	6,061.58	87	True	<Collection: 1 item>
155	J-59	5,879.55	<None>	8	6,061.53	79	True	<Collection: 1 item>
157	J-60	5,879.32	<None>	10	6,058.81	78	True	<Collection: 1 item>
159	J-61	5,879.13	<None>	13	6,057.58	77	True	<Collection: 1 item>
161	J-62	5,882.72	<None>	13	6,055.47	75	True	<Collection: 1 item>
163	J-63	5,888.00	<None>	8	6,055.34	72	True	<Collection: 1 item>
165	J-64	5,924.92	<None>	13	6,055.32	56	True	<Collection: 1 item>
167	J-65	5,941.88	<None>	0	6,055.32	49	True	<Collection: 1 item>
169	J-66	5,826.76	<None>	3	5,972.76	63	True	<Collection: 1 item>
170	J-67	5,817.64	<None>	5	5,972.76	67	True	<Collection: 1 item>
172	J-68	5,811.79	<None>	5	5,972.76	70	True	<Collection: 1 item>

174	J-69	5,805.87	<None>	3	5,972.77	72	True	<Collection: 1 item>
176	J-70	5,806.96	<None>	5	5,972.78	72	True	<Collection: 1 item>
178	J-71	5,799.05	<None>	10	5,972.79	75	True	<Collection: 1 item>
180	J-72	5,780.54	<None>	3	5,972.84	83	True	<Collection: 1 item>
182	J-73	5,858.17	<None>	13	6,055.41	85	True	<Collection: 1 item>
185	J-74	5,950.00	<None>	18	6,064.27	49	True	<Collection: 1 item>
188	J-75	5,941.28	<None>	13	6,064.10	53	True	<Collection: 1 item>
190	J-76	5,936.97	<None>	15	6,063.98	55	True	<Collection: 1 item>
192	J-77	5,931.08	<None>	10	6,063.90	57	True	<Collection: 1 item>
194	J-78	5,916.24	<None>	10	6,063.84	64	True	<Collection: 1 item>
196	J-79	5,903.17	<None>	20	6,063.81	70	True	<Collection: 1 item>
198	J-80	5,925.00	<None>	13	6,063.83	60	True	<Collection: 1 item>
200	J-81	5,930.89	<None>	13	6,063.83	58	True	<Collection: 1 item>
202	J-82	5,933.52	<None>	22	6,063.84	56	True	<Collection: 1 item>
206	J-83	5,936.41	<None>	0	6,154.89	95	True	<Collection: 1 item>
209	J-84	5,950.72	<None>	3	6,154.65	88	True	<Collection: 1 item>
211	J-85	5,948.23	<None>	15	6,153.53	89	True	<Collection: 1 item>
213	J-86	5,953.74	<None>	10	6,152.27	86	True	<Collection: 1 item>
215	J-87	5,916.48	<None>	8	6,152.27	102	True	<Collection: 1 item>
217	J-88	6,016.13	<None>	0	6,027.97	5	True	<Collection: 1 item>
221	J-89	5,951.95	<None>	0	6,025.59	32	True	<Collection: 1 item>
223	J-90	5,944.00	<None>	0	6,026.57	36	True	<Collection: 1 item>
225	J-91	5,925.37	<None>	0	6,025.11	43	True	<Collection: 1 item>
227	J-92	5,894.52	<None>	13	6,023.53	56	True	<Collection: 1 item>
229	J-93	5,868.52	<None>	8	6,021.91	66	True	<Collection: 1 item>
231	J-94	5,857.60	<None>	5	6,021.09	71	True	<Collection: 1 item>
233	J-95	5,843.55	<None>	5	6,020.03	76	True	<Collection: 1 item>
235	J-96	5,825.00	<None>	8	6,019.44	84	True	<Collection: 1 item>
237	J-97	5,815.52	<None>	3	6,019.04	88	True	<Collection: 1 item>
239	J-98	5,819.18	<None>	18	6,018.89	86	True	<Collection: 1 item>
241	J-99	5,823.40	<None>	3	6,018.78	85	True	<Collection: 1 item>
243	J-100	5,827.20	<None>	3	6,018.69	83	True	<Collection: 1 item>
245	J-101	5,835.39	<None>	8	6,018.68	79	True	<Collection: 1 item>
247	J-102	5,841.66	<None>	10	6,018.66	77	True	<Collection: 1 item>
249	J-103	5,823.84	<None>	3	6,018.70	84	True	<Collection: 1 item>
252	J-104	5,816.20	<None>	5	6,018.51	88	True	<Collection: 1 item>
254	J-105	5,824.82	<None>	8	6,018.70	84	True	<Collection: 1 item>
257	J-106	6,015.68	<None>	0	6,027.97	5	True	<Collection: 1 item>
260	J-107	5,951.95	<None>	0	6,027.11	33	True	<Collection: 1 item>
262	J-108	5,945.80	<None>	0	6,023.97	34	True	<Collection: 1 item>
264	J-109	5,946.15	<None>	3	6,023.79	34	True	<Collection: 1 item>
266	J-110	5,927.76	<None>	2	6,022.97	41	True	<Collection: 1 item>
268	J-111	5,912.79	<None>	5	6,022.47	47	True	<Collection: 1 item>
270	J-112	5,874.34	<None>	18	6,021.14	64	True	<Collection: 1 item>
272	J-113	5,856.84	<None>	10	6,020.52	71	True	<Collection: 1 item>
274	J-114	5,842.58	<None>	8	6,020.01	77	True	<Collection: 1 item>
276	J-115	5,832.80	<None>	8	6,019.67	81	True	<Collection: 1 item>
278	J-116	5,815.34	<None>	5	6,018.92	88	True	<Collection: 1 item>
280	J-117	5,804.18	<None>	7	6,018.67	93	True	<Collection: 1 item>
282	J-118	5,799.47	<None>	8	6,018.03	95	True	<Collection: 1 item>
284	J-119	5,793.19	<None>	10	6,017.85	97	True	<Collection: 1 item>
286	J-120	5,788.07	<None>	8	6,017.78	99	True	<Collection: 1 item>
288	J-121	5,769.78	<None>	0	6,017.65	107	True	<Collection: 1 item>
290	J-122	5,776.66	<None>	8	6,017.65	104	True	<Collection: 1 item>
292	J-123	5,783.82	<None>	10	6,017.67	101	True	<Collection: 1 item>
294	J-124	5,790.01	<None>	13	6,017.76	99	True	<Collection: 1 item>
297	J-125	5,813.17	<None>	11	6,018.42	89	True	<Collection: 1 item>
299	J-126	5,799.33	<None>	15	6,017.92	95	True	<Collection: 1 item>
302	J-127	5,909.96	<None>	13	6,022.41	49	True	<Collection: 1 item>
304	J-128	5,834.63	<None>	15	6,019.23	80	True	<Collection: 1 item>
306	J-129	5,824.31	<None>	15	6,019.16	84	True	<Collection: 1 item>
308	J-130	5,809.36	<None>	10	6,018.72	91	True	<Collection: 1 item>
310	J-131	5,805.74	<None>	13	6,018.04	92	True	<Collection: 1 item>
312	J-132	5,796.91	<None>	8	6,017.85	96	True	<Collection: 1 item>
314	J-133	5,796.24	<None>	10	6,017.82	96	True	<Collection: 1 item>
316	J-134	5,840.00	<None>	0	6,017.82	77	True	<Collection: 1 item>
318	J-135	5,787.80	<None>	7	6,017.82	100	True	<Collection: 1 item>
320	J-136	5,783.08	<None>	3	6,017.82	102	True	<Collection: 1 item>
322	J-137	5,786.44	<None>	8	6,017.82	100	True	<Collection: 1 item>
324	J-138	5,791.23	<None>	5	6,017.92	98	True	<Collection: 1 item>
326	J-139	5,795.38	<None>	8	6,018.02	96	True	<Collection: 1 item>
329	J-140	5,788.40	<None>	14	6,017.82	99	True	<Collection: 1 item>
332	J-141	5,791.63	<None>	13	6,017.92	98	True	<Collection: 1 item>
335	J-142	5,812.17	<None>	5	6,018.73	89	True	<Collection: 1 item>
338	J-143	5,797.94	<None>	15	6,018.15	95	True	<Collection: 1 item>
341	J-144	5,790.97	<None>	7	6,017.85	98	True	<Collection: 1 item>
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347	J-145	5,786.37	<None>	8	6,017.79	100	True	<Collection: 1 item>
349	J-146	5,786.71	<None>	5	6,017.85	100	True	<Collection: 1 item>
351	J-147	5,782.27	<None>	0	6,017.85	102	True	<Collection: 1 item>
355	J-148	5,864.31	<None>	10	6,012.19	64	True	<Collection: 1 item>
359	J-150	6,137.89	<None>	3	6,255.96	51	True	<Collection: 1 item>
377	J-151	5,988.45	<None>	18	6,157.49	73	True	<Collection: 1 item>
384	J-152	5,993.00	<None>	30	6,188.04	84	True	<Collection: 1 item>
407	J-153	5,815.52	<None>	3	6,019.04	88	True	<Collection: 1 item>
409	J-154	6,312.00	<None>	20	6,395.89	36	True	<Collection: 1 item>
411	J-155	6,312.24	<None>	10	6,395.89	36	True	<Collection: 1 item>
417	J-156	6,310.00	<None>	8	6,395.88	37	True	<Collection: 1 item>
420	J-159	6,102.77	<None>	0	6,250.74	64	True	<Collection: 1 item>
422	J-160	6,114.00	<None>	5	6,250.73	59	True	<Collection: 1 item>
424	J-161	6,112.45	<None>	5	6,250.72	60	True	<Collection: 1 item>
436	J-162	6,123.78	<None>	5	6,250.72	55	True	<Collection: 1 item>
438	J-163	6,008.00	<None>	10	6,152.19	62	True	<Collection: 1 item>
440	J-164	6,010.00	<None>	15	6,152.19	62	True	<Collection: 1 item>
457	J-165	6,004.00	<None>	15	6,152.19	64	True	<Collection: 1 item>
461	J-181	6,060.29	<None>	0	6,247.97	81	True	<Collection: 0 items>
461	J-182	6,089.82	<None>	0	6,203.94	49	True	<Collection: 0 items>
478	J-189	6,285.66	<None>	0	6,601.06	136	True	<Collection: 0 items>
481	J-190	6,285.66	<None>	0	6,506.52	96	True	<Collection: 0 items>
483	J-191	6,281.96	<None>	0	6,505.55	97	True	<Collection: 0 items>
488	J-192	6,588.82	<None>	0	6,656.42	29	True	<Collection: 0 items>
496	J-193	6,401.60	<None>	0	6,621.28	95	True	<Collection: 0 items>
528	J-202	6,021.60	<None>	0	6,245.60	97	True	<Collection: 0 items>
531	J-203	6,021.00	<None>	0	6,200.71	78	True	<Collection: 0 items>
534	J-204	6,019.34	<None>	0	6,159.28	61	True	<Collection: 0 items>
537	J-205	6,019.00	<None>	0	6,200.59	79	True	<Collection: 0 items>
558	J-208	6,208.98	<None>	0	6,391.71	79	True	<Collection: 0 items>
561	J-209	6,208.71	<None>	0	6,501.73	127	True	<Collection: 0 items>
564	J-210	6,206.80	<None>	0	6,391.49	80	True	<Collection: 0 items>
567	J-211	6,206.52	<None>	0	6,501.61	128	True	<Collection: 0 items>
583	J-215	6,141.46	<None>	0	6,384.92	105	True	<Collection: 0 items>
590	J-216	6,094.20	<None>	0	6,494.68	173	True	<Collection: 0 items>
607	J-224	5,956.42	<None>	0	6,185.73	99	True	<Collection: 0 items>
618	J-226	5,985.89	<None>	0	6,157.37	74	True	<Collection: 0 items>
621	J-227	5,985.88	<None>	0	6,199.04	92	True	<Collection: 0 items>
635	J-230	5,922.79	<None>	0	6,022.43	43	True	<Collection: 0 items>
649	J-235	5,951.91	<None>	0	6,199.04	107	True	<Collection: 0 items>

Z:\Richfield\Richfield 10000\11398 Marysville WMP\CivilWater Model\Marysville Water Model_calibrated_KBM.wtg

Exhibit 11-6 Proposed Peak Day

Scenario: Proposed Peak Day
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?	Demand Collection
34	J-1	6,585.09	<None>	0	6,657.39	31	True	<Collection: 1 item>
36	J-2	6,572.00	<None>	1	6,657.38	37	True	<Collection: 1 item>
38	J-3	6,567.17	<None>	3	6,657.38	39	True	<Collection: 1 item>
40	J-4	6,544.67	<None>	3	6,657.38	49	True	<Collection: 1 item>
42	J-5	6,525.46	<None>	3	6,657.38	57	True	<Collection: 1 item>
44	J-6	6,530.10	<None>	1	6,657.38	55	True	<Collection: 1 item>
46	J-7	6,485.13	<None>	1	6,657.38	75	True	<Collection: 1 item>
48	J-8	6,480.95	<None>	1	6,657.38	76	True	<Collection: 1 item>
50	J-9	6,434.00	<None>	3	6,657.38	97	True	<Collection: 1 item>
52	J-10	6,400.50	<None>	6	6,657.38	111	True	<Collection: 1 item>
57	J-11	6,400.50	<None>	0	6,513.50	49	True	<Collection: 1 item>
59	J-12	6,328.84	<None>	3	6,511.76	79	True	<Collection: 1 item>
61	J-13	6,324.24	<None>	4	6,511.63	81	True	<Collection: 1 item>
63	J-14	6,281.96	<None>	3	6,510.59	99	True	<Collection: 1 item>
65	J-15	6,253.53	<None>	3	6,509.72	111	True	<Collection: 1 item>
67	J-16	6,229.58	<None>	4	6,509.37	121	True	<Collection: 1 item>
71	J-18	6,154.25	<None>	4	6,299.44	63	True	<Collection: 1 item>
73	J-19	6,115.13	<None>	4	6,298.88	80	True	<Collection: 1 item>
75	J-20	6,093.00	<None>	3	6,298.78	89	True	<Collection: 1 item>
77	J-21	6,083.17	<None>	3	6,298.75	93	True	<Collection: 1 item>
79	J-22	6,072.66	<None>	5	6,298.73	98	True	<Collection: 1 item>
81	J-23	6,027.59	<None>	5	6,298.63	117	True	<Collection: 1 item>
83	J-24	5,976.75	<None>	6	6,137.27	69	True	<Collection: 1 item>
85	J-25	5,951.00	<None>	5	6,137.23	81	True	<Collection: 1 item>
87	J-26	5,955.46	<None>	5	6,137.21	79	True	<Collection: 1 item>
89	J-27	5,936.41	<None>	3	6,137.17	87	True	<Collection: 1 item>
91	J-28	5,925.91	<None>	5	6,137.17	91	True	<Collection: 1 item>
93	J-29	5,922.27	<None>	3	6,137.17	93	True	<Collection: 1 item>
95	J-30	5,919.06	<None>	5	6,137.17	94	True	<Collection: 1 item>
97	J-31	5,910.64	<None>	5	6,137.19	98	True	<Collection: 1 item>
99	J-32	5,910.42	<None>	4	6,137.19	98	True	<Collection: 1 item>
101	J-33	5,916.30	<None>	3	6,137.21	96	True	<Collection: 1 item>
103	J-34	5,927.86	<None>	4	6,137.22	91	True	<Collection: 1 item>
106	J-35	6,400.05	<None>	0	6,513.50	49	True	<Collection: 1 item>
108	J-36	6,328.84	<None>	0	6,511.68	79	True	<Collection: 1 item>
110	J-37	6,324.24	<None>	0	6,511.53	81	True	<Collection: 1 item>
112	J-38	6,271.97	<None>	0	6,510.39	103	True	<Collection: 1 item>
114	J-39	6,248.10	<None>	0	6,509.78	113	True	<Collection: 1 item>
116	J-40	6,229.58	<None>	0	6,509.48	121	True	<Collection: 1 item>
118	J-41	6,154.55	<None>	0	6,299.44	63	True	<Collection: 1 item>
120	J-42	6,137.89	<None>	0	6,299.13	70	True	<Collection: 1 item>
122	J-43	6,115.13	<None>	0	6,298.96	80	True	<Collection: 1 item>
126	J-45	6,072.66	<None>	0	6,298.81	98	True	<Collection: 1 item>
128	J-46	6,058.34	<None>	0	6,298.77	104	True	<Collection: 1 item>
130	J-47	6,048.74	<None>	0	6,298.72	108	True	<Collection: 1 item>
132	J-48	6,027.59	<None>	0	6,298.65	117	True	<Collection: 1 item>
134	J-49	6,008.17	<None>	0	6,298.59	126	True	<Collection: 1 item>
136	J-50	5,988.45	<None>	0	6,298.53	134	True	<Collection: 1 item>
138	J-51	5,951.00	<None>	0	6,137.23	81	True	<Collection: 1 item>
141	J-52	5,973.88	<None>	3	6,298.53	140	True	<Collection: 1 item>
143	J-53	5,954.39	<None>	4	6,078.46	54	True	<Collection: 1 item>
145	J-54	5,904.77	<None>	11	6,078.57	75	True	<Collection: 1 item>
147	J-55	5,877.56	<None>	8	6,078.44	87	True	<Collection: 1 item>
149	J-56	5,872.57	<None>	8	6,078.26	89	True	<Collection: 1 item>
151	J-57	5,862.78	<None>	10	6,078.14	93	True	<Collection: 1 item>
153	J-58	5,860.00	<None>	5	6,078.13	94	True	<Collection: 1 item>
155	J-59	5,879.55	<None>	4	6,078.11	86	True	<Collection: 1 item>
157	J-60	5,879.32	<None>	5	6,077.36	86	True	<Collection: 1 item>
159	J-61	5,879.13	<None>	6	6,077.02	86	True	<Collection: 1 item>
161	J-62	5,882.72	<None>	6	6,076.43	84	True	<Collection: 1 item>
163	J-63	5,888.00	<None>	4	6,076.40	82	True	<Collection: 1 item>
165	J-64	5,924.92	<None>	6	6,076.39	66	True	<Collection: 1 item>
167	J-65	5,941.88	<None>	0	6,076.39	58	True	<Collection: 1 item>
169	J-66	5,826.76	<None>	1	5,972.85	63	True	<Collection: 1 item>
170	J-67	5,817.64	<None>	3	5,972.85	67	True	<Collection: 1 item>
172	J-68	5,811.79	<None>	3	5,972.85	70	True	<Collection: 1 item>

174	J-69	5,805.87	<None>	1	5,972.85	72	True	<Collection: 1 item>
176	J-70	5,806.96	<None>	3	5,972.85	72	True	<Collection: 1 item>
178	J-71	5,799.05	<None>	5	5,972.86	75	True	<Collection: 1 item>
180	J-72	5,780.54	<None>	1	5,972.87	83	True	<Collection: 1 item>
182	J-73	5,858.17	<None>	6	6,076.42	94	True	<Collection: 1 item>
185	J-74	5,950.00	<None>	9	6,078.46	56	True	<Collection: 1 item>
188	J-75	5,941.28	<None>	6	6,078.45	59	True	<Collection: 1 item>
190	J-76	5,936.97	<None>	8	6,078.44	61	True	<Collection: 1 item>
192	J-77	5,931.08	<None>	5	6,078.43	64	True	<Collection: 1 item>
194	J-78	5,916.24	<None>	5	6,078.43	70	True	<Collection: 1 item>
196	J-79	5,903.17	<None>	10	6,078.43	76	True	<Collection: 1 item>
198	J-80	5,925.00	<None>	6	6,078.44	66	True	<Collection: 1 item>
200	J-81	5,930.89	<None>	6	6,078.45	64	True	<Collection: 1 item>
202	J-82	5,933.52	<None>	11	6,078.47	63	True	<Collection: 1 item>
206	J-83	5,936.41	<None>	0	6,137.17	87	True	<Collection: 1 item>
209	J-84	5,950.72	<None>	1	6,137.15	81	True	<Collection: 1 item>
211	J-85	5,948.23	<None>	8	6,137.13	82	True	<Collection: 1 item>
213	J-86	5,953.74	<None>	5	6,137.13	79	True	<Collection: 1 item>
215	J-87	5,916.48	<None>	4	6,137.13	95	True	<Collection: 1 item>
217	J-88	6,016.13	<None>	0	6,027.99	5	True	<Collection: 1 item>
221	J-89	5,951.95	<None>	0	6,027.38	33	True	<Collection: 1 item>
223	J-90	5,944.00	<None>	0	6,027.62	36	True	<Collection: 1 item>
225	J-91	5,925.37	<None>	0	6,027.23	44	True	<Collection: 1 item>
227	J-92	5,894.52	<None>	6	6,026.80	57	True	<Collection: 1 item>
229	J-93	5,868.52	<None>	4	6,026.37	68	True	<Collection: 1 item>
231	J-94	5,857.60	<None>	3	6,026.15	73	True	<Collection: 1 item>
233	J-95	5,843.55	<None>	3	6,025.87	79	True	<Collection: 1 item>
235	J-96	5,825.00	<None>	4	6,025.79	87	True	<Collection: 1 item>
237	J-97	5,815.52	<None>	1	6,025.73	91	True	<Collection: 1 item>
239	J-98	5,819.18	<None>	9	6,025.70	89	True	<Collection: 1 item>
241	J-99	5,823.40	<None>	1	6,025.68	88	True	<Collection: 1 item>
243	J-100	5,827.20	<None>	1	6,025.66	86	True	<Collection: 1 item>
245	J-101	5,835.39	<None>	4	6,025.65	82	True	<Collection: 1 item>
247	J-102	5,841.66	<None>	5	6,025.65	80	True	<Collection: 1 item>
249	J-103	5,823.84	<None>	1	6,025.66	87	True	<Collection: 1 item>
252	J-104	5,816.20	<None>	3	6,025.63	91	True	<Collection: 1 item>
254	J-105	5,824.82	<None>	4	6,025.66	87	True	<Collection: 1 item>
257	J-106	6,015.68	<None>	0	6,027.99	5	True	<Collection: 1 item>
260	J-107	5,951.95	<None>	0	6,027.76	33	True	<Collection: 1 item>
262	J-108	5,945.80	<None>	0	6,026.97	35	True	<Collection: 1 item>
264	J-109	5,946.15	<None>	1	6,026.92	35	True	<Collection: 1 item>
266	J-110	5,927.76	<None>	1	6,026.71	43	True	<Collection: 1 item>
268	J-111	5,912.79	<None>	3	6,026.58	49	True	<Collection: 1 item>
270	J-112	5,874.34	<None>	9	6,026.20	66	True	<Collection: 1 item>
272	J-113	5,856.84	<None>	5	6,026.02	73	True	<Collection: 1 item>
274	J-114	5,842.58	<None>	4	6,025.87	79	True	<Collection: 1 item>
276	J-115	5,832.80	<None>	4	6,025.82	84	True	<Collection: 1 item>
278	J-116	5,815.34	<None>	3	6,025.72	91	True	<Collection: 1 item>
280	J-117	5,804.18	<None>	4	6,025.68	96	True	<Collection: 1 item>
282	J-118	5,799.47	<None>	4	6,025.62	98	True	<Collection: 1 item>
284	J-119	5,793.19	<None>	5	6,025.56	101	True	<Collection: 1 item>
286	J-120	5,788.07	<None>	4	6,025.52	103	True	<Collection: 1 item>
288	J-121	5,769.78	<None>	0	6,025.48	111	True	<Collection: 1 item>
290	J-122	5,776.66	<None>	4	6,025.48	108	True	<Collection: 1 item>
292	J-123	5,783.82	<None>	5	6,025.49	105	True	<Collection: 1 item>
294	J-124	5,790.01	<None>	6	6,025.51	102	True	<Collection: 1 item>
297	J-125	5,813.17	<None>	6	6,025.62	92	True	<Collection: 1 item>
299	J-126	5,799.33	<None>	8	6,025.53	98	True	<Collection: 1 item>
302	J-127	5,909.96	<None>	6	6,137.13	98	True	<Collection: 1 item>
304	J-128	5,834.63	<None>	7	6,025.83	83	True	<Collection: 1 item>
306	J-129	5,824.31	<None>	7	6,025.81	87	True	<Collection: 1 item>
308	J-130	5,809.36	<None>	5	6,025.71	94	True	<Collection: 1 item>
310	J-131	5,805.74	<None>	6	6,025.70	95	True	<Collection: 1 item>
312	J-132	5,796.91	<None>	4	6,025.71	99	True	<Collection: 1 item>
314	J-133	5,796.24	<None>	5	6,025.76	99	True	<Collection: 1 item>
316	J-134	5,840.00	<None>	0	6,025.76	80	True	<Collection: 1 item>
318	J-135	5,787.80	<None>	4	6,025.74	103	True	<Collection: 1 item>
320	J-136	5,783.08	<None>	1	6,025.72	105	True	<Collection: 1 item>
322	J-137	5,786.44	<None>	4	6,025.71	104	True	<Collection: 1 item>
324	J-138	5,791.23	<None>	3	6,025.66	101	True	<Collection: 1 item>
326	J-139	5,795.38	<None>	4	6,025.62	100	True	<Collection: 1 item>
329	J-140	5,788.40	<None>	7	6,025.71	103	True	<Collection: 1 item>
332	J-141	5,791.63	<None>	7	6,025.66	101	True	<Collection: 1 item>
335	J-142	5,812.17	<None>	3	6,025.71	92	True	<Collection: 1 item>
338	J-143	5,797.94	<None>	8	6,025.63	99	True	<Collection: 1 item>
341	J-144	5,790.97	<None>	4	6,025.56	101	True	<Collection: 1 item>
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347	J-145	5,786.37	<None>	4	6,025.53	103	True	<Collection: 1 item>
349	J-146	5,786.71	<None>	3	6,025.56	103	True	<Collection: 1 item>
351	J-147	5,782.27	<None>	0	6,025.56	105	True	<Collection: 1 item>
353	J-148	5,864.31	<None>	5	6,023.97	69	True	<Collection: 1 item>
355	J-149	6,198.89	<None>	5	6,298.43	43	True	<Collection: 1 item>
359	J-150	6,137.89	<None>	1	6,299.13	70	True	<Collection: 1 item>
377	J-151	5,988.45	<None>	9	6,298.53	134	True	<Collection: 1 item>
384	J-152	5,993.00	<None>	15	6,298.52	132	True	<Collection: 1 item>
407	J-153	5,815.52	<None>	1	6,025.73	91	True	<Collection: 1 item>
409	J-154	6,312.00	<None>	10	6,509.71	86	True	<Collection: 1 item>
411	J-155	6,312.24	<None>	5	6,509.71	85	True	<Collection: 1 item>
417	J-156	6,310.00	<None>	4	6,509.71	86	True	<Collection: 1 item>
420	J-159	6,102.77	<None>	0	6,298.82	85	True	<Collection: 1 item>
422	J-160	6,114.00	<None>	3	6,298.81	80	True	<Collection: 1 item>
424	J-161	6,112.45	<None>	3	6,298.81	81	True	<Collection: 1 item>
436	J-162	6,123.78	<None>	3	6,298.81	76	True	<Collection: 1 item>
438	J-163	6,008.00	<None>	5	6,137.12	56	True	<Collection: 1 item>
440	J-164	6,010.00	<None>	8	6,137.12	55	True	<Collection: 1 item>
457	J-165	6,004.00	<None>	8	6,137.12	58	True	<Collection: 1 item>
461	J-181	6,060.29	<None>	0	6,298.70	103	True	<Collection: 0 items>
478	J-182	6,089.82	<None>	0	6,298.87	90	True	<Collection: 0 items>
481	J-189	6,285.66	<None>	0	6,510.67	97	True	<Collection: 0 items>
483	J-190	6,285.66	<None>	0	6,510.68	97	True	<Collection: 0 items>
488	J-191	6,281.96	<None>	0	6,510.59	99	True	<Collection: 0 items>
496	J-192	6,588.82	<None>	0	6,657.38	30	True	<Collection: 0 items>
528	J-193	6,401.60	<None>	0	6,657.38	111	True	<Collection: 0 items>
531	J-202	6,021.60	<None>	0	6,298.63	120	True	<Collection: 0 items>
534	J-203	6,021.60	<None>	0	6,298.63	120	True	<Collection: 0 items>
537	J-204	6,021.60	<None>	0	6,298.62	120	True	<Collection: 0 items>
558	J-205	6,021.60	<None>	0	6,298.62	120	True	<Collection: 0 items>
561	J-208	6,208.98	<None>	0	6,509.03	130	True	<Collection: 0 items>
564	J-209	6,208.71	<None>	0	6,509.03	130	True	<Collection: 0 items>
571	J-210	6,206.80	<None>	0	6,300.47	41	True	<Collection: 0 items>
572	J-211	6,206.80	<None>	0	6,300.47	41	True	<Collection: 0 items>
573	J-212	6,208.00	<None>	0	6,509.02	130	True	<Collection: 0 items>
583	J-213	6,207.00	<None>	0	6,300.48	40	True	<Collection: 0 items>
590	J-215	6,141.46	<None>	0	6,299.20	68	True	<Collection: 0 items>
607	J-216	6,094.20	<None>	0	6,298.88	89	True	<Collection: 0 items>
618	J-224	5,956.42	<None>	0	6,298.52	148	True	<Collection: 0 items>
621	J-226	5,985.89	<None>	0	6,137.29	66	True	<Collection: 0 items>
624	J-227	5,985.88	<None>	0	6,137.29	66	True	<Collection: 0 items>
625	J-228	5,988.00	<None>	0	6,298.53	134	True	<Collection: 0 items>
635	J-229	5,986.00	<None>	0	6,137.29	65	True	<Collection: 0 items>
639	J-230	5,922.79	<None>	0	6,137.13	93	True	<Collection: 0 items>
649	J-231	5,910.00	<None>	0	6,137.13	98	True	<Collection: 0 items>
660	J-235	5,951.91	<None>	0	6,137.23	80	True	<Collection: 0 items>
664	J-236	6,198.89	<None>	0	6,298.44	43	True	<Collection: 0 items>
664	J-237	5,807.81	<None>	0	6,025.78	94	True	<Collection: 0 items>

Z:\Richfield\Richfield 10000\11398 Marysville WMP\Civil\Water Model\Marysville Water Model_calibrated_KBM.wtg

Exhibit 11-7 Proposed Peak Instantaneous

Scenario: Proposed Peak Inst
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)	Is Active?	Demand Collection
34	J-1	6,585.09	<None>	0	6,657.37	31	True	<Collection: 1 item>
36	J-2	6,572.00	<None>	3	6,657.37	37	True	<Collection: 1 item>
38	J-3	6,567.17	<None>	5	6,657.36	39	True	<Collection: 1 item>
40	J-4	6,544.67	<None>	5	6,657.36	49	True	<Collection: 1 item>
42	J-5	6,525.46	<None>	5	6,657.36	57	True	<Collection: 1 item>
44	J-6	6,530.10	<None>	3	6,657.36	55	True	<Collection: 1 item>
46	J-7	6,485.13	<None>	3	6,657.36	75	True	<Collection: 1 item>
48	J-8	6,480.95	<None>	3	6,657.36	76	True	<Collection: 1 item>
50	J-9	6,434.00	<None>	5	6,657.36	97	True	<Collection: 1 item>
52	J-10	6,400.50	<None>	13	6,657.35	111	True	<Collection: 1 item>
57	J-11	6,400.50	<None>	0	6,512.41	48	True	<Collection: 1 item>
59	J-12	6,328.84	<None>	5	6,506.15	77	True	<Collection: 1 item>
61	J-13	6,324.24	<None>	8	6,505.69	79	True	<Collection: 1 item>
63	J-14	6,281.96	<None>	5	6,501.94	95	True	<Collection: 1 item>
65	J-15	6,253.53	<None>	5	6,498.78	106	True	<Collection: 1 item>
67	J-16	6,229.58	<None>	8	6,497.50	116	True	<Collection: 1 item>
71	J-18	6,154.25	<None>	8	6,296.71	62	True	<Collection: 1 item>
73	J-19	6,115.13	<None>	8	6,294.69	78	True	<Collection: 1 item>
75	J-20	6,093.00	<None>	5	6,294.33	87	True	<Collection: 1 item>
77	J-21	6,083.17	<None>	5	6,294.21	91	True	<Collection: 1 item>
79	J-22	6,072.66	<None>	10	6,294.14	96	True	<Collection: 1 item>
81	J-23	6,027.59	<None>	10	6,293.80	115	True	<Collection: 1 item>
83	J-24	5,976.75	<None>	13	6,137.21	69	True	<Collection: 1 item>
85	J-25	5,951.00	<None>	10	6,137.07	81	True	<Collection: 1 item>
87	J-26	5,955.46	<None>	10	6,136.99	79	True	<Collection: 1 item>
89	J-27	5,936.41	<None>	5	6,136.85	87	True	<Collection: 1 item>
91	J-28	5,925.91	<None>	10	6,136.85	91	True	<Collection: 1 item>
93	J-29	5,922.27	<None>	5	6,136.85	93	True	<Collection: 1 item>
95	J-30	5,919.06	<None>	10	6,136.87	94	True	<Collection: 1 item>
97	J-31	5,910.64	<None>	10	6,136.92	98	True	<Collection: 1 item>
99	J-32	5,910.42	<None>	8	6,136.95	98	True	<Collection: 1 item>
101	J-33	5,916.30	<None>	5	6,137.01	95	True	<Collection: 1 item>
103	J-34	5,927.86	<None>	8	6,137.04	91	True	<Collection: 1 item>
106	J-35	6,400.05	<None>	0	6,512.42	49	True	<Collection: 1 item>
108	J-36	6,328.84	<None>	0	6,505.86	77	True	<Collection: 1 item>
110	J-37	6,324.24	<None>	0	6,505.32	78	True	<Collection: 1 item>
112	J-38	6,271.97	<None>	0	6,501.21	99	True	<Collection: 1 item>
114	J-39	6,248.10	<None>	0	6,499.00	109	True	<Collection: 1 item>
116	J-40	6,229.58	<None>	0	6,497.91	116	True	<Collection: 1 item>
118	J-41	6,154.55	<None>	0	6,296.72	62	True	<Collection: 1 item>
120	J-42	6,137.89	<None>	0	6,295.60	68	True	<Collection: 1 item>
122	J-43	6,115.13	<None>	0	6,294.99	78	True	<Collection: 1 item>
126	J-45	6,072.66	<None>	0	6,294.45	96	True	<Collection: 1 item>
128	J-46	6,058.34	<None>	0	6,294.29	102	True	<Collection: 1 item>
130	J-47	6,048.74	<None>	0	6,294.13	106	True	<Collection: 1 item>
132	J-48	6,027.59	<None>	0	6,293.86	115	True	<Collection: 1 item>
134	J-49	6,008.17	<None>	0	6,293.64	124	True	<Collection: 1 item>
136	J-50	5,988.45	<None>	0	6,293.42	132	True	<Collection: 1 item>
138	J-51	5,951.00	<None>	0	6,137.08	81	True	<Collection: 1 item>
141	J-52	5,973.88	<None>	5	6,293.41	138	True	<Collection: 1 item>
143	J-53	5,954.39	<None>	8	6,072.86	51	True	<Collection: 1 item>
145	J-54	5,904.77	<None>	23	6,073.27	73	True	<Collection: 1 item>
147	J-55	5,877.56	<None>	15	6,072.77	84	True	<Collection: 1 item>
149	J-56	5,872.57	<None>	15	6,072.14	86	True	<Collection: 1 item>
151	J-57	5,862.78	<None>	20	6,071.71	90	True	<Collection: 1 item>
153	J-58	5,860.00	<None>	10	6,071.65	92	True	<Collection: 1 item>
155	J-59	5,879.55	<None>	8	6,071.60	83	True	<Collection: 1 item>
157	J-60	5,879.32	<None>	10	6,068.88	82	True	<Collection: 1 item>
159	J-61	5,879.13	<None>	13	6,067.64	82	True	<Collection: 1 item>
161	J-62	5,882.72	<None>	13	6,065.54	79	True	<Collection: 1 item>
163	J-63	5,888.00	<None>	8	6,065.41	77	True	<Collection: 1 item>
165	J-64	5,924.92	<None>	13	6,065.38	61	True	<Collection: 1 item>
167	J-65	5,941.88	<None>	0	6,065.38	53	True	<Collection: 1 item>
169	J-66	5,826.76	<None>	3	5,972.76	63	True	<Collection: 1 item>
170	J-67	5,817.64	<None>	5	5,972.76	67	True	<Collection: 1 item>
172	J-68	5,811.79	<None>	5	5,972.76	70	True	<Collection: 1 item>

174	J-69	5,805.87	<None>	3	5,972.77	72	True	<Collection: 1 item>
176	J-70	5,806.96	<None>	5	5,972.78	72	True	<Collection: 1 item>
178	J-71	5,799.05	<None>	10	5,972.79	75	True	<Collection: 1 item>
180	J-72	5,780.54	<None>	3	5,972.84	83	True	<Collection: 1 item>
182	J-73	5,858.17	<None>	13	6,065.48	90	True	<Collection: 1 item>
185	J-74	5,950.00	<None>	18	6,072.86	53	True	<Collection: 1 item>
188	J-75	5,941.28	<None>	13	6,072.80	57	True	<Collection: 1 item>
190	J-76	5,936.97	<None>	15	6,072.77	59	True	<Collection: 1 item>
192	J-77	5,931.08	<None>	10	6,072.76	61	True	<Collection: 1 item>
194	J-78	5,916.24	<None>	10	6,072.76	68	True	<Collection: 1 item>
196	J-79	5,903.17	<None>	20	6,072.74	73	True	<Collection: 1 item>
198	J-80	5,925.00	<None>	13	6,072.78	64	True	<Collection: 1 item>
200	J-81	5,930.89	<None>	13	6,072.83	61	True	<Collection: 1 item>
202	J-82	5,933.52	<None>	22	6,072.90	60	True	<Collection: 1 item>
206	J-83	5,936.41	<None>	0	6,136.85	87	True	<Collection: 1 item>
209	J-84	5,950.72	<None>	3	6,136.78	80	True	<Collection: 1 item>
211	J-85	5,948.23	<None>	15	6,136.72	82	True	<Collection: 1 item>
213	J-86	5,953.74	<None>	10	6,136.70	79	True	<Collection: 1 item>
215	J-87	5,916.48	<None>	8	6,136.70	95	True	<Collection: 1 item>
217	J-88	6,016.13	<None>	0	6,027.97	5	True	<Collection: 1 item>
221	J-89	5,951.95	<None>	0	6,025.77	32	True	<Collection: 1 item>
223	J-90	5,944.00	<None>	0	6,026.62	36	True	<Collection: 1 item>
225	J-91	5,925.37	<None>	0	6,025.21	43	True	<Collection: 1 item>
227	J-92	5,894.52	<None>	13	6,023.68	56	True	<Collection: 1 item>
229	J-93	5,868.52	<None>	8	6,022.12	66	True	<Collection: 1 item>
231	J-94	5,857.60	<None>	5	6,021.34	71	True	<Collection: 1 item>
233	J-95	5,843.55	<None>	5	6,020.31	76	True	<Collection: 1 item>
235	J-96	5,825.00	<None>	8	6,020.01	84	True	<Collection: 1 item>
237	J-97	5,815.52	<None>	3	6,019.82	88	True	<Collection: 1 item>
239	J-98	5,819.18	<None>	18	6,019.70	87	True	<Collection: 1 item>
241	J-99	5,823.40	<None>	3	6,019.61	85	True	<Collection: 1 item>
243	J-100	5,827.20	<None>	3	6,019.54	83	True	<Collection: 1 item>
245	J-101	5,835.39	<None>	8	6,019.52	80	True	<Collection: 1 item>
247	J-102	5,841.66	<None>	10	6,019.50	77	True	<Collection: 1 item>
249	J-103	5,823.84	<None>	3	6,019.55	85	True	<Collection: 1 item>
252	J-104	5,816.20	<None>	5	6,019.45	88	True	<Collection: 1 item>
254	J-105	5,824.82	<None>	8	6,019.54	84	True	<Collection: 1 item>
257	J-106	6,015.68	<None>	0	6,027.97	5	True	<Collection: 1 item>
260	J-107	5,951.95	<None>	0	6,027.14	33	True	<Collection: 1 item>
262	J-108	5,945.80	<None>	0	6,024.28	34	True	<Collection: 1 item>
264	J-109	5,946.15	<None>	3	6,024.11	34	True	<Collection: 1 item>
266	J-110	5,927.76	<None>	2	6,023.35	41	True	<Collection: 1 item>
268	J-111	5,912.79	<None>	5	6,022.89	48	True	<Collection: 1 item>
270	J-112	5,874.34	<None>	18	6,021.49	64	True	<Collection: 1 item>
272	J-113	5,856.84	<None>	10	6,020.84	71	True	<Collection: 1 item>
274	J-114	5,842.58	<None>	8	6,020.31	77	True	<Collection: 1 item>
276	J-115	5,832.80	<None>	8	6,020.13	81	True	<Collection: 1 item>
278	J-116	5,815.34	<None>	5	6,019.78	88	True	<Collection: 1 item>
280	J-117	5,804.18	<None>	7	6,019.64	93	True	<Collection: 1 item>
282	J-118	5,799.47	<None>	8	6,019.40	95	True	<Collection: 1 item>
284	J-119	5,793.19	<None>	10	6,019.18	98	True	<Collection: 1 item>
286	J-120	5,788.07	<None>	8	6,019.06	100	True	<Collection: 1 item>
288	J-121	5,769.78	<None>	0	6,018.91	108	True	<Collection: 1 item>
290	J-122	5,776.66	<None>	8	6,018.91	105	True	<Collection: 1 item>
292	J-123	5,783.82	<None>	10	6,018.93	102	True	<Collection: 1 item>
294	J-124	5,790.01	<None>	13	6,019.01	99	True	<Collection: 1 item>
297	J-125	5,813.17	<None>	11	6,019.40	89	True	<Collection: 1 item>
299	J-126	5,799.33	<None>	15	6,019.08	95	True	<Collection: 1 item>
302	J-127	5,909.96	<None>	13	6,136.70	98	True	<Collection: 1 item>
304	J-128	5,834.63	<None>	15	6,020.17	80	True	<Collection: 1 item>
306	J-129	5,824.31	<None>	15	6,020.08	85	True	<Collection: 1 item>
308	J-130	5,809.36	<None>	10	6,019.75	91	True	<Collection: 1 item>
310	J-131	5,805.74	<None>	13	6,019.69	93	True	<Collection: 1 item>
312	J-132	5,796.91	<None>	8	6,019.74	96	True	<Collection: 1 item>
314	J-133	5,796.24	<None>	10	6,019.91	97	True	<Collection: 1 item>
316	J-134	5,840.00	<None>	0	6,019.91	78	True	<Collection: 1 item>
318	J-135	5,787.80	<None>	7	6,019.84	100	True	<Collection: 1 item>
320	J-136	5,783.08	<None>	3	6,019.79	102	True	<Collection: 1 item>
322	J-137	5,786.44	<None>	8	6,019.74	101	True	<Collection: 1 item>
324	J-138	5,791.23	<None>	5	6,019.56	99	True	<Collection: 1 item>
326	J-139	5,795.38	<None>	8	6,019.40	97	True	<Collection: 1 item>
329	J-140	5,788.40	<None>	14	6,019.73	100	True	<Collection: 1 item>
332	J-141	5,791.63	<None>	13	6,019.57	99	True	<Collection: 1 item>
335	J-142	5,812.17	<None>	5	6,019.75	90	True	<Collection: 1 item>
338	J-143	5,797.94	<None>	15	6,019.45	96	True	<Collection: 1 item>
341	J-144	5,790.97	<None>	7	6,019.18	99	True	<Collection: 1 item>
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347	J-145	5,786.37	<None>	8	6,019.10	101	True	<Collection: 1 item>
349	J-146	5,786.71	<None>	5	6,019.18	101	True	<Collection: 1 item>
351	J-147	5,782.27	<None>	0	6,019.18	103	True	<Collection: 1 item>
353	J-148	5,864.31	<None>	10	6,013.45	65	True	<Collection: 1 item>
355	J-149	6,198.89	<None>	10	6,293.07	41	True	<Collection: 1 item>
359	J-150	6,137.89	<None>	3	6,295.60	68	True	<Collection: 1 item>
377	J-151	5,988.45	<None>	18	6,293.42	132	True	<Collection: 1 item>
384	J-152	5,993.00	<None>	30	6,293.39	130	True	<Collection: 1 item>
407	J-153	5,815.52	<None>	3	6,019.82	88	True	<Collection: 1 item>
409	J-154	6,312.00	<None>	20	6,498.74	81	True	<Collection: 1 item>
411	J-155	6,312.24	<None>	10	6,498.74	81	True	<Collection: 1 item>
417	J-156	6,310.00	<None>	8	6,498.74	82	True	<Collection: 1 item>
420	J-159	6,102.77	<None>	0	6,294.46	83	True	<Collection: 1 item>
422	J-160	6,114.00	<None>	5	6,294.45	78	True	<Collection: 1 item>
424	J-161	6,112.45	<None>	5	6,294.45	79	True	<Collection: 1 item>
436	J-162	6,123.78	<None>	5	6,294.45	74	True	<Collection: 1 item>
438	J-163	6,008.00	<None>	10	6,136.68	56	True	<Collection: 1 item>
440	J-164	6,010.00	<None>	15	6,136.67	55	True	<Collection: 1 item>
440	J-165	6,004.00	<None>	15	6,136.68	57	True	<Collection: 1 item>
457	J-181	6,060.29	<None>	0	6,294.05	101	True	<Collection: 0 items>
461	J-182	6,089.82	<None>	0	6,294.66	89	True	<Collection: 0 items>
478	J-189	6,285.66	<None>	0	6,502.20	94	True	<Collection: 0 items>
481	J-190	6,285.66	<None>	0	6,502.24	94	True	<Collection: 0 items>
483	J-191	6,281.96	<None>	0	6,501.94	95	True	<Collection: 0 items>
488	J-192	6,588.82	<None>	0	6,657.37	30	True	<Collection: 0 items>
496	J-193	6,401.60	<None>	0	6,657.35	111	True	<Collection: 0 items>
528	J-202	6,021.60	<None>	0	6,293.77	118	True	<Collection: 0 items>
531	J-203	6,021.60	<None>	0	6,293.79	118	True	<Collection: 0 items>
534	J-204	6,021.60	<None>	0	6,293.75	118	True	<Collection: 0 items>
537	J-205	6,021.60	<None>	0	6,293.75	118	True	<Collection: 0 items>
558	J-208	6,208.98	<None>	0	6,496.29	124	True	<Collection: 0 items>
561	J-209	6,208.71	<None>	0	6,496.31	124	True	<Collection: 0 items>
564	J-210	6,206.80	<None>	0	6,300.41	41	True	<Collection: 0 items>
567	J-211	6,206.80	<None>	0	6,300.42	41	True	<Collection: 0 items>
571	J-212	6,208.00	<None>	0	6,496.27	125	True	<Collection: 0 items>
572	J-213	6,207.00	<None>	0	6,300.45	40	True	<Collection: 0 items>
583	J-215	6,141.46	<None>	0	6,295.83	67	True	<Collection: 0 items>
590	J-216	6,094.20	<None>	0	6,294.69	87	True	<Collection: 0 items>
607	J-224	5,956.42	<None>	0	6,293.39	146	True	<Collection: 0 items>
618	J-226	5,985.89	<None>	0	6,137.28	66	True	<Collection: 0 items>
621	J-227	5,985.88	<None>	0	6,137.28	66	True	<Collection: 0 items>
624	J-228	5,988.00	<None>	0	6,293.42	132	True	<Collection: 0 items>
625	J-229	5,986.00	<None>	0	6,137.29	65	True	<Collection: 0 items>
635	J-230	5,922.79	<None>	0	6,136.71	93	True	<Collection: 0 items>
639	J-231	5,910.00	<None>	0	6,136.70	98	True	<Collection: 0 items>
649	J-235	5,951.91	<None>	0	6,137.07	80	True	<Collection: 0 items>
660	J-236	6,198.89	<None>	0	6,293.11	41	True	<Collection: 0 items>
664	J-237	5,807.81	<None>	0	6,020.00	92	True	<Collection: 0 items>

Z:\Richfield\Richfield 10000\11398 Marysville WMP\Civil\Water Model\Marysville Water Model_calibrated_KBM.wtg

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Exhibit 11-8 Proposed Fire Flow

Scenario: Proposed Peak Day
Current Time Step: 0.000 h
Fire Flow Node FlexTable: Fire Flow Report

Label	Fire Flow Iterations	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)	Pressure (System Lower Limit) (psi)	Pressure (Calculated System Lower Limit) (psi)
J-1	1	False	0	0	0	0	0	31	0	5	J-88	(N/A)	
J-2	1	False	0	0	1	1	0	37	0	5	J-88	(N/A)	
J-3	1	False	0	0	3	3	0	39	0	5	J-88	(N/A)	
J-4	1	False	0	0	3	3	0	49	0	5	J-88	(N/A)	
J-5	3	True	1,500	2,427	1,503	2,429	20	29	0	5	J-88	(N/A)	
J-6	3	True	1,500	2,427	1,501	2,428	20	26	0	5	J-88	(N/A)	
J-7	3	True	1,500	2,427	1,501	2,428	20	42	0	5	J-88	(N/A)	
J-8	3	True	1,500	2,427	1,501	2,428	20	41	0	5	J-88	(N/A)	
J-9	3	True	1,500	2,427	1,503	2,429	20	58	0	5	J-88	(N/A)	
J-10	3	True	1,500	2,427	1,506	2,433	20	67	0	5	J-88	(N/A)	
J-11	3	True	1,500	2,095	1,500	2,095	20	42	0	5	J-88	(N/A)	
J-12	3	True	1,500	1,862	1,503	1,565	20	41	0	5	J-88	(N/A)	
J-13	3	True	1,500	1,821	1,504	1,624	20	40	0	5	J-88	(N/A)	
J-14	2	True	1,500	1,919	1,503	1,922	20	55	0	5	J-88	(N/A)	
J-15	3	False	1,500	1,398	1,503	1,400	20	69	0	5	J-88	(N/A)	
J-16	3	True	1,500	1,734	1,504	1,738	20	60	0	5	J-88	(N/A)	
J-18	3	True	1,500	1,708	1,504	1,712	20	42	0	5	J-88	(N/A)	
J-19	3	False	1,500	1,333	1,504	1,337	20	48	0	5	J-88	(N/A)	
J-20	3	True	1,500	1,519	1,503	1,522	20	45	0	5	J-88	(N/A)	
J-21	3	True	1,500	1,614	1,503	1,617	20	43	0	5	J-88	(N/A)	
J-22	3	True	1,500	1,681	1,505	1,686	20	43	0	5	J-88	(N/A)	
J-23	3	False	1,500	1,398	1,505	1,403	20	82	0	5	J-88	(N/A)	
J-24	3	False	1,500	1,300	1,506	1,307	20	65	0	5	J-88	(N/A)	
J-25	2	True	1,500	1,918	1,505	1,923	20	72	0	5	J-88	(N/A)	
J-26	4	True	1,500	1,864	1,505	1,868	20	64	0	5	J-88	(N/A)	
J-27	2	True	1,500	1,918	1,503	1,920	20	62	0	5	J-88	(N/A)	
J-28	2	True	1,500	1,918	1,505	1,923	20	66	0	5	J-88	(N/A)	
J-29	2	True	1,500	1,918	1,503	1,920	20	66	0	5	J-88	(N/A)	
J-30	3	True	1,500	1,601	1,505	1,606	20	73	0	5	J-88	(N/A)	
J-31	3	False	1,500	1,495	1,505	1,500	20	80	0	5	J-88	(N/A)	
J-32	3	False	1,500	1,360	1,504	1,363	20	84	0	5	J-88	(N/A)	
J-33	2	True	1,500	1,918	1,503	1,920	20	77	0	5	J-88	(N/A)	
J-34	4	True	1,500	1,890	1,504	1,894	20	76	0	5	J-88	(N/A)	
J-35	3	True	1,500	2,095	1,500	2,095	20	43	0	5	J-88	(N/A)	
J-36	3	True	1,500	1,757	1,500	1,757	20	50	0	5	J-88	(N/A)	
J-37	3	True	1,500	1,781	1,500	1,781	20	50	0	5	J-88	(N/A)	
J-38	5	False	1,500	1,482	1,500	1,482	20	71	0	5	J-88	(N/A)	
J-39	2	True	1,500	1,747	1,500	1,747	20	63	0	5	J-88	(N/A)	
J-40	3	True	1,500	1,841	1,500	1,841	20	63	0	5	J-88	(N/A)	
J-41	3	True	1,500	1,882	1,500	1,882	20	45	0	5	J-88	(N/A)	
J-42	2	True	1,500	1,918	1,500	1,918	20	49	0	5	J-88	(N/A)	
J-43	3	True	1,500	1,824	1,500	1,824	20	46	0	5	J-88	(N/A)	
J-45	2	True	1,500	1,918	1,500	1,918	20	51	0	5	J-88	(N/A)	
J-46	2	True	1,500	1,918	1,500	1,918	20	55	0	5	J-88	(N/A)	
J-47	2	True	1,500	1,918	1,500	1,918	20	57	0	5	J-88	(N/A)	
J-48	2	True	1,500	1,918	1,500	1,918	20	62	0	5	J-88	(N/A)	
J-49	3	True	1,500	1,842	1,500	1,842	20	70	0	5	J-88	(N/A)	
J-50	2	True	1,500	1,918	1,500	1,918	20	70	0	5	J-88	(N/A)	
J-51	2	True	1,500	1,918	1,500	1,918	20	72	0	5	J-88	(N/A)	
J-52	3	True	1,500	1,549	1,503	1,552	20	89	0	5	J-88	(N/A)	
J-53	4	True	1,500	1,855	1,504	1,859	20	47	0	5	J-88	(N/A)	
J-54	2	True	1,500	1,918	1,511	1,929	20	57	0	5	J-88	(N/A)	
J-55	3	False	1,500	1,483	1,508	1,490	20	60	0	5	J-88	(N/A)	
J-56	4	False	1,500	369	1,508	377	20	67	0	5	J-88	(N/A)	
J-57	4	False	1,500	369	1,510	379	20	50	0	5	J-88	(N/A)	
J-58	4	False	1,500	369	1,505	374	20	32	0	5	J-88	(N/A)	
J-59	4	False	1,500	338	1,504	341	20	74	0	5	J-88	(N/A)	
J-60	4	False	1,500	338	1,505	343	20	59	0	5	J-88	(N/A)	
J-61	4	False	1,500	338	1,506	344	20	52	0	5	J-88	(N/A)	
J-62	4	False	1,500	338	1,506	344	20	31	0	5	J-88	(N/A)	
J-63	6	False	1,500	327	1,504	330	20	23	0	0	J-65	(N/A)	
J-64	10	False	1,500	268	1,506	274	20	20	0	5	J-88	(N/A)	
J-65	3	False	1,500	86	1,500	86	20	20	0	5	J-88	(N/A)	
J-66	3	False	1,500	338	1,501	339	20	48	0	5	J-88	(N/A)	
J-67	3	False	1,500	338	1,503	340	20	52	0	5	J-88	(N/A)	
J-68	3	False	1,500	338	1,503	340	20	55	0	5	J-88	(N/A)	
J-69	3	False	1,500	338	1,501	339	20	58	0	5	J-88	(N/A)	
J-70	3	False	1,500	338	1,503	340	20	60	0	5	J-88	(N/A)	
J-71	3	False	1,500	338	1,505	343	20	65	0	5	J-88	(N/A)	
J-72	3	False	1,500	338	1,501	339	20	75	0	5	J-88	(N/A)	
J-73	4	False	1,500	338	1,506	344	20	43	0	5	J-88	(N/A)	
J-74	2	True	1,500	1,918	1,509	1,926	20	46	0	5	J-88	(N/A)	
J-75	3	False	1,500	1,172	1,506	1,178	20	46	0	5	J-88	(N/A)	
J-76	3	False	1,500	1,358	1,508	1,365	20	40	0	5	J-88	(N/A)	
J-77	3	True	1,500	1,564	1,505	1,569	20	35	0	5	J-88	(N/A)	
J-78	3	True	1,500	1,580	1,505	1,585	20	41	0	5	J-88	(N/A)	
J-79	3	False	1,500	871	1,510	881	20	52	0	5	J-88	(N/A)	
J-80	3	False	1,500	1,371	1,508	1,377	20	45	0	5	J-88	(N/A)	
J-81	3	False	1,500	1,196	1,506	1,202	20	49	0	5	J-88	(N/A)	
J-82	2	True	1,500	1,918	1,511	1,929	20	50	0	5	J-88	(N/A)	
J-83	2	True	1,500	1,918	1,500	1,918	20	63	0	5	J-88	(N/A)	
J-84	3	True	1,500	1,523	1,501	1,524	20	58	0	5	J-88	(N/A)	
J-85	3	True	1,500	1,523	1,508	1,530	20	54	0	5	J-88	(N/A)	
J-86	3	True	1,500	1,523	1,505	1,528	20	48	0	5	J-88	(N/A)	
J-87	3	True	1,500	1,523	1,504	1,527	20	61	0	5	J-88	(N/A)	
J-88	1	False	0	0	0	0	0	5	0	5	J-106	(N/A)	
J-89	4	False	1,500	957	1,500	957	20	20	0	5	J-88	(N/A)	
J-90	3	True	1,500	1,586	1,500	1,586	20	20	0	5	J-88	(N/A)	
J-91	7	False	1,500	1,044	1,500	1,044	20	30	0	5	J-88	(N/A)	
J-92	3	False	1,500	1,140	1,506	1,146	20	36	0	5	J-88	(N/A)	
J-93	3	False	1,500	1,241	1,504	1,244	20	39	0	5	J-88	(N/A)	
J-94	3	False	1,500	1,295	1,503	1,297	20	39	0	5	J-88	(N/A)	
J-95	3	False	1,500	1,370	1,503	1,373	20	39	0	5	J-88	(N/A)	
J-96	3	False	1,500	1,370	1,504	1,374	20	41	0	5	J-88	(N/A)	
J-97	3	False	1,500	1,370	1,501	1,372	20	45	0	5	J-88	(N/A)	
J-98	3	False	1,500	1,019	1,509	1,027	20	55	0	5	J-88	(N/A)	
J-99	4	False	1,500	1,108	1,501	1,109	20	43	0	5	J-88	(N/A)	
J-100	4	False	1,500	560	1,501	561	20	65	0	5	J-88	(N/A)	
J-101	4	False	1,500	749	1,504	753	20	44	0	5	J-88	(N/A)	

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J-102	4	False	1,500	387	1,505	392	20	60	0	5	J-88	(N/A)
J-103	7	False	1,500	672	1,501	673	20	66	0	5	J-88	(N/A)
J-104	4	False	1,500	775	1,503	778	20	57	0	5	J-88	(N/A)
J-105	4	False	1,500	626	1,504	629	20	60	0	5	J-88	(N/A)
J-106	1	False	0	0	0	0	0	5	0	5	J-88	(N/A)
J-107	3	True	1,500	1,702	1,500	1,702	20	20	0	5	J-88	(N/A)
J-108	4	False	1,500	882	1,500	882	20	20	0	5	J-88	(N/A)
J-109	4	False	1,500	863	1,501	864	20	20	0	5	J-88	(N/A)
J-110	4	False	1,500	1,054	1,501	1,055	20	20	0	5	J-88	(N/A)
J-111	3	False	1,500	1,192	1,503	1,195	20	20	0	5	J-88	(N/A)
J-112	3	False	1,500	1,482	1,509	1,491	20	20	0	5	J-88	(N/A)
J-113	3	False	1,500	1,445	1,505	1,450	20	29	0	5	J-88	(N/A)
J-114	3	False	1,500	1,371	1,504	1,374	20	39	0	5	J-88	(N/A)
J-115	3	False	1,500	1,309	1,504	1,313	20	42	0	5	J-88	(N/A)
J-116	3	False	1,500	1,246	1,503	1,249	20	51	0	5	J-88	(N/A)
J-117	3	False	1,500	1,298	1,504	1,302	20	47	0	5	J-88	(N/A)
J-118	3	False	1,500	1,033	1,504	1,037	20	59	0	5	J-88	(N/A)
J-119	4	False	1,500	846	1,505	851	20	64	0	5	J-88	(N/A)
J-120	4	False	1,500	931	1,504	935	20	54	0	5	J-88	(N/A)
J-121	6	False	1,500	677	1,500	677	20	42	0	0	J-148	(N/A)
J-122	4	False	1,500	598	1,504	602	20	58	0	5	J-88	(N/A)
J-123	4	False	1,500	519	1,505	524	20	74	0	5	J-88	(N/A)
J-124	4	False	1,500	774	1,506	780	20	61	0	5	J-88	(N/A)
J-125	4	False	1,500	946	1,506	951	20	49	0	5	J-88	(N/A)
J-126	4	False	1,500	722	1,508	729	20	58	0	5	J-88	(N/A)
J-127	3	True	1,500	1,523	1,506	1,529	20	66	0	5	J-88	(N/A)
J-128	3	False	1,500	1,371	1,507	1,378	20	40	0	5	J-88	(N/A)
J-129	3	False	1,500	1,371	1,507	1,378	20	41	0	5	J-88	(N/A)
J-130	3	False	1,500	1,344	1,505	1,349	20	45	0	5	J-88	(N/A)
J-131	4	False	1,500	928	1,506	934	20	61	0	5	J-88	(N/A)
J-132	3	False	1,500	953	1,504	957	20	63	0	5	J-88	(N/A)
J-133	3	False	1,500	1,371	1,505	1,376	20	48	0	5	J-88	(N/A)
J-134	3	False	1,500	87	1,500	87	20	20	0	5	J-88	(N/A)
J-135	3	False	1,500	1,266	1,504	1,270	20	53	0	5	J-88	(N/A)
J-136	3	False	1,500	1,371	1,501	1,372	20	45	0	5	J-88	(N/A)
J-137	4	False	1,500	1,371	1,504	1,374	20	43	0	5	J-88	(N/A)
J-138	3	False	1,500	1,039	1,503	1,041	20	60	0	5	J-88	(N/A)
J-139	3	False	1,500	1,162	1,504	1,166	20	53	0	5	J-88	(N/A)
J-140	4	False	1,500	772	1,507	779	20	71	0	5	J-88	(N/A)
J-141	4	False	1,500	645	1,507	653	20	79	0	5	J-88	(N/A)
J-142	3	False	1,500	1,370	1,503	1,373	20	43	0	5	J-88	(N/A)
J-143	4	False	1,500	701	1,508	709	20	73	0	5	J-88	(N/A)
J-144	4	False	1,500	823	1,504	826	20	66	0	5	J-88	(N/A)
J-145	4	False	1,500	751	1,504	755	20	65	0	5	J-88	(N/A)
J-146	7	False	1,500	823	1,503	825	20	62	0	5	J-88	(N/A)
J-147	4	False	1,500	823	1,500	823	20	59	0	5	J-88	(N/A)
J-148	13	False	1,500	48	1,505	51	20	21	0	5	J-88	(N/A)
J-149	4	False	1,500	387	1,505	392	20	22	0	5	J-88	(N/A)
J-150	2	True	1,500	1,918	1,501	1,919	20	49	0	5	J-88	(N/A)
J-151	2	True	1,500	1,918	1,509	1,926	20	70	0	5	J-88	(N/A)
J-152	3	True	1,500	1,549	1,515	1,564	20	70	0	5	J-88	(N/A)
J-153	3	False	1,500	1,370	1,501	1,372	20	45	0	5	J-88	(N/A)
J-154	3	False	1,500	1,398	1,510	1,408	20	29	0	5	J-88	(N/A)
J-155	4	False	1,500	1,398	1,505	1,403	20	26	0	5	J-88	(N/A)
J-156	3	False	1,500	1,390	1,504	1,394	20	20	0	5	J-88	(N/A)
J-158	(N/A)	False	(N/A)	(N/A)	(N/A)	(N/A)	20	(N/A)	0	(N/A)	(N/A)	(N/A)
J-159	3	False	1,500	1,435	1,500	1,435	20	46	0	5	J-88	(N/A)
J-160	4	False	1,500	874	1,503	876	20	53	0	5	J-88	(N/A)
J-161	4	False	1,500	874	1,503	876	20	49	0	5	J-88	(N/A)
J-162	4	False	1,500	874	1,503	876	20	39	0	5	J-88	(N/A)
J-163	3	False	1,500	1,441	1,505	1,446	20	20	0	5	J-88	(N/A)
J-164	3	False	1,500	1,271	1,508	1,279	20	20	0	5	J-88	(N/A)
J-165	3	False	1,500	1,379	1,508	1,386	20	20	0	5	J-88	(N/A)
J-181	3	True	1,500	1,668	1,500	1,668	20	50	0	5	J-88	(N/A)
J-182	2	True	1,500	1,918	1,500	1,918	20	47	0	5	J-88	(N/A)
J-189	3	False	1,500	1,455	1,500	1,455	20	68	0	5	J-88	(N/A)
J-190	2	True	1,500	1,905	1,500	1,905	20	54	0	5	J-88	(N/A)
J-191	2	True	1,500	1,917	1,500	1,917	20	55	0	5	J-88	(N/A)
J-192	3	True	1,500	1,931	1,500	1,931	20	20	0	5	J-88	(N/A)
J-193	3	False	1,500	1,087	1,500	1,087	20	100	0	5	J-88	(N/A)
J-202	3	False	1,500	1,353	1,500	1,353	20	88	0	5	J-88	(N/A)
J-203	2	True	1,500	1,918	1,500	1,918	20	64	0	5	J-88	(N/A)
J-204	2	True	1,500	1,918	1,500	1,918	20	64	0	5	J-88	(N/A)
J-205	2	True	1,500	1,918	1,500	1,918	20	64	0	5	J-88	(N/A)
J-208	3	False	1,500	1,438	1,500	1,438	20	87	0	5	J-88	(N/A)
J-209	2	True	1,500	1,918	1,500	1,918	20	63	0	5	J-88	(N/A)
J-210	3	False	1,500	795	1,500	795	20	40	0	5	J-88	(N/A)
J-211	3	False	1,500	1,361	1,500	1,361	20	40	0	5	J-88	(N/A)
J-212	2	True	1,500	1,918	1,500	1,918	20	63	0	5	J-88	(N/A)
J-213	2	True	1,500	1,918	1,500	1,918	20	40	0	5	J-88	(N/A)
J-215	3	False	1,500	1,492	1,500	1,492	20	53	0	5	J-88	(N/A)
J-216	2	True	1,500	1,918	1,500	1,918	20	46	0	5	J-88	(N/A)
J-224	3	True	1,500	1,549	1,500	1,549	20	69	0	5	J-88	(N/A)
J-226	3	False	1,500	960	1,500	960	20	65	0	5	J-88	(N/A)
J-227	3	True	1,500	1,581	1,500	1,581	20	65	0	5	J-88	(N/A)
J-228	2	True	1,500	1,918	1,500	1,918	20	70	0	5	J-88	(N/A)
J-229	2	True	1,500	1,918	1,500	1,918	20	65	0	5	J-88	(N/A)
J-230	3	True	1,500	1,523	1,500	1,523	20	61	0	5	J-88	(N/A)
J-231	3	True	1,500	1,523	1,500	1,523	20	65	0	5	J-88	(N/A)
J-235	2	True	1,500	1,918	1,500	1,918	20	71	0	5	J-88	(N/A)
J-236	4	False	1,500	1,175	1,500	1,175	20	20	0	5	J-88	(N/A)
J-237	3	False	1,500	1,371	1,500	1,371	20	46	0	5	J-88	(N/A)

Z:\Richfield\Richfield 10000\11398 Marysville WMPI\Civil\Water Model\Marysville Water Model_calibrated_KBM.wtg

APPENDIX – B
EXHIBITS

Marysvale Town
 Water Master Plan Report-2022

Exhibit 11-9 Water Right 63-107

Water Right Details for 63-107

Utah Division of Water Rights

4/27/2022 4:44 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Water Right: 63-107

Application/Claim: A15218

Certificate:

Owners:		
Name: Marysvale Town Address: P.O. Box 160 Marysvale UT 84750		
		Interest: 100%
Remarks:		
General:		
Type of Right: Application To Appropriate	Source of Info.: Application to Appropriate	Status: No Proof Required
Quantity of Water: 0.015 CFS		
Source: Underground Water Well County: Piute		
Common Description:		
Proposed Det. Book: 63-	Map:	Pub. Date:
Land Owned by Appl.:	County Tax Id#:	
Dates:		
Filing:		
Filed: 05/08/1943		
Priority: 05/08/1943	Decree/Class:	
Advertising:		
Publication Began:	Publication End:	Newspaper:
Protest End Date:	Protested: Not Protested	Hearing Held:
Approval:		
State Eng. Action:	Action Date: 08/24/1944	
Recon. Req. Date:	Recon. Req Action:	
Certification:		
Proof Due Date:	Extension Filed Date:	
Election or Proof:	Election/Proof Date:	
Cert./WUC Date:	Lapsed, Etc. Date:	Lap. Ltr. Date:
Wells:		
Prov. Well Date:	Most Recent Well Renovate/Replace Date:	
Points of Diversion:		
Points of Diversion - Underground:		
(1) N 2792 ft. W 241 ft. from SE corner, Sec 32 T 27S R 3W SLBM		
Well Diameter: 4 in.	Depth: 150 to ft.	Year Drilled: Well Log: Well Id#:
Elevation:	UTM: 393641.768, 4253159.627 (NAD83)	
Source/Cmnt:		
Proposed Water Uses:		
Proposed Water Uses - Group Number: 424838		
Water Use Types:		
Stock Water -Beneficial Use Amount: 207	Group Total: 207	Period of Use: 01/01 to 12/31

Marysvale Town
Water Master Plan Report-2022

Use Totals:		
	Stock Water sole-supply total: 207 ELUs	for a group total of: 207 ELUs

Marysville Town
 Water Master Plan Report-2022

Exhibit 11-2 Water Right 63-2835

Water Right Details for 63-2835

Utah Division of Water Rights

4/28/2022 10:20 AM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Water Right: 63-2835

Application/Claim:

Certificate: a1051

Changes:		
a16401	(Filed: 09/30/1991)	Certificated
t91-63-20	(Filed: 09/30/1991)	Expired
Owners:		
Name: Town of Marysville (Public Water Supplier)		
Address: P.O. Box 160		
Marysville UT 84750		
Remarks:		Interest:
General:		
Type of Right: Decree	Source of Info.: Certificate	Status: Certificated
Quantity of Water: 359 ACFT		
Source: Spring and Underground Water Well		
County: Piute		
Common Description:		
Proposed Det. Book: 63-	Map:	Pub. Date:
Land Owned by Appl.:	County Tax Id#:	
Distribution Account: 102136 TOWN OF MARYSVALE		
Dates:		
Filing:		
Filed: 12/26/1974		
Priority: / /1880	Decree/Class:	
Advertising:		
Publication Began:	Publication End:	Newspaper:
Protest End Date: 09/03/1983	Protested: Not Protested	Hearing Held:
Approval:		
State Eng. Action:	Action Date: 05/22/1975	
Recon. Req. Date:	Recon. Req Action:	
Certification:		
Proof Due Date:	Extension Filed Date:	
Election or Proof:	Election/Proof Date:	
Cert./WUC Date: 01/13/2006	Lapsed, Etc. Date:	Lap. Ltr. Date:
Wells:		
Prov. Well Date:	Most Recent Well Renovate/Replace Date:	

Marysvale Town
Water Master Plan Report-2022

Points of Diversion:																																																																																					
Points of Diversion - Surface:																																																																																					
Stream Alteration Required: No																																																																																					
(1) S 1019 ft. E 52 ft. from W4 corner, Sec 34 T 27S R 3W SLBM																																																																																					
Diverting Works:										Source:																																																																											
Elevation:										UTM: 395348.386, 4252798.854																																																																											
Points of Diversion - Underground:																																																																																					
(1) N 3681 ft. W 255 ft. from S4 corner, Sec 20 T 27S R 3W SLBM																																																																																					
Well Diameter: 12 in. Depth: 350 to ft. Year Drilled:										Well Log: Yes Well Id#:																																																																											
Elevation:										UTM: 392845.819, 4256683.396 (NAD83)																																																																											
Source/Cmnt:																																																																																					
Proposed Water Uses:																																																																																					
Proposed Water Uses - Group Number: 424543																																																																																					
Water Rights Appurtenant to the following use(s):																																																																																					
63-2835(CERT), 63-4280(CERT),																																																																																					
Water Use Types:																																																																																					
Irrigation-Beneficial Use Amount: 4.69 acres Group Total: 4.69 Period of Use: 04/01 to 10/31																																																																																					
Place Of Use:																																																																																					
<table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="4">North West</th> <th colspan="4">North East</th> <th colspan="4">South West</th> <th colspan="4">South East</th> <th rowspan="2">Section Totals</th> </tr> <tr> <th>NW</th> <th>NE</th> <th>SW</th> <th>SE</th> <th>NW</th> <th>NE</th> <th>SW</th> <th>SE</th> <th>NW</th> <th>NE</th> <th>SW</th> <th>SE</th> <th>NW</th> <th>NE</th> <th>SW</th> <th>SE</th> </tr> </thead> <tbody> <tr> <td>Sec 20 T 27S R 3W SLBM</td> <td></td> <td></td> <td>4.69</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>4.69</td> </tr> <tr> <td colspan="16" style="text-align: right;">Group Acreage Total :</td> <td>4.69</td> </tr> </tbody> </table>																		North West				North East				South West				South East				Section Totals	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	Sec 20 T 27S R 3W SLBM			4.69														4.69	Group Acreage Total :																4.69
	North West				North East				South West				South East					Section Totals																																																																			
	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE																																																																					
Sec 20 T 27S R 3W SLBM			4.69														4.69																																																																				
Group Acreage Total :																4.69																																																																					
Proposed Water Uses - Group Number: 426030																																																																																					
Water Rights Appurtenant to the following use(s):																																																																																					
63-2835(CERT), 63-4280(CERT), 63-4606(CERT),																																																																																					
Water Use Types:																																																																																					
Municipal: Marysvale Period of Use: 01/01 to 12/31																																																																																					
Acre Feet Contributed by this Right for this Use: 359																																																																																					
Comments: Within the service area of Marysvale.																																																																																					
Use Totals:																																																																																					
Irrigation sole-supply total: 4.69 acres for a group total of: 4.69 acres																																																																																					
Municipal sole-supply total: 359 acft																																																																																					
Other Comments:																																																																																					
Surface Point of Diversion as per proof: South 6,357 feet and West 10,513 feet from the E1/4 Corner, Section 26, T 27S, R 4W, SLBM.																																																																																					

Marysvale Town
 Water Master Plan Report-2022

Segregation History:										
This Right was Segregated from: none										
as originally filed:	Flow in CFS	AND/ OR/ BLANK	Quantity in Acre-Feet	Water Uses						
				Irrigated Acreage	Stock (ELUs)	Domestic (EDUs)	Acre-Feet			
			362.0	4.69			Municipal	Mining	Power	Other
							362.0			
The following Water Rights have been Segregated from 63-2835:										
(1) WrNum:63-4606			[3.0]				[3.0]			
AppNum:										
Name:Marysvale, Town of										
Filed:04/20/2009										
Commen										
This Right as currently calculated:	Flow in CFS		Quantity in Acre-Feet	Water Uses						
				Irrigate Acreage	Stock (ELUs)	Domestic (EDUs)	Acre-Feet			
			359.0	4.69			Municipal	Mining	Power	Other
							359.0			

Marysville Town
 Water Master Plan Report-2022

Exhibit 11-3 Water Right 63-3967

Water Right Details for 63-3967

Utah Division of Water Rights

4/27/2022 4:45 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Water Right: 63-3967

Application/Claim: A65472

Certificate:

Owners:		
Name: Weldo Lay Address: 1750 S Thompsonville Rd. Marysville UT 84750		
Remarks: 0.1200 acre-foot, 0.04 acre irrigation		Interest:
Name: Marysville Town Address: P.O. Box 160 Marysville UT 84750		
Remarks: 1.10 acre-feet, 0.1718 acre irrigation, 5 stock, 1 Family		Interest:
General:		
Type of Right: Application To Appropriate	Source of Info.: Certificate	Status: Certificated
Quantity of Water: 1.229 ACFT		
Source: Underground Water Well County: Piute		
Common Description: 3 miles SE of Marysville		
Proposed Det. Book: 63-	Map:	Pub. Date:
Land Owned by Appl.: Yes	County Tax Id#:	
Dates:		
Filing:		
Filed: 06/20/1991	Decree/Class:	
Priority: 06/20/1991		
Advertising:		
Publication Began: 07/03/1991	Publication End:	Newspaper: The Richfield Reaper
Protest End Date: 08/16/1991	Protested: Protested and	Hearing Held:
Approval:		
State Eng. Action: Approved	Action Date: 09/20/1991	
Recon. Req. Date:	Recon. Req Action:	
Certification:		
Proof Due Date: 11/30/2000	Extension Filed Date:	
Election or Proof: Proof	Election/Proof Date: 10/30/2000	
Cert./WUC Date: 01/07/2009	Lapsed, Etc. Date:	Lap. Ltr. Date:
Wells:		
Prov. Well Date:	Most Recent Well Renovate/Replace Date: 03/14/2000	

Marysville Town
Water Master Plan Report-2022

Exhibit 11-4 Water Right 63-4016

Water Right Details for 63-4016

Utah Division of Water Rights

4/27/2022 4:45 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Water Right: 63-4016

Application/Claim: D6281

Certificate:

Owners:		
Name: Marysville Town Address: P.O. Box 160 Marysville UT 84750		
		Interest: 100%
Remarks:		
General:		
Type of Right: Diligence Claim	Source of Info.: Diligence Claim	Status:
Quantity of Water: 0.007 CFS		
Source: Calloway Spring County: Piute		
Common Description: 3 1/2 South of Marysville		
Proposed Det. Book: 63-	Map:	Pub. Date:
Land Owned by Appl.: Yes	County Tax Id#:	
Dates:		
Filing:		
Filed: 03/12/1993		
Priority: / /1903	Decree/Class:	
Advertising:		
Publication Began:	Publication End:	Newspaper:
Protest End Date:	Protested: Not Protested	Hearing Held:
Approval:		
State Eng. Action:	Action Date:	
Recon. Req. Date:	Recon. Req Action:	
Certification:		
Proof Due Date:	Extension Filed Date:	
Election or Proof:	Election/Proof Date:	
Cert./WUC Date:	Lapsed, Etc. Date:	Lap. Ltr. Date:
Wells:		
Prov. Well Date:	Most Recent Well Renovate/Replace Date:	
Points of Diversion:		
Points of Diversion - Surface:		
Stream Alteration Required:		
(1) N 400 ft. W 650 ft. from SE corner, Sec 32 T 27S R 3W SLBM		
Diverting Works: Coll. system into 3/4 in. pipe	Source: Calloway Spring	
Elevation:	UTM: 393517.105, 4252430.545	
Proposed Water Uses:		
Proposed Water Uses - Group Number: 622842		
Water Use Types:		
Irrigation-Beneficial Use Amount: 0.15 acres	Group Total: 0.15	Period of Use: 04/01 to 10/31

Marysvale Town
 Water Master Plan Report-2022

Domestic-Beneficial Use Amount: 1 EDUs																Group Total: 1				Period of Use: 01/01 to 12/31			
Place Of Use:	North West				North East				South West				South East				Section Totals						
	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE							
Sec 33 T 27S R 3W SLBM									X								0.15						
Group Acreage Total :																0.15							
Use Totals:																							
Irrigation sole-supply total: 0.15 acres																for a group total of: 0.15 acres							
Domestic sole-supply total: 1 EDUs																for a group total of: 1 EDUs							

Marysville Town
Water Master Plan Report-2022

Exhibit 11-5 Water Right 63-4280

Water Right Details for 63-4280

Utah Division of Water Rights

4/27/2022 4:11 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Water Right: 63-4280

Application/Claim:

Certificate:

Changes:		
a23445	(Filed: 06/21/1999)	Certificated
Owners:		
Name: Marysville Town (Public Water Supplier)		
Address: P.O. Box 160		
Marysville UT 84750		
Remarks:		Interest:
General:		
Type of Right: Decree	Source of Info.: Certificate	Status: Certificated
Quantity of Water: 0.042 CFS OR 15.85 ACFT		
Source: Spring and Underground Water Well		
County: Piute		
Common Description: 1 1/2 mile SE of Marysville		
Proposed Det. Book: 63-	Map:	Pub. Date:
Land Owned by Appl.:	County Tax Id#:	
Dates:		
Filing:		
Filed: 03/25/1997		
Priority: / /1895	Decree/Class:	
Advertising:		
Publication Began:	Publication End:	Newspaper:
Protest End Date:	Protested: Not Protested	Hearing Held:
Approval:		
State Eng. Action:	Action Date:	
Recon. Req. Date:	Recon. Req Action:	
Certification:		
Proof Due Date:	Extension Filed Date:	
Election or Proof:	Election/Proof Date:	
Cert./WUC Date: 04/04/2003	Lapsed, Etc. Date:	Lap. Ltr. Date:
Wells:		
Prov. Well Date:	Most Recent Well Renovate/Replace Date:	
Points of Diversion:		
Points of Diversion - Surface:		
Stream Alteration Required:		
(1) S 1077 ft. E 47 ft. from E4 corner, Sec 34 T 27S R 4W SLBM		
Diverting Works:	Source:	
Elevation:	UTM: 387238.098, 4252834.727	

Marysvale Town
Water Master Plan Report-2022

Points of Diversion - Underground:																		
(1) N 3681 ft. W 255 ft. from S4 corner, Sec 20 T 27S R 3W SLBM																		
Well Diameter: 12 in.				Depth: 350 to ft.				Year Drilled:				Well Log: No Well Id#:						
Elevation:								UTM: 392845.819, 4256683.396 (NAD83)										
Source/Cmnt:																		
Proposed Water Uses:																		
Proposed Water Uses - Group Number: 424543																		
Water Rights Appurtenant to the following use(s): 63-2835(CERT), 63-4280(CERT),																		
Water Use Types:																		
Irrigation-Beneficial Use Amount: Unevaluated Group Total: 4.69 Period of Use: 04/01 to 10/31																		
Place Of Use:		North West				North East				South West				South East				Section
		NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	NW	NE	SW	SE	Totals
Sec 20 T 27S R 3W SLBM				4.69														4.69
Group Acreage Total :																	4.69	
Proposed Water Uses - Group Number: 426030																		
Water Rights Appurtenant to the following use(s): 63-2835(CERT), 63-4280(CERT), 63-4606(CERT),																		
Water Use Types:																		
Municipal: Marysvale Period of Use: 01/01 to 12/31																		
Acre Feet Contributed by this Right for this Use: Unevaluated																		
Comments: Within the service area of Marysvale.																		
Use Totals:																		
Irrigation sole-supply total: Unevaluated acres for a group total of: 4.69 acres																		
Municipal sole-supply total: Unevaluated acft																		
Other Comments:																		
Surface Point of Diversion as per proof: South 6,357 feet West 10,513 feet from the E4 corner, Section 26. T 27S, R 4W, SLBM.																		
Segregation History:																		
This Right was Segregated from: 63-3023, with Appl.#., Approval Date: / / under which Proof is to be submitted.																		
as originally filed:		Flow in CFS	AND/ OR/ BLANK	Quantity in Acre-Feet	Water Uses													
					Irrigated Acreage	Stock (ELUs)	Domestic (EDUs)	Acre-Feet										
		0.042			8.4				Municipal	Mining	Power	Other						
Comment: see change																		
This Right as currently calculated:		Flow in CFS		Quantity in Acre-Feet	Water Uses													
					Irrigate Acreage	Stock (ELUs)	Domestic (EDUs)	Acre-Feet										
		0.042			8.4				Municipal	Mining	Power	Other						

Marysville Town
Water Master Plan Report-2022

Exhibit 11-6 Water Right 63-4606

Water Right Details for 63-4606

Utah Division of Water Rights

4/27/2022 4:46 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Water Right: 63-4606

Application/Claim:

Certificate: a1051

Changes:		
a35486	(Filed: 04/21/2009)	Lapsed
Owners:		
Name: Town of Marysville (Public Water Supplier)		
Address: P.O. Box 160		
Marysville UT 84750		
Remarks:		Interest:
General:		
Type of Right: Decree	Source of Info.: Ownership Segregation	Status: Certificated
Quantity of Water: 3 ACFT		
Source: Spring and Underground Water Well		
County: Piute		
Common Description:		
Proposed Det. Book: 63-	Map:	Pub. Date:
Land Owned by Appl.:	County Tax Id#:	
Dates:		
Filing:		
Filed: 12/26/1974		
Priority: / /1880	Decree/Class:	
Advertising:		
Publication Began:	Publication End:	Newspaper:
Protest End Date: 09/03/1983	Protested: Not Protested	Hearing Held:
Approval:		
State Eng. Action:	Action Date: 05/22/1975	
Recon. Req. Date:	Recon. Req Action:	
Certification:		
Proof Due Date:	Extension Filed Date:	
Election or Proof:	Election/Proof Date:	
Cert./WUC Date: 01/13/2006	Lapsed, Etc. Date:	Lap. Ltr. Date:
Wells:		
Prov. Well Date:	Most Recent Well Renovate/Replace Date:	
Points of Diversion:		
Points of Diversion - Surface:		
Stream Alteration Required: No		
(1) S 1019 ft. E 52 ft. from W4 corner, Sec 34 T 27S R 3W SLBM		
Diverting Works:	Source:	
Elevation:	UTM: 395348.386, 4252798.854	

Marysvale Town
Water Master Plan Report-2022

Points of Diversion - Underground:			
(1) N 3681 ft. W 255 ft. from S4 corner, Sec 20 T 27S R 3W SLBM			
Well Diameter: 12 in.	Depth: 350 to ft.	Year Drilled:	Well Log: Yes Well Id#:
Elevation:	UTM: 392845.819, 4256683.396 (NAD83)		
Source/Cmnt:			

Proposed Water Uses:	
Proposed Water Uses - Group Number: 426030	
Water Rights Appurtenant to the following use(s): 63-2835(CERT), 63-4280(CERT), 63-4606(CERT),	
Water Use Types:	
Municipal: Marysvale	Period of Use: 01/01 to 12/31
Acre Feet Contributed by this Right for this Use: 3	
Comments: Within the service area of Marysvale.	

Use Totals:
Municipal sole-supply total: 3 acft

Segregation History:										
This Right was Segregated from: 63-2835, with Appl.#., Approval Date: / / under which Proof is to be submitted.										
as originally filed:	Flow in CFS	AND/OR/BLANK	Quantity in Acre-Feet	Water Uses						
				Irrigated Acreage	Stock (ELUs)	Domestic (EDUs)	Acre-Feet			
			3.0				Municipal	Mining	Power	Other
							3.0			
This Right as currently calculated:	Flow in CFS		Quantity in Acre-Feet	Water Uses						
				Irrigate Acreage	Stock (ELUs)	Domestic (EDUs)	Acre-Feet			
			3.0				Municipal	Mining	Power	Other
							3.0			

Marysville Town
Water Master Plan Report-2022

Exhibit 11-7 Water Right 63-4843

Water Right Details for 63-4843

Utah Division of Water Rights

4/27/2022 4:09 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Water Right: 63-4843

Application/Claim:

Certificate:

Changes:		
a46857	(Filed: 03/08/2021)	Approved
Owners:		
Name: Town of Marysville Address: PO BOX 160 Marysville UT 84750		Interest: 100%
Remarks:		
General:		
Type of Right: Decree	Source of Info.: Certificate	Status: Certificated
Quantity of Water: 0.0094 CFS OR 2 ACFT		
Source: Beaver Creek County: Piute		
Common Description: .5 mile North of Marysville		
Proposed Det. Book: 63-	Map:	Pub. Date:
Land Owned by Appl.:	County Tax Id#:	
Dates:		
Filing:		
Filed:	Decree/Class:	
Priority: / /1882		
Advertising:		
Publication Began:	Publication End:	Newspaper:
Protest End Date:	Protested:	Hearing Held:
Approval:		
State Eng. Action:	Action Date:	
Recon. Req. Date:	Recon. Req Action:	
Certification:		
Proof Due Date:	Extension Filed Date:	
Election or Proof:	Election/Proof Date: 11/27/1989	
Cert./WUC Date:	Lapsed, Etc. Date:	Lap. Ltr. Date:
Wells:		
Prov. Well Date:	Most Recent Well Renovate/Replace Date:	
Points of Diversion:		
Points of Diversion - Surface:		
Stream Alteration Required:		
(1) N 1215 ft. W 3413 ft. from SE corner, Sec 18 T 27S R 3W SLBM		
Diverting Works: Concrete splitter into settling	Source:	
Elevation:	UTM: 391068.252, 4257606.262	

Marysvale Town
Water Master Plan Report-2022

Exhibit 11-8 Water Right a16401

Change Details for a16401

Utah Division of Water Rights

4/27/2022 4:46 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Change: a16401

Water Right: 63-2835

Certificate:

1. General	
Status: Certificated	Amendatory: N
County TaxID:	
Base Water Rights: 63-2835	
Right Evidenced By: 63-2835 (Sevier River Decree)	
Changes: Point of Diversion	
2. Owners	
Name: Town of Marysvale	Interest:
Address: P.O. Box 160	
Marysvale UT 84750	
Remarks:	
3. Dates	
Filing:	
Filed: 09/30/1991	Priority of Change: 09/30/1991
State Engineer's Consideration of Rebuttable Presumption of Quantity Impairment (RPQI):	
RPQI Designation:	
RPQI Notice Date:	
Advertising:	
Publication Began: 10/16/1991	Publication End: Newspaper: The Richfield Reaper
Protest End Date: 11/29/1991	Protested: Protested and Hearing Held:
Approval:	
State Eng. Action: Approved	Action Date: 02/21/1992
Recon. Req. Date:	Recon. Req Action:
Certification:	
Proof Due Date: 11/30/1995	Extension Filed Date:
Election or Proof: Proof	Election/Proof Date: 11/16/1995
Cert./WUC Date: 01/13/2006	Lapsed, Etc. Date: Lap. Ltr. Date:
Wells:	
Prov. Well Date:	Most Recent Well Renovate/Replace Date:
Heretofore	Hereafter
General	General
Flow: 0.5 CFS	Flow: 362 ACFT
Source: Unnamed Spring	Source: Spring and Underground Water Well
County: Piute	County: Piute
	Conn Desc
	Place of use within Marysvale Town water system service area.
Points of Diversion	Changed As Follows

Marysvale Town
 Water Master Plan Report-2022

Surface 1: S 6357 ft W 10513 ft from E4 corner, Sec 26 T 27S R 4W SLBM Diverting Works: spring collection box Source: Big Spring	Surface 1: S 6357 ft W 10513 ft from E4 corner, Sec 26 T 27S R 4W SLBM Diverting Works: spring collection box Source: Big Spring
	Underground 1: N 3681 ft W 255 ft from S4 corner, Sec 20 T 27S R 3W SLBM Diameter: 12 ins. Depth: 350 to ft. Well ID#: 1450 Source:
Water Uses Supplemental to other Water Rights: N	Same as Heretofore Supplemental to other Water Rights: N
Municipal 1: Marysvale used: 01/01-12/31	
Reservoirs	Same as Heretofore
Protestants:	
Unspecified Protestants:	
Received: Name: BLM Address:	Type:
Comments:	

Marysvale Town
Water Master Plan Report-2022

Exhibit 11-9 Water Right a23445

Change Details for a23445

Utah Division of Water Rights

4/27/2022 4:45 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Change: a23445

Water Right: 63-4280

Certificate:

1. General	
Status: Certificated	Amendatory: N
County TaxID:	
Base Water Rights: 63-4280	
Right Evidenced By: 63-4280 (a portion of 63-3023, Decree)	
Changes: Point of Diversion, Place of Use, Nature of Use	
2. Owners	
Name: Marysvale Town	Interest:
Address: PO Box 160 Marysvale UT 84750	
Remarks:	
3. Dates	
Filing:	Priority of Change: 06/21/1999
Filed: 06/21/1999	
State Engineer's Consideration of Rebuttable Presumption of Quantity Impairment (RPQI):	
RPQI Designation:	
RPQI Notice Date:	
Advertising:	
Publication Began: 06/30/1999	Publication End: 07/07/1999
Protest End Date: 07/27/1999	Protested: Not Protested
	Hearing Held:
Newspaper: The Richfield Reaper	
Approval:	
State Eng. Action: Approved	Action Date: 09/14/1999
Recon. Req. Date:	Recon. Req Action:
Certification:	
Proof Due Date: 11/30/2002	Extension Filed Date:
Election or Proof: Proof	Election/Proof Date: 11/15/2002
Cert./WUC Date: 04/04/2003	Lapsed, Etc. Date:
	Lap. Ltr. Date:
Wells:	
Prov. Well Date:	Most Recent Well Renovate/Replace Date:
Heretofore	Hereafter
General	General
Flow: 0.042 CFS	Flow: 0.042 CFS OR 25.2 ACFT
Source: Sevier River	Source: Spring & Underground Water well
County: Sevier	County: Piute
	Comn Desc Marysvale Town
Points of Diversion	Changed As Follows

Marysvale Town
Water Master Plan Report-2022

Surface					Surface												
1: N 770 ft W 1600 ft from SE corner, Sec 28 T 27S R 3W SLBM					1: S 6357 ft W 10513 ft from E4 corner, Sec 26 T 27S R 4W SLBM												
Diverting Works: Foisey Ditch					Diverting Works: spring collection box												
Source:					Source: spring												
					Underground												
					1: N 3681 ft W 255 ft from S4 corner, Sec 20 T 27S R 3W SLBM												
					Diameter: 12 ins. Depth: 350 to ft. Well ID#: 0												
					Source: existing well												
Place of Use					Changed As Follows												
		NW¼	NE¼	SW¼	SE¼												
		N	N	S	S	N	N	S	S	N	N	S	S	N	N	S	S
		W	E	W	E	W	E	W	E	W	E	W	E	W	E	W	E
Sec 20 T 27S R 3W SLBM		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sec 21 T 27S R 3W SLBM		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sec 28 T 27S R 3W SLBM		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Water Uses					Changed As Follows												
Supplemental to other Water Rights: N					Supplemental to other Water Rights: N												
Irrigation																	
1: Beneficial Use Amount: 8.4 acres used: 01/01-12/31																	
Group Total: acres																	
					Municipal												
					1: Marysvale used: 01/01-12/31												
Reservoirs					Same as Heretofore												

Marysvale Town
Water Master Plan Report-2022

Exhibit 11-10 Water Right a35486

Change Details for a35486

Utah Division of Water Rights

4/27/2022 4:47 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Change: a35486

Water Right: 63-4606

Certificate:

1. General	
Status: Lapsed	Amendatory:
County TaxID:	
Base Water Rights: 63-4606	
Right Evidenced By: 63-4606	
Changes: Point of Diversion	
2. Owners	
Name: Town of Marysvale	Interest:
Address: P.O. Box 160	
Marysvale UT 84750	
Remarks:	
3. Dates	
Filing:	
Filed: 04/21/2009	Priority of Change: 04/21/2009
State Engineer's Consideration of Rebuttable Presumption of Quantity Impairment (RPQI):	
RPQI Designation:	
RPQI Notice Date:	
Advertising:	
Publication Began: 04/29/2009	Publication End: 05/06/2009 Newspaper: The Richfield Reaper
Protest End Date: 05/26/2009	Protested: Protested and Hearing Held:
Approval:	
State Eng. Action: Approved	Action Date: 02/10/2010
Recon. Req. Date:	Recon. Req Action:
Certification:	
Proof Due Date: 02/28/2015	Extension Filed Date:
Election or Proof:	Election/Proof Date:
Cert./WUC Date:	Lapsed, Etc. Date: 02/28/2015 Lap. Ltr. Date: 03/13/2015
Wells:	
Prov. Well Date: 11/04/2009	Most Recent Well Renovate/Replace Date:
Heretofore	Hereafter
General	General
Flow: 3 ACFT	Flow: 3 ACFT
Source: Spring and Underground Water Well	Source: Underground Water Well
County: Piute	County: Piute
	Conn Desc Marysvale Town
	The purpose of this application is to add an underground water well to the Marysvale Town system to be used for fire protection.
Points of Diversion	Changed As Follows

Marysvale Town
 Water Master Plan Report-2022

Surface 1: S 1019 ft E 52 ft from W4 corner, Sec 34 T 27S R 3W SLBM Diverting Works: Source:	
Underground 1: N 3681 ft W 255 ft from S4 corner, Sec 20 T 27S R 3W SLBM Diameter: 12 ins. Depth: 350 to ft. Well ID#: 0 Source:	Underground 1: S 100 ft E 1000 ft from NW corner, Sec 35 T 27S R 3W SLBM Diameter: 10 ins. Depth: 300 to 400 ft. Well ID#: 433403 Source:
Water Uses Supplemental to other Water Rights: Y	Same as Heretofore Supplemental to other Water Rights: N
Municipal 1: Marysvale used: 01/01-12/31	
Reservoirs	Same as Heretofore
Protestants:	
Application Protestants:	
Received: 05/26/2009 Name: DMADC Irrigation Companies Address: c/o Richard Waddingham 362 West Main Delta, UT 84624 Comments:	Type: Application

Marysvale Town
Water Master Plan Report-2022

Exhibit 11-11 Water Right a46857

Change Details for a46857

Utah Division of Water Rights

4/27/2022 4:10 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Change: a46857

Water Right: 63-4843

Certificate:

1. General	
Status: Approved	Amendatory:
County TaxID:	
Base Water Rights: 63-4843	
Right Evidenced By: 63-4843	
Changes: Point of Diversion, Place of Use, Nature of Use	
2. Owners	
Name: Town of Marysvale	
Address: PO BOX 160	
Marysvale UT 84750	
Interest: 100%	
Remarks:	
3. Dates	
Filing:	
Filed: 03/08/2021	Priority of Change: 03/08/2021
State Engineer's Consideration of Rebuttable Presumption of Quantity Impairment (RPQI):	
RPQI Designation: No	
RPQI Notice Date:	
Advertising:	
Publication Began: 03/17/2021	Publication End: 03/24/2021
Protest End Date: 04/13/2021	Protested: Protested and
	Newspaper: The Richfield Reaper
	Hearing Held: 05/13/2021
Approval:	
State Eng. Action: Approved	Action Date: 09/30/2021
Recon. Req. Date:	Recon. Req Action:
Certification:	
Proof Due Date: 09/30/2026	Extension Filed Date:
Election or Proof:	Election/Proof Date:
Cert./WUC Date:	Lapsed, Etc. Date:
	Lap. Ltr. Date:
Wells:	
Prov. Well Date:	Most Recent Well Renovate/Replace Date:
Heretofore	Hereafter
General	General
Flow: 0.0094 CFS OR 2 ACFT	Flow: 0.0094 CFS OR 2 ACFT
Source: Beaver Creek	Source: Underground Water Well (existing)
County: Piute	County: Piute
	Conn Desc Marysvale Town
	Hereafter place of use is Marysvale Town Service Area.
Points of Diversion	Changed As Follows

Marysvale Town
Water Master Plan Report-2022

Exhibit 11-12 Water Right t91-63-20

Change Details for t91-63-20

Utah Division of Water Rights

4/27/2022 4:52 PM

(WARNING: Water Rights makes NO claims as to the accuracy of this data.)

Change: t91-63-20

Water Right: 63-2835

Certificate:

1. General	
Status: Expired	Amendatory: N
County TaxID:	
Base Water Rights: 63-2835	
Right Evidenced By: 63-2835 Pg. 40, Sevier River Decree	
Changes: Point of Diversion, Nature of Use	
2. Owners	
Name: Town of Marysvale	Interest:
Address: P.O. Box 160	
Marysvale UT 84750	
Remarks:	
3. Dates	
Filing:	
Filed: 09/30/1991	Priority of Change: 09/30/1991
State Engineer's Consideration of Rebuttable Presumption of Quantity Impairment (RPQI):	
RPQI Designation:	
RPQI Notice Date:	
Advertising:	
Publication Began:	Publication End: Newspaper:
Protest End Date:	Protested: Not Protested Hearing Held:
Approval:	
State Eng. Action:	Action Date:
Recon. Req. Date:	Recon. Req Action:
Certification:	
Proof Due Date:	Extension Filed Date:
Election or Proof:	Election/Proof Date:
Cert./WUC Date:	Lapsed, Etc. Date: 08/31/1992 Lap. Ltr. Date:
Wells:	
Prov. Well Date:	Most Recent Well Renovate/Replace Date:
Heretofore	Hereafter
General	General
Flow: 0.5 CFS	Flow: 0.5 CFS
Source: Unnamed Spring	Source: Spring & Underground Water (well)
County: Piute	County: Piute
	Comn Desc
Point of diversion: S6357, W10, S13 from E1/4, Sec. 26, T27S, R4N, SLBN.	This application is needed to allow Marysvale Town to drill a production well as a backup to their spring water supply.
Points of Diversion	Changed As Follows

Marysvale Town
 Water Master Plan Report-2022

Surface 1: S 1077 ft W 5233 ft from NE corner, Sec 4 T 28S R 4W SLBM Diverting Works: Source:	Surface 1: S 1077 ft W 5233 ft from NE corner, Sec 4 T 28S R 4W SLBM Diverting Works: spring collection box Source: Big Spring
	Underground 1: S 2050 ft E 2350 ft from NW corner, Sec 20 T 27S R 3W SLBM Diameter: 10 ins. Depth: 300 to 500 ft. Well ID#: 0 Source:
Water Uses Supplemental to other Water Rights: N	Changed As Follows Supplemental to other Water Rights: N
Municipal 1: Marysvale used: 01/01-12/31	Municipal 1: Marysvale used: 09/30-08/31
Reservoirs	Same as Heretofore

Exhibit 11-14 Fireman's Park Well Log

WELL DRILLER'S REPORT
State of Utah
Division of Water Rights

For additional space, use "Additional Well Data Form" and attach

Well Identification
Change Application: a35486 (63-4606) WIN: 433403

Owner *Note any changes*
Town of Marysvale
P.O. Box 160
Marysvale UT 84750
Contact Person/Engineer: _____

Well Location *Note any changes*
S 100 E 1000 from the NW corner of section 35, Township 27S, Range 3W, SL B&M

Location Description: (address, proximity to buildings, landmarks, ground elevation, local well #)

Drillers Activity Start Date: 11-8-09 Completion Date: 5-8-12
Check all that apply: New Repair Deepen Clean Replace Public Nature of Use: _____
If a replacement well, provide location of new well. _____ feet north/south and _____ feet east/west of the existing well.

DEPTH (feet) FROM TO	BOREHOLE DIAMETER (in)	DRILLING METHOD	DRILLING FLUID
0 340	12 1/4	Rotary Mud Rotary	Water Bentonite slurry

DEPTH (feet) FROM TO	WATER LEVEL	ARTESIAN Pressure	UNCONSOLIDATED					CONSOLIDATED		ROCK TYPE	COLOR	DESCRIPTION AND REMARKS (e.g., relative %, grain size, sorting, angularity, bedding, grain composition density, plasticity, shape, cementation, consistency, water bearing, odor, fracturing, mineralogy, texture, degree of weathering, hardness, water quality, etc.)
			C L A Y	S S A N D	G R A V E L	C O B B L E S	B O T H E R					
0 40	XX	High	XX	XX	XX							
40 340	XX	Low							X Volcanic	Red		

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SALT LAKE

Static Water Level
Date 5-8-12 Water Level 12 feet Flowing? Yes No
Method of Water Level Measurement Tape If Flowing, Capped Pressure _____ PSI
Point to Which Water Level Measurement was Referenced ground level Elevation _____
Height of Water Level reference point above ground surface _____ feet Temperature _____ degrees C F

Well Log

Marysville Town
Water Master Plan Report-2022

Construction Information									
DEPTH (feet)		CASING			DEPTH (feet)		SCREEN PERFORATIONS		OPEN BOTTOM
FROM	TO	CASING TYPE AND MATERIAL GRADE	WALL THICK (in)	NOMINAL DIAM. (in)	FROM	TO	SCREEN SLOT SIZE OR PERF SIZE (in)	SCREEN DIAM. OR PERF LENGTH (in)	SCREEN TYPE OR NUMBER PER FOOT (per round)
0	340	new steel	.258	8"	240	340	1/16"	8"	8" 4 side's

Well Head Configuration: water TIGHT SEAL Access Port Provided? Yes No
 Casing Joint Type: welded Perforator Used: AGSING TOREN
 Was a Surface Seal Installed? Yes No Depth of Surface Seal: 40 feet Drive Shoe? Yes No
 Surface Seal Material Placement Method: TRAMIE PIPE
 Was a temporary surface casing used? Yes No If yes, depth of casing: 12 feet diameter: 14 inches

DEPTH (feet)		SURFACE SEAL / INTERVAL SEAL / FILTER PACK / PACKER INFORMATION		
FROM	TO	SEAL MATERIAL, FILTER PACK and PACKER TYPE and DESCRIPTION	Quantity of Material Used (if applicable)	GROUT DENSITY (lbs./gal., # bag mix, gal./sack etc.)
0	34	neat cement grout	48 BAGS	6.9# BAG
34	340	1/4" gravel	4 TONS	

Well Development and Well Yield Test Information

DATE	METHOD	YIELD	Units Check One		DRAWDOWN (ft)	TIME PUMPED (hrs & min)
			GPM	CFS		
5-8-12	AIR PURGED	350	X		300	12 HRS

Pump (Permanent)

Pump Description: NONE Horsepower: _____ Pump Intake Depth: _____ feet
 Approximate Maximum Pumping Rate: _____ Well Disinfected upon Completion? Yes No

Comments

Description of construction activity, additional materials used, problems encountered, extraordinary circumstances, abandonment procedures. Use additional well data form for more space.

Well Driller Statement

This well was drilled and constructed under my supervision, according to applicable rules and regulations, and this report is complete and correct to the best of my knowledge and belief.

Name STEWART DRILLING

License No. 760

Signature Todd Stewart
(Person, Firm, or Corporation - Print or Type)
(Licensed Well Driller)

Date 6-3-12



State of Utah
GARY R. HERBERT
Governor
GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director
DIVISION OF DRINKING WATER
Kenneth H. Bousfield, P.E.
Director

Drinking Water Board
Paul Hansen, P.E., *Chair*
Ken Bassett, *Vice-Chair*
Terry Beebe
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Daniel Fleming
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Betty Naylor
Petra Rust
Amanda Smith
David Stevens, Ph.D.
Ron Thompson
Kenneth H. Bousfield, P.E.
Executive Secretary

January 11, 2011

The Honorable Wade Fautin, Mayor
Marysvale Town
P.O. Box 160
Marysvale, UT 84750

Dear Mayor Fautin:

Subject: **Exception Request Denied**, Exception-to-Rule R309-515-6(6)(i) for Grouting Bullion Canyon 2009 Well (WS004) to a Depth of only 40 feet, System #16003, File #07950

This is not plan approval.

On December 13, 2010, the Division of Drinking Water (the Division) received a request for an exception-to-rule R309-515-6(6)(i) which requires that **all public drinking water wells grout the annulus between the outermost well casing and the borehole wall to a depth of at least 100 feet below the ground surface unless an "exception" is issued by the Executive Secretary.**

Our understanding of the current status of the Bullion Canyon 2009 Well (referenced as WS004 in our inventory database) is as following:

1. This well has been drilled to a depth of approximately 340 feet, which is less than the planned depth of 450 feet according to preliminary well drilling specifications. The well has 8-inch diameter steel casing in place. The steel casing has been perforated and the well has been developed.
2. The driller has placed gravel pack in the well, up to approximately 40 feet below ground surface. A surface seal has not been completed for this well and the annular space in the top 40 feet is still open. A temporary 14-inch conductor casing is still in place, with a packer at the top to protect the annular space.
3. The well log has not been filed with Division of Water Rights yet due to the well not being completed. A drill rig is still on site at the well.
4. This well was drilled in November of 2009, prior to obtaining well drilling plans/specifications approval.
5. The Division received the original and revised well drilling plans/specifications for Bullion Canyon 2009 Well (WS004) on April 13, 2009 and August 31, 2009, respectively.

195 North 1950 West • Salt Lake City, UT
Mailing Address: P.O. Box 144830 • Salt Lake City, UT 84114-4830
Telephone (801) 536-4200 • Fax (801) 536-4211 • T.D.D. (801) 536-4414
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Mayor Wade Fautin
Page 2
January 11, 2011

6. The Division has issued four review comment letters for this project on May 8, 2009, September 17, 2009, September 23, 2009, and November 24, 2010.
7. We received the original Preliminary Evaluation Report (PER) on September 1, 2009. After requesting additional PER information, we received the revised PER on October 19, 2010. The Division staff has completed the review of the revised PER and a third comment letter requesting additional information has been sent. As of the date of this letter, the Division has not concurred with the revised PER.
8. As of the date of this letter, we have not issued a well drilling plan approval due to inadequate well seal design and lack of PER concurrence.

We understand your wish to drill the Bullion Canyon 2009 Well with only 40 feet of well seal (instead of the required 100 feet of well seal) and perform increased water quality monitoring such as an annual Microscopic Particulate Analysis (MPA) test and monthly fecal indicator sampling. We have not received sufficient information explaining why the 100 feet of well seal requirement can not be met or information regarding the well screen/perforation/water bearing strata depths.

The location of the new well adjacent to Bullion Creek and the lack of a geological barrier such as a thick layer of naturally protective clay increase the possibility of this well being under the direct influence of surface water. In our opinion, this well is susceptible to surface water influence based on its location and proposed design with 40 feet of well seal. A minimum of 100 feet of well seal or sufficient well seal to reach a clay formation is required if the new well is to be classified as a ground water source that is not under the direct influence of surface water. Increased water quality testing will not protect the public health, the aquifer, and the long term interest of this water system, to an equivalent or better degree than proper well construction and the minimum 100-foot grout seal as required by rule. **For this reason your exception request is denied at this time.**

The Division would like to offer the following options that Marysville Town may pursue given the current situation:

1. The first option would be to develop this well as a surface water intake or groundwater well under the direct influence of surface water (UDI source), which has to be treated to meet the surface water treatment requirements. If this well is considered a surface water intake or a UDI source, a 40-foot grout seal could be considered an acceptable design. However, this would require you to install surface water treatment equipment to adequately treat the water prior to delivering it to the Town's storage reservoirs or potential customers. The surface water treatment includes filtration or removal of Giardia and Crypto, and disinfection. For this option, we suggest that you consider the capital cost of installing a surface water treatment plant, on-going operational and maintenance cost, reporting requirements associated with surface water treatment, and the certified treatment operator requirement. If this is an option that the Town would like to consider, we are available to meet with you and your consultant to discuss the minimum plan review and design requirements associated with surface water treatment. The Division still will require PER concurrence before any approval can be issued for this well.

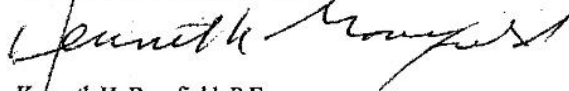
Mayor Wade Fautin
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2. The second option is to follow the minimum requirements of the public drinking water well construction standards per Utah Administrative Code R309-515. This requires the minimum 100 feet of grout seal and an approved PER. A checklist outlining the well approval process is enclosed for your information. Please be aware that the 100 feet of grout seal requirement is a minimal construction standard, and that the 100 feet of well seal does not guarantee the quality of the well water given the proximity of surface water to this well and the geological condition. Based on the limited information we have received so far, it appears that this well is sited at a location that could potentially be susceptible to contamination. If future water quality tests indicate surface-water influence or not meeting the drinking water maximum contaminant levels (MCLs), you will be required to install adequate treatment in order to use this well as a drinking water source.
3. If it is not possible to obtain PER concurrence or design approval for this well, you may want to consider using this well for irrigation only (not as a public drinking water source). This option means you need to meet the Division of Water Rights' requirement of 30-foot well seal. This option will prohibit you using this well as a drinking water source, unless in the future the well water goes through complete surface water treatment per Option 1 and the well obtains PER concurrence.

If you wish to contest this decision before the Drinking Water Board, please file a written request to be included in the agenda for the next Board meeting. The written request should be sent to Kenneth H. Bousfield, Executive Secretary, Drinking Water Board, at: P. O. Box 144830, Salt Lake City, Utah 84114-4830. If you need any assistance or have any additional question, please contact John Chartier, P.E., Central District Engineer, at (435) 896-5451, extension 314 or Ying-Ying Macauley, Engineering Section Manager, of this office, at (801) 536-4188.

Sincerely,

DRINKING WATER BOARD



Kenneth H. Bousfield, P.E.
Executive Secretary

JLC

Enclosures – Well Approval Checklist

cc: Edward Shaw, Boss Engineering, 220 North 1300 West, Suite #4 Pleasant Grove, Utah 84062
John Vercoe, Central Utah Public Health Department, 70 Westview Dr., Richfield, UT 84701
Jim Goddard, P.G., Division of Water Rights, P.O. Box 146300 Salt Lake City, UT 84114-6300
John L. Chartier, P.E., DEQ Central District Office, 70 Westview Drive, Richfield, UT 84701
Ying-Ying Macauley, P.E., Division of Drinking Water
Jim Martin, Division of Drinking Water
Kate Johnson, Division of Drinking Water

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