BOULDER FARMSTEAD WATER COMPANY

DEER RANCH SUBDIVISION HYDRAULIC ANALYSIS

PROFESSIONAL ENGINEER
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NO. 11768545-2202
8/5/2022
STATE OF UTAH

August 5, 2022

Project #: 2207-006

Prepared by:
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TABLE OF CONTENTS

FIGURES

TABLES

HYDRAULIC MODEL DESIGN ELEMENTS REPORT

HYDRAULIC ANALYSIS CERTIFICATION

I hereby certify that the hydraulic modeling analysis for:

Project: Deer Ranch Subdivision

Public Water System: Boulder Farmstead Water Company

PWS Number: 09002

Meets all requirements as set forth in *R309-511* (*Hydraulic Modeling Requirements*) and complies with the provisions thereof, as well as the sizing requirements of *R309-510*, and the minimum water pressures of *R309-105-9*. Where applicable the proposed additions to the distribution system will not cause the pressures at any new or existing connections to be less than those specified in *R309-105-9*. The model is sufficiently calibrated and accurate to represent the conditions within this water system. The velocities in the model are not excessive and are within industry standards. The hydraulic modeling method is *use of computer software*, and the computer software used was *Innovyze InfoWater Pro Version 3.5.*

Signature: 

Print Name: James M. Saunders

State of Utah P.E. License No.: 11768545-2202

Date: August 5, 2022

1. INTRODUCTION

Jones and DeMille Engineering was contracted to study the impacts of the Deer Ranch subdivision to the Boulder Farmstead Water Company's culinary water system. This report will provide background information for the water system and the development, provide an analysis, and present results on the impact of the development.

1.1. SYSTEM INFORMATION

Boulder Farmstead Water Company, the "Company", is located in Boulder Town in Garfield County, Utah. The system is privately owned and provides culinary water to a mainly non-transient community water system composed of residents and businesses in Boulder. The water system is comprised of several pressure zones with several water tanks and sources, see the System Exhibits in Appendix B.

Only the lower service area was modeled as pressures are governed by the storage tanks by the cemetery. For the lower service area, the water system is comprised of varying pipe sizes from 2-inch to 12-inch pipe, see Table 1.

Table 1 Modeled Pipe Length Summary

Pipe Diameter (in)	Total Length of Pipe (ft)
2	2,394
4	14,944
6	10,178
8	14,584
10	22,630
12	692

1.1.1. SYSTEM CONTACT

System Name:	Boulder Farmstead Water Company
Address:	PO Box 1356
City, State, Zip:	Boulder, UT 84716
Business Phone:	(435) 616-7446 Ext:
Email Address:	bldrmesa@scinternet.net
Supervisor Name:	Randy Catmull
Title:	Board Member
Contact Name:	Evonne Roundy
County:	Garfield
Water Right System ID:	1304
Public Water System ID:	09002
DEQ Category:	Community

1.2. PROPOSED SYSTEM & CONNECTION

The development will initially include approximately 14 residential type connections. The proposed water connection branches off the existing water main on South Boulder Road at 1600 South or approximately 1 mile southeast of the intersection of SR 12 and Burr Trail Rd. See the Preliminary Plat Map included in Appendix B for a visual representation.

The proposed water system consists of approximately 5,100 feet of 8-inch PVC piping. This pipeline is needed to deliver water from the existing pipeline along Lower Boulder Road to the development location. The pipeline will tee from a 10-inch line and follow an existing gravel road (1600 South) for approximately 2,300 feet, then turns north for approximately 2,300 feet and then back east for another 500 feet. Fire hydrants are proposed to be installed every 400 feet along the subdivided 14 lots of the development. There is currently no other development along the pipeline that would benefit from additional fire hydrants.

2. WATER DEMAND CRITERIA

2.1. ERC EVALUATION

Currently, the Company serves 187 residential connections, 9 commercial connections, 2 industrial connections, and 7 institutional connections. Water use for non-residential connections was used to calculate the ERC value for these connections. Table 1 below displays the current connections to the system the corresponding ERC value.

Table 2 ERC Summary

2021	Connections	ERCs	Average ERC Value per Connection
Residential	187	187	1.00
Commercial	9	15	1.64
Industrial	2	0	0.19
Institutional	8	53	6.66
Total	**206**	**255**	

The Deer Ranch Subdivision will add 14 residential connections with a corresponding 14 ERCs, increasing the total number of ERCs for the Company to 269.

2.2. LEVEL OF SERVICE (WATER USE DEMAND)

The State of Utah DDW Rules and the current IFC outline the minimum LOS that water systems are required to provide. Establishing a LOS allows the Company to provide new water users the same quantity and quality of water as existing users.

In 2018, the DDW has updated the requirements for calculations to determine the LOS for water systems serving more than 500 people. A detailed outline of DDWs requirements and procedure to determine levels of service can be found in Appendix C. In general, the new sizing guideline requires the use of measured data from the sources and water meter data by connection type to determine requirements for source, storage, and water right. To conservatively plan for non-typical water usage years, a variation factor is applied to the data. This value, called a System-Specific Variation Factor, is determined based on the distribution of the data. The maximum measured value is then multiplied by this value to set the minimum standard for the system. The following table shows the calculated and selected variation factor for each category considered.

The LOS for Boulder Farmstead Water Company is as follows:

2.3. WATER RIGHTS

The LOS related to water rights is as follows:

- Diversion Limit (peak flow or PDD) = 0.00175 cfs/ERC (0.786 gpm/ERC)
- Annual Diversion Volume (ADD projected for one year) = 0.637 ac-ft/yr/ERC (207,530 gallons/ERC)

The LOS for water rights is determined by the peak flow (based on PDD) and the annual diversion limit (based on the ADD over a year).

2.4. SOURCE

The LOS related to source is as follows:

- Flow Rate: provide a flow equal to the Peak Day Demand of 0.786 gpm per ERC for indoor and outdoor use.

These levels are consistent with the Utah Administrative Code Section R309-510-7, Source Sizing.

2.5. STORAGE

The LOS related to storage is the combination of the following.:

- Equalization Storage: 566 gallons per ERC

  This volume is based on the new Water System Minimum Sizing Requirements (Utah Code 19-4-104 and 114) and water usage data provided by Boulder Farmstead Water Company. Indoor and outdoor water usage is included and reflects the average day water usage.
- Fire storage: 300,000 gallons

  This volume is based on Appendix B Table B105.1(2) of the current IFC rule for fire flow storage for the church, which was assumed to be a Type 5B building, with no sprinkler system, and approximately 9,000 square feet. A structure of that size and type requires a fire flow of 2,500 gpm for 2 hours.

- Emergency Storage: 0 gallons
    - Utah Administrative Code Section R309.510-8(4), Facility Design and Operation: minimum Sizing Requirements, Storage Sizing, Emergency Storage states that, "*Emergency storage shall be considered during the design process. The amount of emergency storage shall be based upon an assessment of risk and the desired degree of system dependability. The Director may require emergency storage when it is warranted to protect public health and welfare*." The Company currently does not have a specific storage volume requirement for emergency storage and therefore has not been evaluated for this plan.

2.6. DISTRIBUTION MINIMUM WATER PRESSURE REQUIREMENTS

The LOS related to minimum water pressure is as follows:

- Minimum of 20 psi during fire flow and PDD
- Minimum of 30 psi during PID
- Minimum of 40 psi during PDD

These levels are consistent with the Utah Administrative Code Section R309-105-9, Minimum Water Pressure.

2.7. FIRE FLOW

Fire hydrants exist within the system. The LOS related to fire flow is providing a minimum of the following:

- 1,000 gpm for residential homes with a finished square footage less than 3,600 square feet.
- Non-residential buildings vary based on finished square footage, usage, automatic sprinkler systems, and construction material type.

These levels are consistent with the UAC Section R309-550(5), Water Main Design, Fire Protection and the 2018 IFC.

3. METHODOLOGY AND ANALYSIS

3.1. HYDRAULIC MODEL USED

The hydraulic model was set up using information from previous construction projects in CAD data. The water system was then modeled using Innovyze InfoWater Pro Version 3.5 program.

Junctions were strategically placed at beginning, middle and end of pipes, along major roads and intersections and at other locations as necessary to achieve system representation. Junctions were used to represent the nearby ERC values of homes and businesses. The demand allocator tool was used to assign ERC data to the placed junctions, based on the nearest connection locations, and associated ERC values. The hydraulic model was used to check multiple scenarios for system performance in accordance with Utah drinking water laws and rules. The scenarios evaluated include ADD, PDD, PID and PDD + Fire Flow. The scenarios include minimum system pressures that must be checked for function of the system. The model was setup to run a steady state analysis for all scenarios, which should be sufficient for the purposes of this study.

The hydraulic model was created to check existing conditions and evaluate future scenarios. The values described in Section 5 are the assigned rate values per ERC by scenario. These calculations were used as a global demand factor and adjusted for the required scenario.

3.2. HYDRAULIC MODEL INPUT

Table 3 shows model flows for various scenarios. The PID was calculated by using Equation 4 per state requirements and dividing by the total number of ERCs.

$$Total\ Flow\ (gpm) = 10.8 * Number\ of\ ERCs^{0.64}$$

Table 3 Model Flows

ADD Flow per ERC	PDD Flow per ERC	PID Flow Capacity per ERC (Existing System)
0.393 gpm	0.786 gpm	1.469 gpm

3.3. FIELD CALIBRATION METHODOLOGY

The model was calibrated with existing system conditions, such as surveyed tank elevations, current PRV settings, and double-checking pipe sizes and materials. Hazen-Williams roughness values were assigned based on pipe material. A roughness value of 130 was used for all pipes, as a note most pipes in the system are C200 PVC pipe. Upon completing the existing system model, dependent scenarios were created for the Deer Ranch Development.

3.4. HYDRAULIC MODEL ANALYSIS

The existing system and Deer Ranch Subdivision situations were evaluated for Average Day, Peak Day, and Peak Instantaneous Demands as wells as the fire flow capacity of the system was evaluated.

4. ANALYSIS RESULTS AND CONCLUSIONS

4.1. HYDRAULIC MODEL RESULTS

Based on the preliminary plat map layout of the water system the development will not negatively impact the existing system, velocities in the pipes are within industry standards and not excessive, and the minimum pressure for Peak Instantaneous Demands is met for the development. However, the minimum pressure for Peak Day Demand and fire flow requirement are not met at the end of the cul-de-sac is only capable of flows between 470 and 750 gpm of fire flow capacity, see Figures 1 and 2.

Figure 1 PDD Pressures Not Met

Figure 2 Fire Flow Not Met

4.2. CONCLUSION OF PROJECT IMPACT FROM MODEL RESULTS

Based on the preliminary layout of the water lines, the proposed development will not meet minimum pressure requirements or fire flow requirements. To remedy the deficiency, a couple of recommended alternatives are given below.

4.2.1. ALTERNATIVE 1

The first option to make the development work is to increase the pressure setting to 50 psi in PRV 6 (just upstream of the development) and install an 8-inch pipeline from the dead-end leg of the development and run east to connect to the 10-inch line near Muse Lane. The increased pressure setting will allow the development to meet the minimum pressure requirement and the loop line will allow the development to meet the minimum fire flow requirement.

Figure 3 Alt 1 PDD Pressures

Figure 4 Alt 1 Fire Flow Capacity

4.2.2. ALTERNATIVE 2

Another option to make the development work is to run a mile of 8-inch pipeline south from East Burr Trail Road and tie into the upper end of the development, creating a loop. Because this line will loop the lower end of the system, two pressure reducing vaults will be required to reduce system pressure and match the existing system. This is a very expensive option for this development.

Figure 5 Alt 2 PDD Pressures

Figure 6 Alt 2 Fire Flow Capacity

4.3. RULE COMPLIANCE CONCLUSION

This analysis and report have been prepared in accordance with applicable BFWC, State, and International Fire Code minimum level of service criteria. The analysis results show that the proposed water system will have a minimal impact on the surrounding BFWC system but will not meet the requirements for minimum fire flow capacity. The proposed water line will need to have an additional 8-inch water line to loop the water lines, which will provide the pressure and flow requirements required by the applicable state codes, rules, and guidelines.

APPENDIX A. HYDRAULIC MODEL DESIGN ELEMENTS REPORT CHECKLIST

CHECKLIST FOR HYDRAULIC MODEL DESIGN ELEMENTS REPORT

This hydraulic model checklist identifies the components included in the Hydraulic Model Design Elements Report for

Deer Ranch Hydraulic Analysis

(Project Name or Description)

09002

(Water System Number)

Boulder Farmstead Water Company

(Water System Name)

8/5/2022

(Date)

The checkmarks and/or P.E. initials after each item indicate the conditions supporting P.E. Certification of this Report.

1. At least 80% of the total pipe lengths in the distribution system affected by the proposed project are included in the model. *[R309-511-5(1)]*

   ☒ JMS

2. 100% of the flow in the distribution system affected by the proposed project is included in the model. If customer usage in the system is metered, water demand allocations in the model account for at least 80% of the flow delivered by the distribution system affected by the proposed project. *[R309-511-5(2)]*

   ☒ JMS

3. All 8-inch diameter and larger pipes are included in the model. Pipes smaller than 8-inch diameter are also included if they connect pressure zones, storage facilities, major demand areas, pumps, and control valves, or if they are known or expected to be significant conveyers of water such as fire suppression demand. *[R309-511-5(3)]*

   ☒ JMS

4. All pipes serving areas at higher elevations, dead ends, remote areas of a distribution system, and areas with known under-sized pipelines are included in the model. *[R309-511-5(4)*

   ☒ JMS

5. All storage facilities and accompanying controls or settings applied to govern the open/closed status of the facility for standard operations are included in the model. *[R309-511-5(5)]*

☒ JMS

6. Any applicable pump stations, drivers (constant or variable speed), and accompanying controls and settings applied to govern their on/off/speed status for various operating conditions and drivers are included in the model. *[R309-511-5(6)]*

☒ JMS

7. Any control valves or other system features that could significantly affect the flow of water through the distribution system (i.e. interconnections with other systems, pressure reducing valves between pressure zones) for various operating conditions are included in the model. *[R309-511-5(7)]*

☒ JMS

8. Imposed peak day and peak instantaneous demands to the water system's facilities are included in the model. The Hydraulic Model Design Elements Report explains which of the Rule-recognized standards for peak day and peak instantaneous demands are implemented in the model (i.e., (i) peak day and peak instantaneous demand values per *R309-510, Minimum Sizing Requirements*, (ii) reduced peak day and peak instantaneous demand values approved by the Director per *R309-510-5, Reduction of Sizing Requirements*, or (iii) peak day and peak instantaneous demand values expected by the water system in excess of the values in *R309-510, Minimum Sizing Requirements*). The Hydraulic Model Design Elements Report explains the multiple model simulations to account for the varying water demand conditions, or it clearly explains why such simulations are not included in the model. The Hydraulic Model Design Elements Report explains the extended period simulations in the model needed to evaluate changes in operating conditions over time, or it clearly explains (e.g., in the context of the water system, the extent of anticipated fire event, or the nature of the new expansion) why such simulations are not included in the model. *[R309-511-5(8) & R309-511-6(1)(b)]*

☒ JMS

9. The hydraulic model incorporates the appropriate demand requirements as specified in *R309-510, Minimum Sizing Requirements*, and *R309-511, Hydraulic Modeling Requirements*, in the evaluation of various operating conditions of the public drinking water system. The Report includes:
   - the methodology used for calculating demand and allocating it to the model.
   - a summary of pipe length by diameter.
   - a hydraulic schematic of the distribution piping showing pressure zones, general pipe connectivity between facilities and pressure zones, storage, elevation, and sources; and
   - a list or ranges of values of friction coefficient used in the hydraulic model according to pipe material and condition in the system. In accordance with Rule stipulation, all coefficients of friction used in the hydraulic analysis are consistent with standard practices.

   [R309-511-7(4)]

☒ JMS

10. The Hydraulic Model Design Elements Report documents the calibration methodology used for the hydraulic model and quantitative summary of the calibration results (i.e., comparison tables or graphs). The hydraulic model is sufficiently accurate to represent conditions likely to be experienced in the water delivery system. The model is calibrated to adequately represent the actual field conditions using field measurements and observations. *[R309-511-4(2)(b), R309-511-5(9), R309-511-6(1)(e) & R309-511-7(7)]*

☒ JMS

11. The Hydraulic Model Design Elements Report includes a statement regarding whether fire hydrants exist within the system. Where fire hydrants are connected to the distribution system, the model incorporates required fire suppression flow standards. The statement that appears in the Report also identifies the local fire authority's name, address, and contact information, as well as the standards for fire flow and duration explicitly adopted from *R309-510-9(4), Fireflow*, or alternatively established by the local fire suppression agency, pursuant to *R309-510-9(4), Fireflow.* The Hydraulic Model Design Elements Report explains if a steady-state model was deemed sufficient for residential fire suppression demand, or acknowledges that significant fire suppression demand warrants extended model simulations and explains the run time used in the simulations for the period of the anticipated fire event. *[R309-511-5(10) & R309-511-7(5)]*

☒ JMS

12. If the public drinking water system provides water for outdoor use, the Report describes the criteria used to estimate this demand. If the irrigation demand map in *R309-510-7(3), Irrigation Use,* is not used, the report provides justification for the alternative demands used in the model. If the irrigation demands are based on the map in *R309-510-7(3), Irrigation Use,* the Report identifies the irrigation zone number, a statement and/or map of how the irrigated acreage is spatially distributed, and the total estimated irrigated acreage. The indicated irrigation demands are used in the model simulations in accordance with Rule stipulation. The model accounts for outdoor water use, such as irrigation, if the drinking water system supplies water for outdoor use. *[R309-511-5(11) & R309-511-7(1)]*

☒ JMS

13. The Report states the total number of connections served by the water system including existing connections and anticipated new connections served by the water system after completion of the construction of the project. *[R309-511-7(2)]*

☒ JMS

14. The Report states the total number of equivalent residential connections (ERC) including both existing connections as well as anticipated new connections associated with the project. In accordance with Rule stipulation, the number of ERC's includes high as well as low volume water users. In accordance with Rule stipulation, the determination of the equivalent residential connections is based on flow requirements using the anticipated demand as outlined in *R309-510, Minimum Sizing Requirements*, or is based on alternative sources of information that are deemed acceptable by the Director. *[R309-511-7(3)]*

☒ JMS

15. The Report identifies the locations of the lowest pressures within the distribution system, and areas identified by the hydraulic model as not meeting each scenario of the minimum pressure requirements in *R309-105-9, Minimum Water Pressure*. *[R309-511-7(6)]*

☒ JMS

16. The Hydraulic Model Design Elements Report identifies the hydraulic modeling method, and if computer software was used, the Report identifies the software name and version used. *[R309-511-6(1)(f)]*

☒ JMS

17. For community water system models, the community water system management has been provided with a copy of input and output data for the hydraulic model with the simulation that shows the worst-case results in terms of water system pressure and flow. *[R309-511-6(2)(c)]*

☒ JMS

18. The hydraulic model predicts that new construction will not result in any service connection within the new expansion area not meeting the minimum distribution system pressures as specified in *R309-105-9, Minimum Water Pressure.* *[R309-511-6(1)(c)]*

☒ JMS

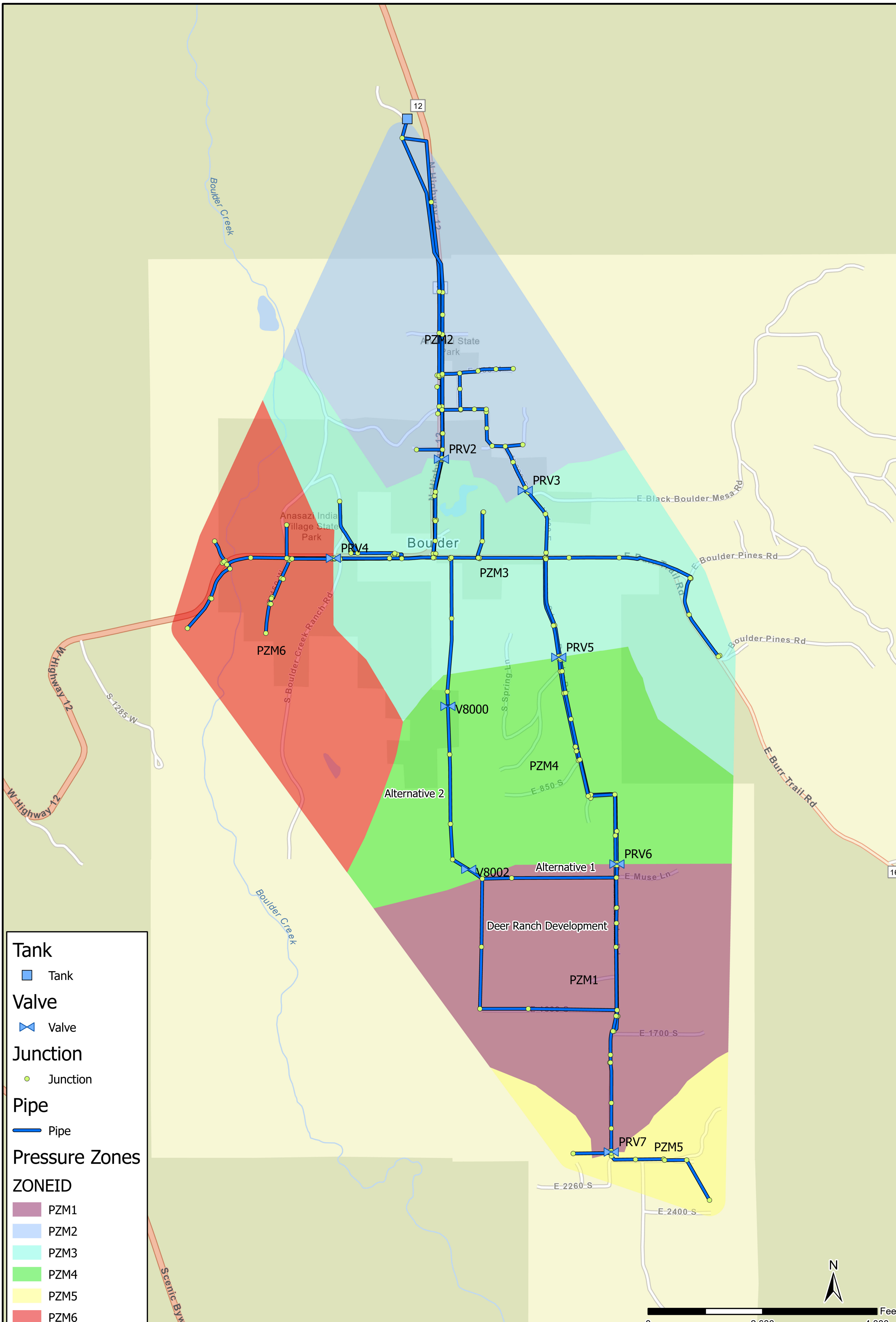
19. The hydraulic model predicts that new construction will not decrease the pressures within the existing water system to such that the minimum pressures as specified in *R309-105-9, Minimum Water Pressure* are not met. *[R309-511-6(1)(d)]*

☒ JMS

20. The velocities in the model are not excessive and are within industry standards.

☒ JMS

APPENDIX B. EXHIBITS



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Boulder Farmstead Water Company

Deer Ranch Hydraulic Analysis
Pressure Zone Map

Map Name: H:\JD\Proj\2207-006\Design\Design Process Documentation\Hydraulics_Hydrology\Boulder Water Model\Boulder Water Model.aprx - 11x17 Portrait1

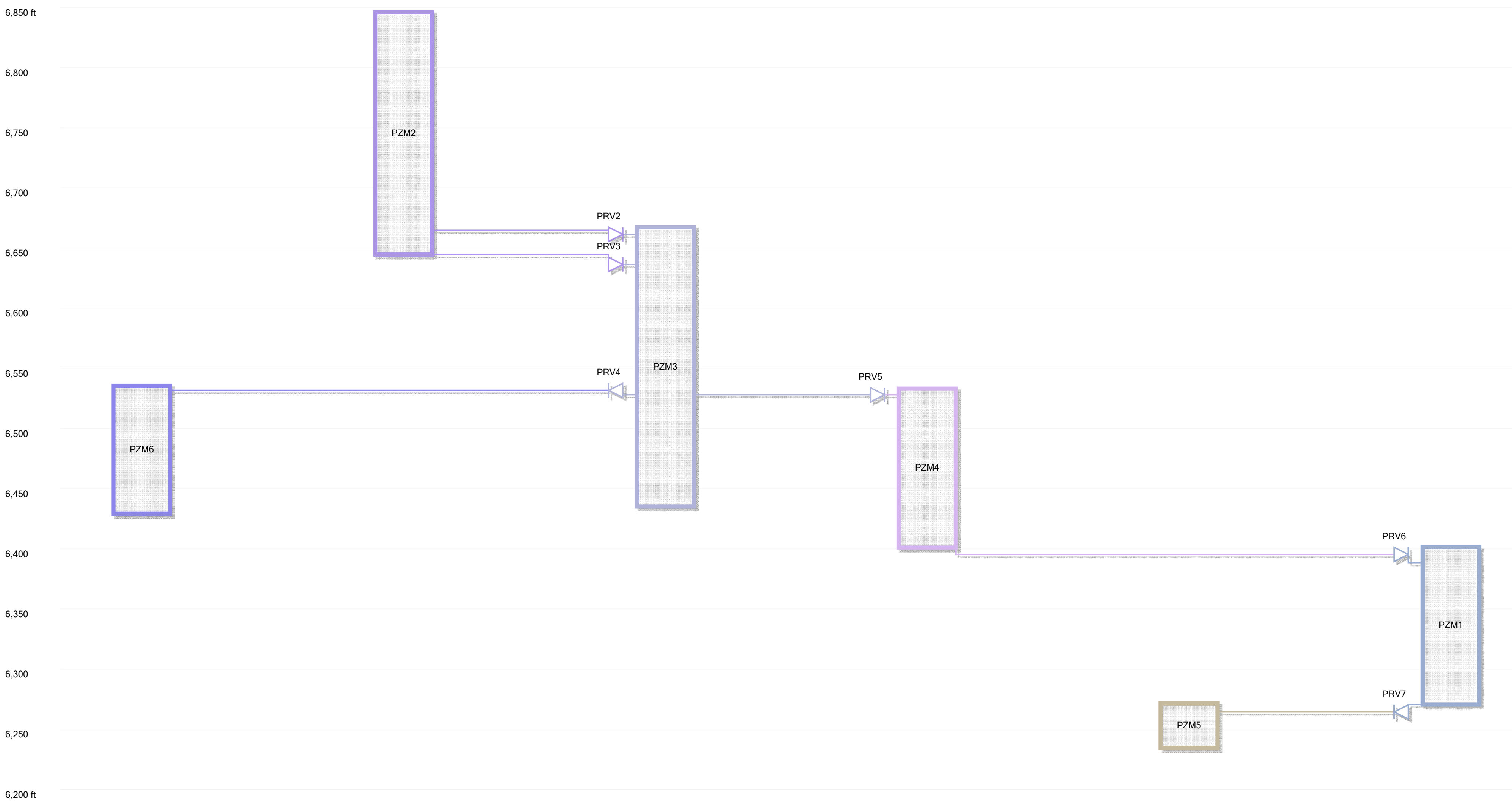
Project Number: 2207-006	Drawn by: JMS 07-22	Last Edit: 07/29/2022

Garfield County

Scale: 1" = 1,500'

1

System Schematic - Boulder Water Model



APPENDIX C. STATE MINIMUM SIZING GUIDELINES

Summary of New Water Use Data Reporting and Water System Minimum Sizing Requirements
(2018 Legislative Revisions to Utah Code 19-4-104 and 114)

I. Annual Water Use Data Reporting by All Community Water Systems Serving 500 People or More

Water Use Data to Be Collected:	Reporting Frequency:	Report Data to:	Reporting Due:
1. Peak Day Source Demand 2. Average Annual Demand *3.* Number of Retail Equivalent Residential Connections *[Number of Total ERCs]* 4. Quantity of Non-revenue Water	Annual	Division of Water Rights (**DWRi**)	**March 1, 2019** for 2018 data; as specified by DWRi for future years

II. Schedule of Water Use Data Reporting and Minimum Sizing Requirements for Community Water Systems (CWS)

Water System Type	3 Years of Data Due	Report Data to	DDW Sets System-Specific Sizing Requirements by
Community Water Systems serving over 3,300 people	March 1, 2019	• DWRi – Annual Water Use Data described in 19-4-104(6)(a) • DDW – Engineering Study	After Division of Drinking Water (**DDW**) receives acceptable data
Community Water Systems serving between 500 and 3,300 people	March 1, 2023	• DWRi – Annual Water Use Data described in 19-4-104(6)(a) • DDW – Engineering Study	October 1, 2023
Community Water Systems serving fewer than 500 people	TBD	DWRi – Water Use Data (as previously required by DWRi)	TBD
Wholesale Water Suppliers that serve a total population of more than 10,000 people and the wholesale population is 75% or more of the total population served	March 1, 2019 (assume to be same as CWS serving over 3,300 people)	DWRi – Annual Water Use Data	Not Applicable

III. Non-Community Water Systems

DDW Director to establish minimum source and storage sizing standards - no water use reporting or deadlines given for water systems

Process of Analyzing Water Use Data and Establishing Minimum Sizing Requirements

Data Submission: Water systems certify and report the water use data to Division of Water Rights (DWRi) each year.

↓

Data Review: The water use data are processed and reviewed by DWRi and Division of Water Resources (DWRe). The processed data are forwarded to Division of Drinking Water (DDW).

↓

Process "per ERC" Data: The DDW program calculates and converts the DWRi data to three data types (see D.1):

- **"Peak Day Demand per ERC" Data**
- **"Average Annual Demand per ERC" Data**
- **"Equalization Storage per ERC" Data**

↓

Set Minimum Sizing Requirements: The DDW program evaluates the "per ERC" data, selects a specific value from each "per ERC" data type for further calculation, and checks for anomalies that trigger further evaluation. If no anomalies are identified, the DDW program then applies a "system-specific variation factor" to the selected value and sets the corresponding "per ERC minimum sizing requirement" (see D.4.a through e):

- **Peak Day Demand per ERC Minimum Sizing Requirement**
- **Average Annual Demand per ERC Minimum Sizing Requirement**
- **Equalization Storage per ERC Minimum Sizing Requirement**

↓

Set Customized Minimum Sizing Requirements: If a water system's "per ERC" data trigger further evaluation in the DDW program, a DDW committee reviews the data and selects a specific value from each "per ERC" data type for further calculation. The DDW committee determines a customized "system-specific variation" factor, applies the factor to the selected value, and sets the corresponding "per ERC minimum sizing requirement" (see D.4.f).

↓

Capacity Evaluation: When source/storage capacity evaluation of a water system's current/future needs are needed:

- The "Peak Day Demand per ERC Minimum Sizing Requirement" and the "Average Annual Demand per ERC Minimum Sizing Requirement" are used to evaluate the water system's source capacity. (see E.2)
- The "Equalization Storage per ERC Minimum Sizing Requirement" is used to evaluate the water system's storage capacity. (see E.3)

To Calculate the Data:

Quantity of Non-Revenue Water (in gallons) =
[Average Annual Demand] **–** [Water Volume Metered/Billed] **–** [Wholesale Delivery Outflow]

"Peak Day Demand per ERC" Data = $\frac{\text{[Peak Day Source Demand]}}{\text{[Total Number of ERCs]}}$
(in gallons/day)

"Average Annual Demand per ERC" Data = $\frac{\text{[Average Annual Demand]}}{\text{[Total Number of ERCs]}}$
(in gallons/year)

"Equalization Storage per ERC" Data = $\frac{\text{[Average Annual Demand per ERC]}}{\text{[Operational Days in a Year]}}$
(in gallons)

To Calculate the "per ERC Minimum Sizing Requirements":

System-Specific Variation Factor = $\frac{\text{[Highest Data Value]} - \text{[Lowest Data Value]}}{\text{[Lowest Data Value]}}$

Peak Day Demand per ERC Minimum Sizing Requirement (in gallons/day) =
["Peak Day Demand per ERC" selected value] × [1 + System-Specific Variability Factor]

Average Annual Demand per ERC Minimum Sizing Requirement (in gallons/year) =
["Average Annual Demand per ERC" selected value] × [1 + System-Specific Variability Factor]

Equalization Storage per ERC Minimum Sizing Requirement (in gallons) =
["Equalization Storage per ERC" selected value] × [1 + System-Specific Variability Factor]

To Calculate Source Capacity:

Source Capacity Needed to Meet the Peak Day Source Demand (in gallons/day) =
[Peak Day Demand per ERC Minimum Sizing Requirement] × [Total Number of ERCs]

Source Capacity Needed to Meet the Average Annual Demand (in gallons/year) =
[Average Annual Demand per ERC Minimum Sizing Requirement] × [Total Number of ERCs]

To Calculate Storage Capacity:

Total Storage Capacity Required (in gallons) =
[Equalization Storage] + [Fire Suppression Storage] + [Emergency Storage (optional)]

Equalization Storage R**equired in Utah** (in gallons) =
[Equalization Storage per ERC Minimum Sizing Requirement] × [Total Number of ERCs]

Fire Suppression Storage Required by Local Fire Code Authority (in gallons) =
[Required Fire Flow (in gallons per minute)] × [Required Duration (in minutes)]