

CITY OF GRASS VALLEY

Water System Master Plan Update

Sherman County, Oregon



January, 2026

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CITY OF GRASS VALLEY SHERMAN COUNTY, OREGON **WATER SYSTEM MASTER PLAN UPDATE**

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**GRASS VALLEY, OREGON
WATER SYSTEM MASTER PLAN UPDATE**

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CITY OF GRASS VALLEY, OREGON WATER SYSTEM MASTER PLAN UPDATE

EXECUTIVE SUMMARY

The Grass Valley Water System Master Plan Update has been prepared to meet the requirements of the Oregon Health Authority (OHA) as specified in OAR 333-061-0060 and to replace the previous Water Master Plan written in 1998.

The Grass Valley Water System serves an area of approximately 330 acres. The City pumps water from two groundwater wells located just outside the westerly city limits. After a change in location of Well No. 1, the original OWRD water right Certificate from 1980 allowing 0.78 cfs of water from two wells is in the process of being transferred to a new certificate number with the same allowed rate.

A 2004 improvement project installed over 100 meters and service lines and 13,000 feet of 6- and 8-inch pipes to the distribution system. As part of the same project, a water storage reservoir with a nominal volume of 224,000 gallons was constructed near the system's well pump building, a masonry block building that includes a standby generator on a concrete pad for emergency power. In accordance with Oregon's implementation of the groundwater rule, the system operates without chlorination since water analysis consistently shows no microbial contamination other than a single testing event in 2009. The system's water quality consistently meets all federal and state requirements for drinking water.

Average daily consumption of water in 2024 was 73,000 gallons. Data shows that demand is less than 200 gallons per person per day in the winter and over 800 gallons per person in the summer. The large discrepancy between winter and summer usage is thought to be a result of extensive irrigation in the dry months, particularly by a couple of customers. Grass Valley sends out monthly bills with a flat rate water service charge that is independent of water consumption. While each service includes a meter, the City does not read them. It is not known how many meters, if any, are still capable of measuring accurately.

Recent engineering model simulations predicted a 1,000-gpm fire flow could be supported throughout the system (with a few exceptions) while maintaining a minimum pressure of 20 psi. However, fire hydrant flow tested in the field was 750 gpm.

The past seven years of water production was analyzed and used to determine future water demand for the planning period of 20 years. A small population growth in the coming decades of 1.0 percent was assumed. The peak day projected demand for the year 2045 (194 gpm) is well within the City's current water right, and the pumping capacity of the well pumps is also sufficient.

While the storage capacity of the reservoir is sufficient even for summer use, its capacity is technically already deficient for fire flow on a theoretical peak day in summer. Rather than constructing more storage, it is recommended that the City make some changes to the way the system is administered, e.g. charge more for high usage and enforce limits on irrigation. In addition, though it is hard to quantify, water losses appear to be fairly high (26%) and may be attributable to leaking pipes. If older pipes can be replaced with new C900 on a pre-determined schedule, possibly combined with a leak detection study, and the billing and irrigation changes are made, it is highly likely that the system will produce enough water to satisfy 20-year projected demand.

1. EXISTING WATER SYSTEM

A. Introduction and Background

The purpose of this report is to provide the City of Grass Valley with an accurate Master Plan for operation of its water system for the planning period of twenty years, and to analyze the feasibility and costs of system improvements. It has been prepared to meet the requirements of the Oregon Health Authority (OHA) as specified in OAR 333-061-0060 and to replace the previous Water Master Plan that was written in 1998. Description and evaluation of the existing water system includes a description of the service area, water supply source, storage, distribution system, water rights, water quality, water use and demands, system operation, and regulatory standards. System deficiencies will be evaluated considering goals for water quality, quantity, service levels, water rights, and growth estimates. Water system improvements and alternatives have been identified, and the recommended alternatives and their estimated costs are summarized in Sections 6 through 8 of this report.

The City of Grass Valley is located in Sherman County, Oregon, between the John Day and Deschutes Rivers, 27 miles south of the Columbia River and Interstate 84 on Highway 97. In the 1840's, the Barlow Road cutoff of the Oregon Trail ran just to the north of present-day Grass Valley, and the area was eventually settled by cattle ranchers and then wheat farmers. The City of Grass Valley was established in 1878. To this day, wheat and barley are the predominant agricultural crops.

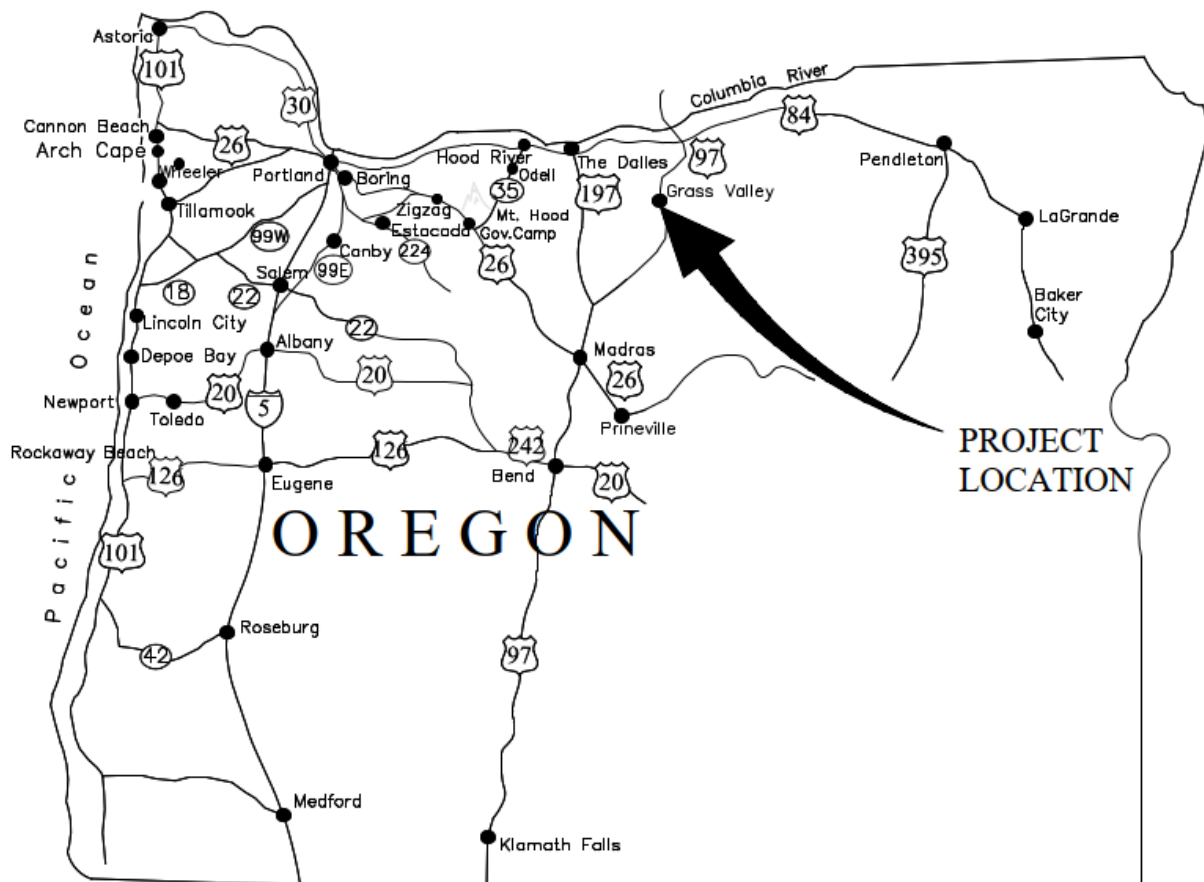


Figure 1 - Vicinity Map

B. Service Area

The City limits and urban growth boundary enclose 330.3 acres. The official US Census found that Grass Valley had a population of 150 in 2020 and the Portland State University Population Research Center estimated that the City's population has grown every year since 2021. For the purposes of this report, the current City population is estimated to be 166, which will be the number used for projecting water needs for the 20-year planning window.

The Grass Valley Water System provides service to 89 customers: one commercial and 88 residential connections. All but two are within City limits. Figure 2 shows the water system service area as well as the City limits, urban growth boundary (UGB), and existing land use classifications. There are currently no plans to expand the City limits or the UGB, and indeed most of the available area inside the limits is not likely to be developed during the 20-year planning period of this study. The largest user of water is a property just west of the City Limits that belong to a local family that has a long-held agreement with the City. The City is currently allowing them to obtain free water to irrigate surrounding cropland, though the terms of the agreement are not completely clear.

The City limits roughly create a one-mile by one-half-mile rectangle running north/south and centered around Hwy 97. Grass Valley's elevation ranges from approximately 2,230 feet above sea level at the north edge of the city to 2,280 ft at the south edge. There are plateaus above the City to the east that are more than 60 feet higher, and some hills to the west nearly as tall, one of which holds the system's 224,000-gallon water reservoir, which was constructed in 2004 and has a base elevation 2,310 ft. All service connections in town are far enough below the height of the reservoir to allow adequate water pressure. One residential customer complains of low water pressure, but it has been determined that this is due to the length of the service line on the private side of the meter, and despite its elevation proximity with the reservoir, the pressure at the meter is adequate.

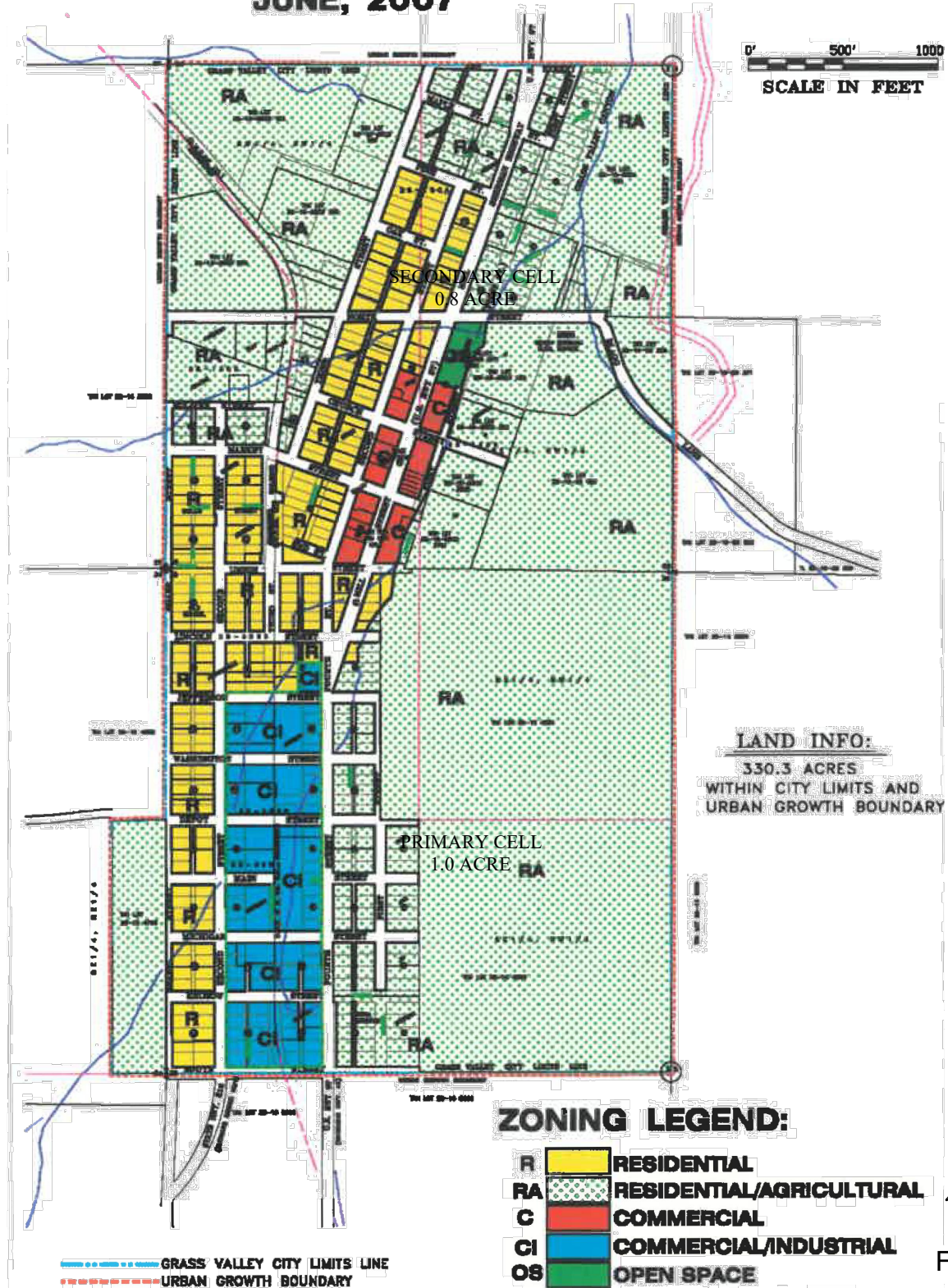
The area served by the water system is zoned by Sherman County as Residential/Agricultural, Residential, Commercial/Industrial, Commercial, and Open Space. Table 1, taken from information provided in the City's 2007 Comprehensive Plan map, shows the relative percentages of land use by zone.

Table 1 - Land Use Within Grass Valley's UGB

<i>Zoning Designation</i>	<i>Acres</i>	<i>Percent of Total Area</i>
Residential/Agricultural	224.0	68.6%
Residential	58.0	17.8%
Commercial/Industrial	26.1	8.0%
Commercial	8.7	2.7%
Open Space	9.8	3.0%
Total	326.6	100%

Build-out potential exists in all zones of the City. Growth has historically been slow or nonexistent in Grass Valley. While unlikely to happen in such a rural area, it is possible for the 58 acres of Residential zoning and the Residential/Agricultural-zoned areas that are close to the main streets to be subdivided into 50-foot-wide lots once sewer service is available. An analysis of potential population growth is in Section 3 of this report.

**IN SECTIONS 26, 34 AND 35,
TWP. 2 SOUTH, RANGE 16 EAST, W.M.
SHERMAN COUNTY, OREGON
JUNE, 2007**



**CITY OF GRASS VALLEY ZONING
CLASSIFICATION AND CITY LIMITS**

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C. Water System Narrative

1. Overview

Grass Valley's water system is classified as a Community Water System with Active status and has an Oregon Health Authority public water system number of OR41 00356. The water system is regulated by the Oregon Health Authority but is overseen by North Central Public Health District, which serves Wasco and Sherman Counties.

Figure 3 shows the layout of the Grass Valley water system, which serves an area of approximately 330 acres. A larger version of the system map is included in Appendix 3 of the bound copy of the Master plan Update.

2. Source

The City pumps water from two groundwater wells located just outside the westerly city limits, west of Sharp Street and north of Lincoln Street near the system's reservoir. The names of the two wells are not consistent among the State agencies that oversee water quality (OHA), water rights (OWRD), and the water system (City). When reporting to the OWRD (monthly water usage, etc.) and to the OHA (water quality monitoring), it is important that the City know which well the agency is referencing. Table 2 clarifies the official and unofficial names that each agency uses to refer to the two wells.

Table 2 –Well Source Information

<i>Well Location (from the NE corner of NE/NE 34 2S 16E)</i>	<i>Year Drilled (deepened)</i>	<i>Water Right Transfer T-9885 (cfs)</i>	<i>Grass Valley Unofficial Well Name</i>	<i>O & M Manual and OWRD Official Well Name</i>	<i>OHA Official Well Name</i>
25'S and 41'W	1949 (abandoned in 2005)	0.56 (transferred)	(original/ abandoned)	~~Well 1~~	
10'S and 31'W	1970 (2000)	0.22	"North Well"	Well 2	Well 1
80'S and 11'W	2004	0.56	"South Well"	Well 1	Well 3

The original system well was drilled in 1949 and abandoned in 2005. A second well (known as "North Well" in Grass Valley and corresponding to the OWRD right for what the State calls "Well 2") was drilled about 20 feet away in 1970 and has served as the system's primary water source ever since. Another well was drilled in 2004 about 60 feet south of the others to replace the abandoned well. This well is called the "South Well" in Grass Valley and because it replaced the original system well with an OWRD water right for Well 1, it maintains that right and is now known as "Well 1" by the OWRD. Water production data (2018-2024) for both wells indicates that the two wells pump similar quantities of water each year, regardless of season. The pertinent well logs are contained in Appendix 1. Tables 3 and 4 present a brief summary of well construction details and well motor details.

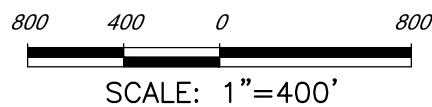
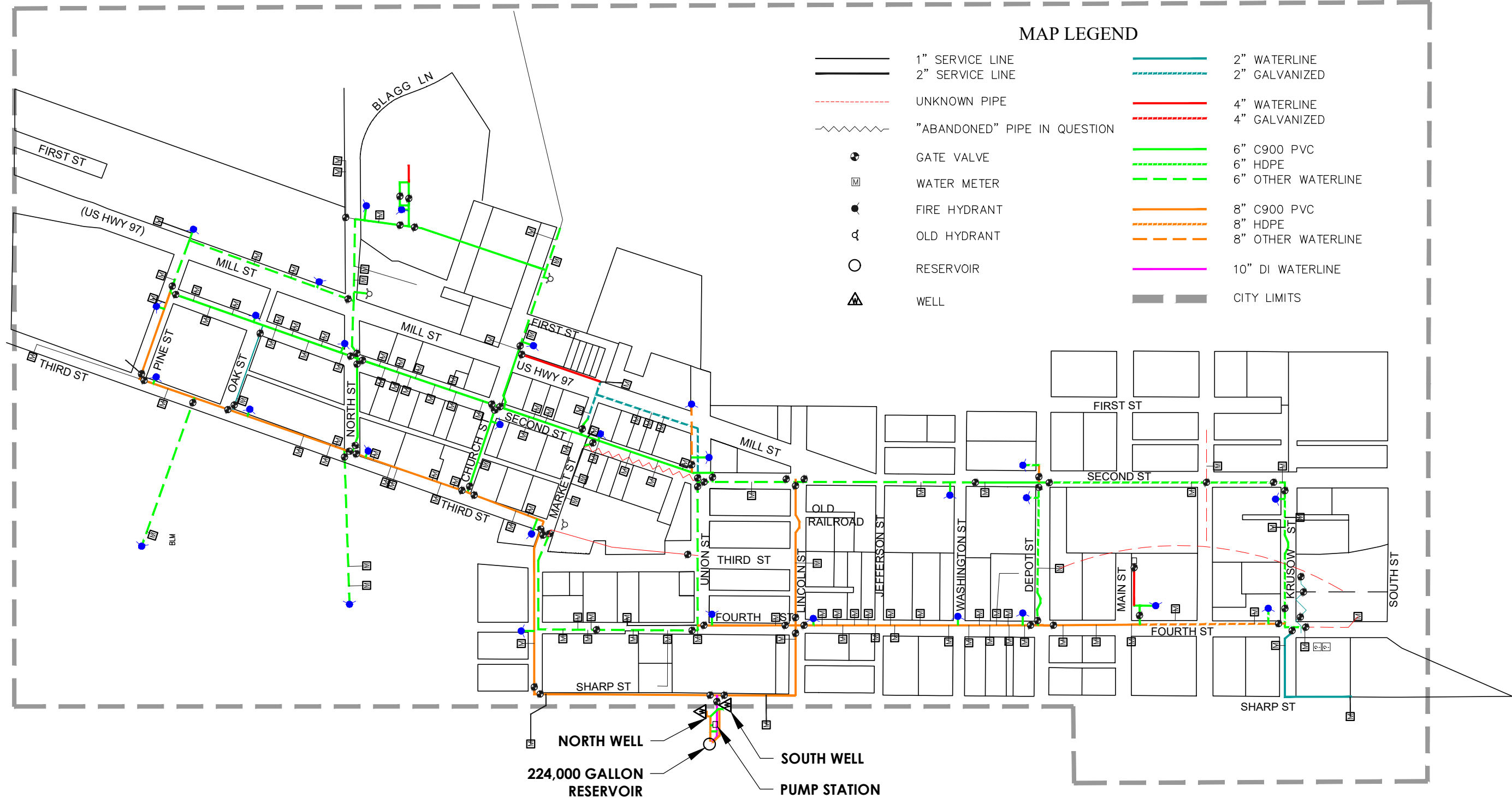


FIGURE 3

**CITY OF GRASS VALLEY
EXISTING WATER SYSTEM
SHERMAN COUNTY, OREGON**

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Table 3 – Well Construction Details

<i>Well Name</i>	<i>OWRD Well Log No.</i>	<i>Total Depth (fbg*)</i>	<i>Static Water Level (fbg)</i>	<i>Casing Diameter</i>	<i>Open Interval (fbg)</i>	<i>Seal Interval</i>	<i>Drill Yield (gpm)</i>	<i>Pump Test in August 2005</i>
Well 2 "North Well"	SHER 50108	290 (in 1970) 350 (in 2000)	140	8"	290'-346'	0-42'	220	264 gpm @ 183 fbg Static level 122' fbg
Well 1 "South Well"	SHER 50163	450 (in 2004)	103	10"	284'-440'	0-284'	250	293 gpm @ 155 fbg Static level 122' fbg

*feet below grade

Table 4 – Well Pump Summary

<i>Well Name</i>	<i>Pump Type</i>	<i>Volts/Phase</i>		<i>HP</i>	<i>Year Installed</i>	<i>Pump Intake Depth (fbg*)</i>	<i>Production Capacity (gpm) at 260 feet TDH at 77% efficiency</i>
Well 2 "North Well"	Submersible	460	3-Phase	25	2003	227	265
Well 1 "South Well"	Submersible	480	3-Phase	25	2003	243	300

*feet below grade



Figure 4 – South Well (Well #1) in Foreground, North Well (Well #2) in Background

3. Status of Water Rights

The Oregon Water Resources Department (OWRD) Water Rights Information System was reviewed to confirm any water right permits, certificates, or transfers held by the City.

The City's original water right Certificate 49289 from 1980, which allows 0.78 cfs of water from two wells was cancelled in January 2006 so that a change of point of appropriation could be made. In 2006, Transfer T-9885 ordered the abandoning and redrilling of one of the two wells. Since the transfer T-9885 only changes the Point of Appropriation, the water right can be reinstated under a different water right number, but with the same 0.78 cfs of water allowed. Table 5 summarizes the water right information for each well.

As of June of 2025, the City has complied with the Final Order Approving Transfer T-9885. The OWRD has received the necessary claim of beneficial use but is experiencing a backlog of several years processing such claims. When approved, the OWRD will issue a new Water Right Certificate with the same allowed quantities and conditions, and the same priority date as the one issued in 1980. Water has been pumped legally under T-9885 since 2006. Copies of the water rights documents and the transfer order are contained in Appendix 1.

Table 5 - Water Rights

<i>Source</i>	<i>Document No.</i>	<i>Year*</i>	<i>Max Flow (CFS/GPM)</i>
Well No. 1	Transfer T-9885	2006	0.56/251
Well No. 2	Transfer T-9885	2006	0.22/99
Total Water Rights			0.78/350

*Note: T-9885 cancels Certificate 49289 (1980) perfected from Permit G-7907

The maximum flow allowed by the water right is technically split unequally between the two wells. Information provided by OWRD water master explained that as long as the water used from both wells does not reduce the ability of any other water right holder to pump their allowed water (e.g. water is pumped from an aquifer faster than it can be replenished) the flows can be combined to the total right of 0.78 cfs (350 gpm). In practice the two wells pump roughly the same quantity of water most months: on average, Well 1 pumps 45% of the water and Well 2 pumps 55% of the water that is used by the system. This is consistent with the fact that both wells have pumps that have been measured to produce 250 to 300 gpm, and they are each only running a fraction of each day.

4. Storage Reservoir

The water storage for the City is located just outside the west city limits, west of Sharp Street and north of Lincoln Street near the system's well pump building. The tank has a nominal volume of 224,000 gallons, is of glass-coated bolted steel construction, and was built in 2004. The reservoir is 22 feet in diameter, with a 78.9 foot sidewall height and is constructed on a reinforced concrete slab (elevation 2,310 feet msl). Operational settings keep the reservoir filled to a height of 74-78 feet above the base elevation under typical circumstances, with an overflow elevation of approximately 78.3 feet (2,388.3 feet msl), according to the as-built plans. The reservoir has dedicated inlet and outlet pipes, and a pressure transducer in the adjacent booster

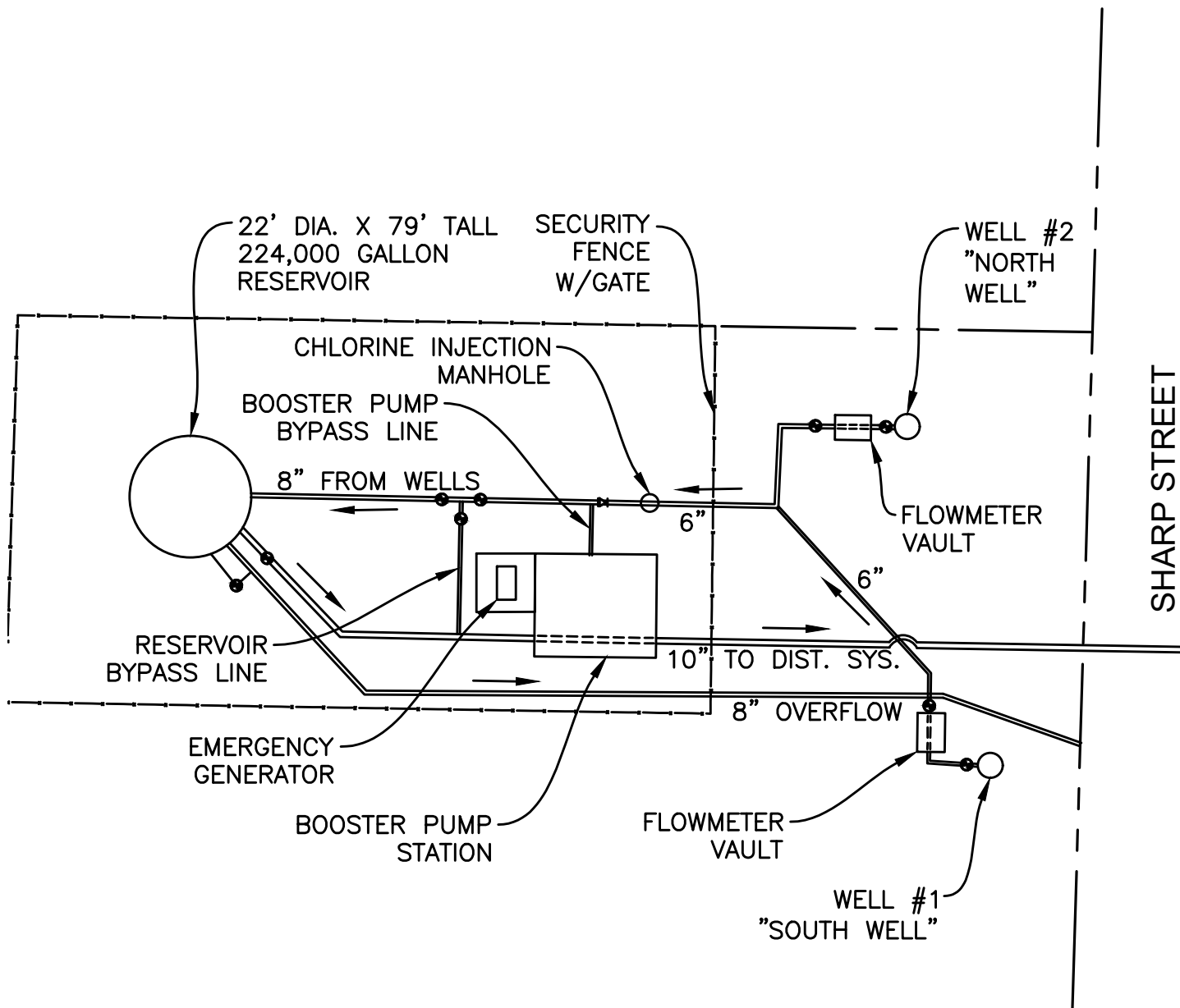
pump station enclosure monitors the water level in the reservoir and is used to call on the two system wells.



Figure 5: Glass-Coated Steel Bolted Tank Reservoir

5. Pump Station and Chlorination System

A single-story standalone masonry block construction pump house was constructed at the reservoir site in 2004. The pump house contains two rooms, one for pumping equipment and one for a tablet chlorination system. See Figure 6 on the following page which shows the layout of the reservoir, booster pump station, and well site.



CITY OF GRASS VALLEY RESERVOIR AND WELL SITE



FIGURE 6
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Figure 7 – Plaque on Grass Valley Booster Pump Station

The pump station facility room contains a motor control center (MCC), a fire pump booster system, individual well flow meters, and a master flow meter for water leaving the site along with telemetry and controls.



Figure 8 – Booster Pump Station Control Panel



Figure 9 –Booster Pump Station Piping

During normal system operation the pumps maintain reservoir elevation between approximately 72 feet (32 psi) and 78 feet (34 psi). The pumps are programmed to operate in a lead/lag configuration each time they operate. When a call for water comes, the system lead pump operates while the water elevation is between 78 feet and 74 feet. Below 74 feet, the lag pump is turned on with both pumps operating until the high-level turn-off occurs at 78 feet. The system is set up to that at the next call for water, the lead/lag pump configuration alternates.

The booster pump is configured to start when the reservoir elevation falls to 60 feet of elevation. The fire pump system consists of a 40 horsepower PACO centripetal pump rated for 1,250 gpm at 100 feet of total dynamic head.

A tablet chlorination system is located in a separate room in the pump station building. The water system currently uses an Accupro Power Pro tabular chlorination unit. The system combines calcium hypochlorite tablets and chlorinators to provide a simpler alternative to gas or bleach-based systems. There is evidence of corrosion on the metallic components in the room. The ventilation system has an air intake at the floor level with an exhaust out the ceiling. Chlorine fumes are heavier than air. The air flow in the room should be reversed to discharge air out the lower air intake.

Currently the chlorination system is not in use. This is because in accordance with Oregon's implementation of the groundwater rule, groundwater wells and springs can operate without chlorination if their construction meets state standards and water analysis consistently shows no microbial contamination. The City has had no evidence of E.coli or coliform contamination other than a single testing event in 2009. Prior to this there were no positive coliform events in records going back to 2002.



Figure 10 – Chlorination Room

6. Emergency Power

To ensure continued operation of the water supply system, a standby generator is located on a concrete pad just outside the pump station building. The backup power system consists of a standby diesel generator located in an all-weather enclosure. An automatic transfer switch monitors utility power and in the event of a failure of utility power, starts the generator transferring the load to emergency power. Once utility power is restored, operations are switched back to utility power. The existing generator has load capacity to operate all systems including both well pumps, the booster pump and the controls system simultaneously.

7. Distribution System

The distribution system includes pipes in sizes ranging from 2-inch to 10-inch diameters, with the majority being 6 or 8-inch. Older pipes are largely PVC, but a system improvement project in 2004 installed approximately 14,000 lf of mostly 6- and 8-inch C900 pipe. According to the water system operator, approximately 2,800 lf of the new pipe installed in the southern part of the City is HDPE despite the project plans calling for C900. It should be noted that the as-built plan set for this project does not show the substitution of HDPE pipe and it is not known whether the installation of pipe was inspected during the construction phase of the project.

Table 6 summarizes the approximate total length of each size and type of water line in the distribution system.

Table 6 – Distribution System Water Lines

<i>Size</i>	<i>Material</i>	<i>Length (FT)</i>	<i>Size</i>	<i>Material</i>	<i>Length (FT)</i>	<i>Size</i>	<i>Material</i>	<i>Length (FT)</i>
2"	Galvanized	754	6"	C900	4,271	8"	C900	6,233
2"	All other	1,725	6"	HDPE	2,306	8"	HDPE	554
4"	Galvanized	329	6"	DI	100	8"	DI	373
4"	PVC	160	6"	AC	236	8"	All other	261
4"	All other	573	6"	All other	6,949	10"	DI	186
						Total		25,010

A 2004 Water System Improvement Project installed over 100 meters and new 1" HDPE service lines from the mains to all meters of one inch or smaller. The system also has seven 1-1/2" or 2" meters with service lines of 1½" or 2" HDPE. The City bulk fill station has a 4" service line and the City Park has a 3" line. The fill station is connected with a 3" meter and the City Park connection is unmetered. Many of the meters are not in service, as there are only 89 billed customers. Only the RV park is billed at a higher rate and is charged as if it were four connections.

There is one customer with extremely large water consumption (based on visual information of water irrigation near the District pump house) who has a ¾" meter but pumps water using a pump installed on the customer side.

D. Water Demand

1. Production

Water production data has been provided for the period from January 2018 through April 2025. Annual water production is shown in the following chart, and a summary of monthly water production is shown in Table 7.

Exhibit 1 – Total Well Production, MG, 2018-2024

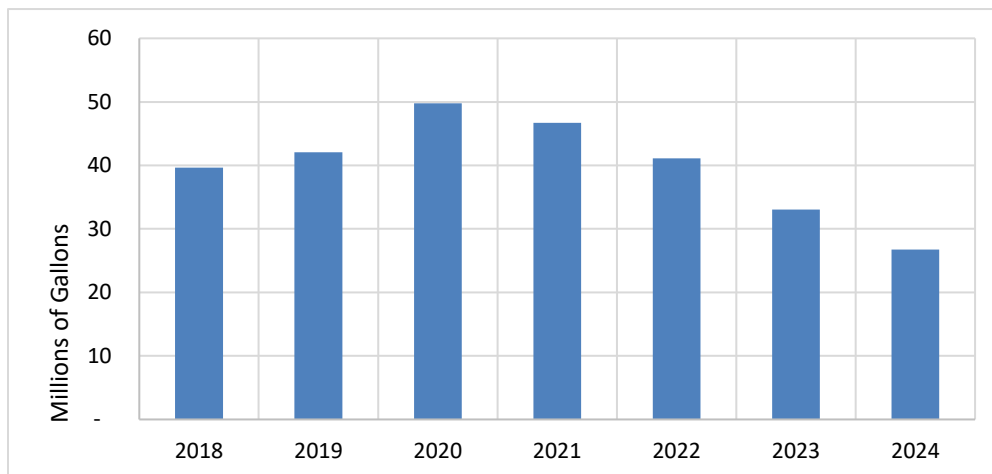


Table 7 – Total Well Production, Gallons

<i>Month</i>	<i>Year</i>						
	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>2022</i>	<i>2023</i>	<i>2024</i>
<i>January</i>	1,446,000	2,336,200	2,166,200	2,222,000	2,522,100	1,881,200	947,100
<i>February</i>	1,457,700	1,944,900	1,934,500	1,948,400	1,897,300	1,534,200	808,300
<i>March</i>	1,671,900	2,244,500	2,052,000	1,921,900	2,181,400	1,689,700	784,000
<i>April</i>	1,826,100	2,317,900	3,087,100	3,081,200	2,287,200	1,718,600	1,548,300
<i>May</i>	3,532,600	3,593,200	4,031,400	4,752,300	2,602,000	3,261,600	1,578,600
<i>June</i>	5,059,200	6,064,800	4,653,600	6,941,700	3,148,600	5,407,500	3,970,600
<i>July</i>	8,297,100	7,017,200	8,412,800	8,439,100	6,709,600	6,581,500	6,047,800
<i>August</i>	7,131,400	6,485,500	8,856,000	6,888,600	6,443,700	6,178,300	4,715,800
<i>September</i>	4,190,900	3,738,600	6,565,200	3,848,000	6,092,435	2,301,100	3,286,000
<i>October</i>	2,156,900	2,144,900	3,896,000	2,411,900	3,207,500	1,208,500	1,525,100
<i>November</i>	1,742,300	2,028,300	2,191,300	2,074,100	1,976,100	614,100	692,000
<i>December</i>	1,110,700	2,125,700	1,909,800	2,195,300	2,021,600	693,700	832,600
<i>Total Gallons</i>	39,622,800	42,041,700	49,755,900	46,724,500	41,089,535	33,070,000	26,736,200
<i>Avg Month</i>	3,301,900	3,503,475	4,146,325	3,893,708	3,424,128	2,755,833	2,228,017
<i>Peak Month</i>	8,297,100	7,017,200	8,856,000	8,439,100	6,709,600	6,581,500	6,047,800
<i>Annual Avg Per Day</i>	108,556	115,183	135,945	128,012	112,574	90,603	73,050

Monthly production totals are available for the first three years of this time period, and since 2021, daily readings have been taken at the well flow meters in the pump house. A manual record of these readings is carefully maintained, but the time of day that the readings are recorded ranges widely. Hence there is no consistent data for a single 24-hour period. Still an attempt was made to determine the peak day usage in the peak month of each year since 2021 so that a peaking factor could be calculated to account for the highest water demand during peak usage times. The peaking factor is the ratio of demand on the highest usage day to the demand on the average day, and it is used as a multiplier when projecting future usage. (See Section 3B for projected water use.)

When planning for the future of the system, it is important that the water system can handle the maximum flow rate, not just the average daily flow. Normally the peaking factor is calculated as the ratio of maximum daily demand to average daily demand. Instead of finding the peak 24-hour period, peak day usage for the Grass Valley system was determined by calculating *hourly* flow rates for all time periods between flowmeter readings in the peak month of each year between 2021 and 2024. Multiplying the peak hourly flow rate by 24 hours permitted a reasonable estimate of the peak 24-hour day usage in the highest usage month. Table 8 shows the average and maximum month usage and the calculated peak day. (The maximum month was always July except in 2020, when it was August.) Based on the data provided, total production and per-person daily usage for the Average Day, Maximum Month, and the Peak Day are shown. The peaking factor shown in the last column is the ratio of the per-capita demand on the highest usage day in the highest usage month, to the per-capita demand on the average day that year. The peaking factor ranged from approximately 2.8 to 3.7, and the average

of the four years is approximately 3.1. (Data that would allow calculation of the peak day was not available prior to 2021.)

In 2021, the second highest usage “day” was chosen as the peak day, (measurement taken over 22 hours ending July 12). The time period with the highest hourly flow rate was actually the last eight hours of July 31 and the first eight hours of August 1, so this date was excluded. Similarly, in 2023, the second highest usage “day” was chosen (the 23 hours ending on July 9), since the hours with the actual highest flow rate was a 19-hour period resulted in an artificially high peak “day” that was more than 50 percent larger than that of July 9, and this was considered too excessive and was excluded. The peak days in 2022 (July 30) and 2024 (July 10) were periods very close to 24 hours with the highest hourly flow rates of their respective month.

Table 8 – Average and Maximum Usage 2018-2024

Year	Well Production							
	Population Estimate*	Total (Gal)	Per Capita Avg Day (gpcd)	Max Month		Peak Day		
				(Gal)	(gpcd)	(Gal)	Per Capita (gpcd)	Peaking Factor
2018	153	39,622,800	710	8,297,100	1,749			
2019	152	42,041,700	758	7,017,200	1,489			
2020	150	49,755,900	906	8,856,000	1,905			
2021	150	46,724,500	853	8,439,100	1,815	361,250	2,408	2.82
2022	156	41,089,535	722	6,709,600	1,387	313,745	2,011	2.79
2023	156	33,070,000	581	6,581,500	1,361	279,652	1,793	3.09
2024	158	26,736,200	462	6,047,800	1,235	267,909	1,696	3.67
Average		39,862,948	713	7,421,186	1,563	305,639	1,977	3.09

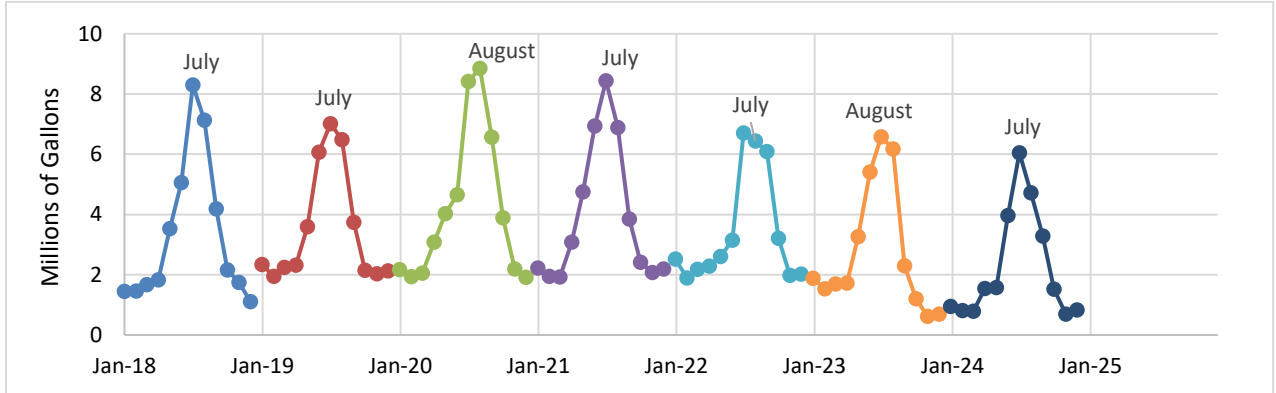
*Portland State University Population Research Center population estimate
gpcd=gallons per capita per day

2. Consumption

Customer service meters were installed in the early 2000’s, but the required visit to each property each month to read each meter was discontinued about 2006 since it was understood to be irrelevant. (Grass Valley has always sent out monthly bills, with a \$55 flat rate water service charge that is independent of water consumption.) Therefore, there is no data available for water consumption at the household or business level from the individual meter readings.

Some assumptions can be made about water consumption in Grass Valley based only on the well production data supplied by the City. There is a vast difference in the quantity of water pumped during the months of low usage (typically November – April) and the summer months. See Exhibit 2.

Exhibit 2 – Monthly Well Production, MG, 2018-2024



Grass Valley tends to not be a summer destination for vacationers, nor do many residents leave for the winter. Therefore, it can be assumed that additional summer water consumption is supplying outdoor uses, including crop watering and lawn irrigation. Using only the quantities pumped during November through April, which are typically the lowest-production months of each year, a “baseline” for the average person’s indoor household water usage was calculated and is shown in Table 9. This number has dropped significantly in recent years. The lowest figure, from 2024, is still almost double the statewide average of 100 gallons per person per day for household water use.

Table 9 – Baseline Water Usage, November through April

<i>Year</i>	<i>Six Month Usage (Gal)</i>	<i>Average Flow Rate (gpm)</i>	<i>Percentage of Annual Usage</i>	<i>Per Capita Avg Day (gpcd*)</i>
2018	9,254,700	35	23%	332
2019	12,997,500	50	31%	470
2020	13,340,900	51	27%	489
2021	13,442,900	51	29%	492
2022	12,885,700	49	31%	454
2023	8,131,500	31	25%	286
2024	5,612,300	21	21%	195
Average	10,809,357	41	27%	388

*gpcd=gallons per capita per day

As shown previously in Exhibit 1, total water usage has decreased steadily every year since 2020. Table 9 shows an even more drastic decrease in “baseline” or indoor water usage since 2022. This corresponds to a time when the District repaired a number of leaking pipes. Therefore, it is very likely that the recent decrease in water usage has been the result of a decline in water losses, rather than purposeful water conservation by residents.

In most systems, services are metered, and thus only the quantity of water that is piped to an individual property is billed (consumption). This yields data from residential and commercial use that is typically compared with pumped quantities (production) to check for leakage, water theft, and other losses. Water loss is a crucial piece of information that systems can use to

evaluate the reliability of their pipe network, which in turn can drive the formation of a Capital Improvement Plan. Water loss is also of interest to the OWRD, the State agency is responsible for promoting responsible water management. Grass Valley is not currently required to submit a Water Management and Conservation Plan to the OWRD.

Metering water use is an extremely important factor in water conservation. Meter reading allows the purveyor to charge customers based on their water usage; generally, all customers pay a fixed charge for water use up to a certain quantity. Usage over that amount is billed by the amount used. These systems, and tiered billing structures, where excess water use above certain limits is charged at a higher per-unit rate, have been shown to be instrumental in curbing excess water use. Understandably, customers are much more likely to monitor their water usage and do things like time their sprinklers, when it directly affects their monthly water bill.

Since the District cannot quantify leaks by comparing the quantity of water pumped to the quantity of water consumed, another way of checking for possible system leakage was used. For a period of time during recent winter months, the system flow meter in the pump house was checked at roughly 3 AM each day. It was seen that at this hour, when City residents were assumed to be asleep or at least not running water, the system was flowing at a rate of approximately 13 gpm. If this is assumed to be the quantity of water the system “loses” when no one is actively running water, this water can be considered to be leaking from the system. It is of course possible that water is leaking from customer faucets, but until consumption can be metered, it is conservative to assume the leaks exist in the system’s piping. Thirteen gpm is approximately 26 percent of the average flow of 51 gpm for all of 2024 as shown in Table 10. Earlier in this decade, the system was seen to be flowing at 47 gpm at 3 AM. The recent decrease to 13 gpm is consistent with the leak repairs that were made to the system since 2021.

Table 10 – Water Loss Estimate

<i>Total Production 2024 (gallons)</i>	<i>Average Flow (gpm)</i>	<i>Flow at 3 AM Winter 2024 (gpm)</i>	<i>Percent Loss</i>
26,736,200	51	13	26%

It is apparent from Exhibit 2 that significantly more water is pumped during only three months each year than the rest of the year. Table 11 quantifies this by totaling the usage for the three highest-production months of each year (typically June, July, and August, with some variation). As shown in the last column of Table 11, per capita water usage is nearly four times higher during high-usage months than during the low-usage time of year, or over 1,000 extra gallons a day per person. This large variation is likely primarily due to lawn and crop irrigation, but it is extremely high compared to most communities and is probably the result of customers’ lack of financial incentive to conserve water. Summer usage peaked in 2020 and has declined by one-third since 2021. In recent years, the Water Operator has had success in convincing some customers with high irrigation usage to install timers on their lawn sprinklers. Grass Valley water policy includes a \$50 penalty for night watering, but is rarely, if ever, enforced.

Table 11 –Water Usage During Summer

<i>Year</i>	<i>Three Highest-Usage Months (Gal)</i>	<i>Percentage of Annual Usage</i>	<i>Per Capita Avg Day (gpcd)</i>	<i>Per Capita Extra Usage During Summer Months (gpcd)</i>
2018	20,487,700	52%	1,456	1,123
2019	19,567,500	47%	1,399	929
2020	23,834,000	48%	1,727	1,238
2021	22,269,400	48%	1,614	1,121
2022	18,167,300	47%	1,266	812
2023	18,167,300	55%	1,266	979
2024	14,734,200	55%	1,014	819
Average	19,603,914	50%	1,392	1,003

In addition, Grass Valley’s largest user of water is not charged at all due to a legal agreement that is several decades old and applies only to their family. Without consumption data it is not possible to calculate how much of the City’s water they alone consume. However, In August and September 2025, an attempt was made to measure the usage of two of the largest water consumers in the City: the family with the legal agreement to receive free water, and the City Park irrigation system.

The family meter readings were recorded at the beginning and end of a 54-day period. Similarly, the park usage was calculated based on the irrigation system flow rate and the number of hours per week it was running for the two month period (84 gpm for 3.5 hours three days a week). Both are quantified in Table 12 and compared with the City’s total summer usage.

Table 12 –Two Highest Customers’ Water Usage, August & September 2025

	<i>Usage, gal</i>	<i>Percentage of Total Two-Month Production</i>	<i>Percentage of City Two-Month Increase over Baseline Usage</i>
City Total Production, Aug-Sept 2025	7,489,500		
Production Above Baseline, Aug-Sept 2024	2,945,033		
Family with Agreement	707,950*	9.5%	22%
City Park	455,112	6.1%	15%

*54 days of data extrapolated to 61 days

August-September City water production in 2025 is similar to the same time period in 2024. In 2024, the City used almost 3MG more water in August and September than two average months in winter (one-third of the Baseline usage from Table 9). This means that City Park irrigation accounts for over 6 percent of City water usage during the months when the sprinklers are running, or more than 15 percent of the additional water pumped in summer months. The family with the agreement accounts for an even higher percentage of the City’s water, but the portion of this quantity that can be attributed to irrigation is difficult to determine, since they are also using water for their household. However, the average household used less than 11,000 gallons per month in the winter of 2024. Even if their household use is double the average family’s,

their extra summer use (presumably irrigation) accounts for more than 22 percent of the entire City's extra summer production.

Motivating all Grass Valley's residents to irrigate efficiently (e.g. timers on sprinklers, charge more for high usage) would decrease summer demand considerably. However, limiting the highest users' summer consumption (e.g allowing the City Park grass to go dormant or changing the terms of the legal agreement) would be disproportionately effective in reducing the City's summer water use.

E. Operation and Maintenance

Grass Valley has one Water Operator for the operation and maintenance of the water system and one City Administrator. Both are employed half time, or 20 hours per week. The Water Operator is also responsible for the maintenance of the City Park.

Routine sampling and monitoring of the water system is conducted as required by OHA. Maintenance of water system consists of flushing of the distribution system at the blow off points and hydrants twice a year. All distribution system valves are on a schedule to be operated annually. Repairs are made to the distribution system when leaks are detected. Other system mechanical components are maintained, replaced or repaired on an as needed basis. The City is able to make repairs as needed to all pipes in the system except the HDPE pipe south of Depot Street that was installed as part of a 2004 system improvement project. Repairs to HDPE over 1-inch in diameter are hired out.

2. WATER QUALITY AND SERVICE GOALS

A. Existing Regulatory Requirements

Drinking water quality is regulated by Federal law since the Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974. As a Community Water System, Grass Valley is subject to routine monitoring under the SDWA along with the State of Oregon Administrative Rules (OAR) for Public Water Systems. The U.S. Environmental Protection Agency (USEPA) and State agencies enforce drinking water regulations. In Oregon, the Oregon Health Authority (OHA) is the primary agency in the enforcement of Federal and State regulations for public water systems.

1. Monitoring Requirements

The City contracts with Box-R Water to coordinate water testing according to the OHA schedule. OAR 333-61-020 defines MCLs as the maximum allowable level of a contaminant in water delivered to the users of a public water system and defines action levels as the concentration of lead or copper in water which determines, in some cases, the treatment requirements that a water system be required to complete.

The routine monitoring schedule and sampling interval for chemicals is shown in Table 13 taken from the Oregon Health Authority web site:

Table 13 – Monitoring Requirements

<i>PWS #: 00356 Routine Sampling Schedules For Chemicals</i>								
Facility ID	Name	Status	Test Group	Samples Required	Sampling Interval	Start	End	Notes
DIST-A	Distribution System	A	Lead & Copper	5	3 Years	1/1/2002	Open	Sample Between June 1st and Sept 30th
EP-A	EP for Wells #1 & #3	A	IOC	1	9 Years	1/1/2002	Open	Schedule Reflects Monitoring Reduction Granted
EP-A	EP for Wells #1 & #3	A	Nitrate	1	Yearly	1/1/2002	Open	
EP-A	EP for Wells #1 & #3	A	SOC	1	3 Years	1/1/2002	Open	
EP-A	EP for Wells #1 & #3	A	Volatile Organics	1	3 Years	1/1/2002	Open	
EP-A	EP for Wells #1 & #3	A	Rad - Gross Alpha	1	6 Years	1/1/2020	Open	
EP-A	EP for Wells #1 & #3	A	Rad - Radium 226/228	1	9 Years	1/1/2011	Open	Schedule Reflects Monitoring Reduction Granted
EP-A	EP for Wells #1 & #3	A	Rad - Uranium	1	9 Years	1/1/2020	Open	
EP-A	EP for Wells #1 & #3	A	Nitrite	1	9 Years	1/1/2002	Open	Schedule Reflects Monitoring Reduction Granted
EP-A	EP for Wells #1 & #3	A	Arsenic	1	9 Years	1/1/2020	Open	

In the Table 13, Facility ID refers to sample locations at the entry point to the City's pipe distribution network (EP-A) or at another sampling location in the distribution system (DIST-A).

2. Monitoring Results

Water quality data from the OHA Drinking Water Data Online System was reviewed. Since 2002, the City has tested water samples for the above chemicals at the entry points for Wells 1 & 2, and, beginning in 2013, at a location in the distributions system. The only chemical that is tested every year is Nitrate; the rest are tested at 3-, 6-, or 9-year intervals.

a. Lead and Copper

Lead and copper sampling is required every three years in the distribution system. The state has placed stringent limits on lead and copper levels in drinking water, so monitoring is more intensive than some other chemicals. According to OHA records back to 1993, Grass

Valley has never come close to exceeding safe levels for Lead or Copper. In fact, when any of these metals have been detected, they tend to be at less than 5% of the allowed concentration.

b. Inorganic Compounds

The City is required to test for these inorganic compounds (IOC) once every 9 years: Antimony, Barium, Beryllium, Cadmium, Chromium, Cyanide, Fluoride, Mercury, Nickel, Selenium, Sodium, and Thallium. Except for Sodium, no IOC has ever been present at a concentration anywhere close to the maximum allowed level. Sodium was detected in 2013 and 2016 at levels very close to the MCL of 20.0 mg/l, and in 2012 it exceeded the limit with a result of 20.6 MG/L. This exceedance was very slight, and when retested the next year, it had fallen to 19.5 MG/L. The EPA recommends that drinking water sodium be held to 20.0 MG/L or less for people who may be on a very low sodium or sodium restricted diet because sodium is so common in other beverages and food, and should be made aware when the drinking water level is above 20mg/L. For most healthy people, sodium is not hazardous at levels typically found in food and water supplies.

Table 14 - MCL and Action Levels for Inorganic Chemicals

<i>Inorganic Chemical</i>	<i>MCL*, mg/l</i>	<i>Action Level, MG/L</i>	<i>Sample Date</i>
Antimony, total	ND*	0.006	4/07/2022
Barium	0.0174	2	4/07/2022
Beryllium, total	ND	0.004	4/07/2022
Cadmium	ND	0.005	4/07/2022
Chromium	0.00662	0.1	4/07/2022
Cyanide	ND	0.2	4/07/2022
Fluoride	0.496	4	4/07/2022
Mercury	ND	0.002	4/07/2022
Nickel	ND		4/07/2022
Selenium	ND	0.05	4/07/2022
Sodium	18.6	20	4/07/2022
Thallium, total	ND	0.002	4/07/2022

* MCL – Maximum Contaminant Level, ND – Non-detect

c. Nitrate

OHA requires the City of Grass Valley to test for Nitrates once per year. The MCL for this analyte is set at 10 mg/l. Nitrate is typically detected at levels of less than one-fifth of the allowed concentrations.

d. Synthetic Organic Chemicals (SOC)

The City monitors the following chemical compounds every three years:

1,2-Dibromo-3-Chloropropane, 2,4,5-Tp, 2,4-D, Atrazine, Benzo(A)Pyrene, Bhc-Gamma, Carbofuran, Chlordane, Dalapon, Di(2-Ethylhexyl) Adipate, Di(2-Ethylhexyl) Phthalate,

Dinoseb, Diquat, Endothall, Endrin, Ethylene Dibromide, Glyphosate, Heptachlor, Heptachlor Epoxide, Hexachlorobenzene, Hexachlorocyclopentadiene, Lasso, Methoxychlor, Oxamyl, Pentachlorophenol, Picloram, Simazine, Total Polychlorinated Biphenyls (Pcb), and Toxaphene.

Samples are collected at the entry point to the distribution system. All sample results from 2003 to 2025 were non-detect.

e. Volatile Organic Chemicals

Sampling of VOC's is performed every three years at the entry point. All sampling results for VOCs were reported as "non-detect" 2003 to 2025.

f. Radionuclides

Grass Valley tests for radionuclides every 6 years (Gross Alpha) and every 9 years (Radium and Uranium). All but two of the tests have detected no radionuclides, and both of those detections, in 2019, were at a very small fraction of the allowed concentration.

g. Nitrite

Sampling has been performed at the entry point every nine years since 2003. No nitrite has ever been detected.

h. Arsenic

Sampling is required every nine years but has been performed at the entry point every three years since 2003. Trace amounts of arsenic have been detected in all but one of the samples since 2003. In all cases where it was detected, the amounts were only 12 to 23 percent of the allowed concentration.

i. Total Coliform and E.Coli

OHA Drinking Water requires Grass Valley to test for Coliform once per month. Aside from four positive Total Coliform (TC) test results in the first decade of this century, Grass Valley has had only one positive test result: in 2016, TC was found in a sample taken at the well faucet. This positive result triggered two more tests and four repeat tests in the following days, none of which were positive. Grass Valley has never had a positive test result for E coli (EC) in the history of OHA online recordkeeping. Hence, as discussed earlier in the report, the City is not required to chlorinate drinking water for the source wells.

B. Violations and Public Notices

The public record from OHA for the City of Grass Valley only lists one violation, for the late- or non-reporting of the Lead & Copper Rule (LCR) for the period 2020-22.

C. New and Future Regulatory Requirements

1. Use of Lead Free Pipes, Fittings, Fixtures, Solder, and Flux for Drinking Water

On September 1, 2020, the U.S. Environmental Protection Agency (EPA) published the final "Lead Free" Rule. In the final rule, EPA makes conforming changes to existing regulations based on the Reduction of Lead in Drinking Water Act (RLDWA) and the Community Fire Safety Act enacted by Congress. The final rule also requires that manufacturers and/or importers certify that their products meet the requirements using a consistent verification process within 3 years of the final rule publication date. As a result, this new rule will reduce lead in drinking water and assure that states, manufacturers, inspectors and consumers have a common understanding of "Lead Free" plumbing.

2. Service Line Inventory - Lead and Copper Rule (LCR)

The Lead and Copper Rule applies to all community and non-transient public water systems. EPA adopted revisions to the Lead and Copper Rule in 2021 that include a requirement for public water systems to conduct inventories of service lines and to identify service line material type. The intent of the service line inventory requirement is to identify those service lines made of lead so that they can be scheduled for removal and replacement.

Public water systems must conduct an inventory of all service lines, on both the water system side and the homeowner side of the meter and submit the results to OHA Drinking Water Services. Grass Valley has complied with this requirement. There are no lead service lines in the City.

3. Per- and Polyfluoroalkyl Substances (PFAS) Rule

EPA released the final National Primary drinking water regulation for six PFAS on April 10, 2024. All Community and Non-Transient Non-Community water systems must comply with the final PFAS drinking water regulation and complete initial monitoring at all entry points to the distribution system and report the results to OHA by April 26, 2027. For groundwater systems serving $\leq 10,000$ customers (such as Grass Valley), samples must be collected 5-7 months apart, and twice within 12-month period.). Public water systems have until 2029 to implement solutions that reduce these PFAS if monitoring shows that drinking water levels exceed these MCLs.

Table 15 - PFAS Health Advisory Levels

<i>Compound</i>	<i>Final MCL (enforceable levels)</i>
PFOA	4.0 parts per trillion (ppt) (also expressed as ng/L)
PFOS	4.0 ppt
PFHxS	10 ppt
PFNA	10 ppt
HFPO-DA (commonly known as GenX chemicals)	10 ppt
Mixtures containing two or more PFHxS, PFNA, HFPO-DA, and PFBS	1 (unitless) Hazard Index

4. Potential Revisions of Microbial and Disinfection Byproducts Rules

EPA is currently conducting analyses to further evaluate the eight NPDWRs (Chlorite, Cryptosporidium, Haloacetic acids, heterotrophic bacteria, Giardia lamblia, Legionella, Total Trihalomethanes, and viruses) for potential regulatory revisions. Additionally, with a consideration of risk/risk tradeoff among different disinfection byproducts (DBPs), EPA is also evaluating information on unregulated DBPs, including chlorate and nitrosamines. EPA anticipates proposing MDBP rule revisions in Summer 2025. EPA is also reviewing whether a new drinking water regulation for chromium-6 or a revision to the current total chromium standard is warranted.

D. Flow and Pressure Requirements

Oregon Administrative Code 333-061-0025(7) requires water system operators to maintain a pressure of at least 20 pounds per square inch (psi) at all service connections at all times. According to the system operator, all services within the distribution system have sustained pressures in excess of the required 20 psi, and the system generally operates at 40 to 70 psi. The property owner closest to the reservoir complains of low pressure at times, but this problem would have to be alleviated on the private side, possibly by shortening the extremely long service line from their meter to their home.

E. Fire flow and Storage Capacity

Oregon Fire Code, Appendix B, Section B105, Table B105.1(1) requires fire flow of 1,000 gpm for a minimum of one hour to protect the residential structures with a floor area of less than 3,600 sf with no automatic sprinkler system or in a zone of light commercial development. However, a few commercial enterprises, such as fuel company and a grain elevator, may have buildings larger than 3,600 sf.

As discussed previously, a 40 Hp booster pump has been installed in the booster pump station to provide a residential fire flow of approximately 1,250 gpm to the distribution system. According to modeling done using EPANET2 software, all of the City's hydrants are capable of passing 1,000 GPM of water. Modeling of the system was based on the available system mapping information.

Pipe sizes from 2" to 10" were included in the model. Where pipe material information was available, it was included in the model descriptors along with the roughness coefficients. Hazen-Williams roughness coefficients were based on the pipe material as follows: Galvanized pipe, C 100; PVC C900, C120; HDPE, C140. Where the pipe material was not a known value of C120 was used. These are conservative values; the condition of each pipe may actually be better. Elevations in the model were determined from the water system plan contours. Peak day flows were modeled by assigning 3.5 gpm to the system nodes/junctions for a total peak day demand of approximately 200 gpm (288,000 gpd). The map of this model simulation is provided in Appendix 4.

The reservoir has a maximum water level of 78 feet when full. An initial level of 74 feet was used to simulate peak day demand at an assumed level when the well pumps would begin to refill the reservoir. At 74 feet the static pressure within the system was determined to be well above the required minimum 20 psi dictated by the OHA in all parts of the distribution system. Simulations were run lowering the reservoir level until the minimum pressure could not be maintained. At 30 feet, system pressure dropped below 20 psi along Sharp Street.

A second series of simulations were run applying a fire flow of 1,000 gpm during the peak day flow to various nodes/junctions within the system. This was used to determine if there are system deficiencies that would result in pressures of less than 20 psi anywhere within the system during a fire. It should be noted that fire flow modeling was not conducted for 2-inch line sizes.

In general, the simulations predicted a 1,000 gpm fire flow could be supported throughout the system with a few exceptions while maintaining a minimum pressure of 20 psi. However, the simulations predicted 1,000 gpm fire flows could not be supported at nodes/junctions 31 and 63. These are the hydrants located on North Street west of 3rd and at the BLM fire guard station respectively, in the northwest corner of the City. At node/junction 31 a maximum flow of 900 gpm with a reservoir level of 74 feet could be sustained; the flow was predicted to drop to 700 gpm with the reservoir at 50 feet. Similarly, node/junction 63 is predicted to have a maximum flow of 750 gpm with the reservoir level of 74 feet with flows dropping to 500 gpm at 50 feet. The low fire flows are the result of both nodes/junctions being located at the higher elevations in the Northwest area of the system.

A large fire occurred in 2022 at a hemp plant in the northeast part of the City, requiring the entire city to evacuate. As the reservoir drained, the nearby hydrants were able to provide approximately 600 gpm flow to firefighters, which is less than required fire flow. It is not known whether this is a problem in other parts of town. In the fall of 2025, a gauge was placed on several fire hydrants while flushing them and they were able to produce 750 gpm.

If the system's hydrants are passing 1,000 GPM of water, one hour of flow at one hydrant would use 60,000 gallons of water. Assuming the 222,700 gallon reservoir is full before fire flow is required, this would leave approximately 162,700 gallons for use by residents. See Section 4.D.2 for an evaluation of Grass Valley's storage capacity for domestic use and fire flow.

The City has mostly achieved 500-foot maximum spacing between hydrants as required by fire code.

3. PROJECTED POPULATION GROWTH

A. Population

The City of Grass Valley's population has varied by only about 30 people in the last 45 years, with the highest being 180 people in 1985 and the lowest being 150 in the last official US Census in 2020. In the subsequent four years, the Portland State University (PSU) Population Research Center estimated that the City's population had grown to 158, or approximately 1.3 percent per year. Table 16 shows population data over the last 45 years.

Table 16 – Grass Valley Historical Population

<i>Year</i>	<i>Population</i>	<i>Year</i>	<i>Population</i>
1980	164	2015	165
1985	180	2020	150
1990	160	2021	150
1995	170	2022	156
2000	171	2023	156
2005	170	2024	158
2010	164	2025	166

This study is charged with generating an estimate of Grass Valley's population change for the next twenty years. Given this projected growth or decline, water use can be projected, and the adequacy of the current source can be evaluated over the study period.

PSU's Oregon Population Forecast Program publishes 50-year planning studies for most Oregon counties. This publication, *Coordinated Population Forecast for Sherman County, its Urban Growth Boundaries (UGB), and Area Outside UGBs 2019-2069*, predicts that Grass Valley will *decline* in population by 0.2 percent per year between now and 2044. They predict the same decline for the Sherman County as a whole.

At the time of the preparation of the *1998 Grass Valley Water System Master Plan*, a similar study by PSU predicted a population decline with an Average Annual Growth Rate (AAGR) of -1.25 percent for Sherman County by 2010. (PSU did not make forecasts for individual cities at that time.) This prediction of declining population turned out to be fairly accurate: Grass Valley's population declined by approximately -0.6 percent per year during the next 20 years. The *1998 WSMP* instead chose to use a positive AAGR of 1.0 percent per year to forecast population and water production needs in the hope that Grass Valley would exceed expectations by attracting industry.

In 2025, 27 years later, the City again hopes to exceed expectations and experience population growth over the next 20 years. For a recent Wastewater Feasibility Study for Grass Valley, a case was made for assuming an annual growth rate of 1.0 percent. Since water use and water treatment are parallel systems requiring consistency in planning, this Water Master plan Update will also use an AAGR of 1.0 percent rather than the -0.2 percent decline that PSU predicts. Since the last US Census, several homes have been constructed in Grass Valley resulting in one or two new services each year. The demographics of these households have been different from the typical one-person household in the City in that these new homes are now occupied by families. This is another reason

that it is conservative to plan as though some measure of growth will continue in Grass Valley. Population projections through the year 2045 are shown in Table 17, using an adopted AAGR of 1.0 percent.

Table 17 – 20-Year Population Projection

<i>Year</i>	<i>Population</i>	<i>Year</i>	<i>Population</i>
2024	158	2035	183
2025	166	2036	185
2026	168	2037	187
2027	169	2038	189
2028	171	2039	191
2029	173	2040	193
2030	174	2041	195
2031	176	2042	197
2032	178	2043	199
2033	180	2044	201
2034	182	2045	203

B. Projected Water Use

An analysis of seven years of water production (2018-2024) and the estimates of future population were used to determine future water demand for the planning period of 20 years.

From the production data provided and shown in Table 8, it can be seen that annual production has been decreasing significantly since 2020. In fact, 2024 total production was only 54 percent of 2020 production. From Table 9 it can be seen that water usage during the months without irrigation (“baseline use”) decreased even more sharply: 2024 use was only 42 percent of 2020 production. Irrigation use, which drive the summer production spikes, has also been decreasing since 2020, but not by as much as baseline household use; summer production in 2024 was 62 percent of what it was in 2020. A quick analysis of the available data for 2025 seems to indicate that this downward trend is still continuing. For the 20-year projections, production from 2024 (26,736,200 gallons total or 73,250 gallons per day) will be used as the basis for future calculations, as it is the last year for which full data is available.

As discussed in Section 3A above, Grass Valley has opted to assume some small population growth in the coming decades. To project necessary production, Table 18 uses the 1.0 percent AAGR and a Peaking Factor of 3.1 from Table 8. The peak day projected demand for the year 2045 is 202 gpm, which is well within the City’s current water right of 350 gpm.

**Table 18 -Projected Average and Peak Day
Water Production 2024 - 2045**

<i>Year</i>	<i>Population</i>	<i>Avg Daily Production</i>		<i>Peak Day Production</i>	
		<i>GPD</i>	<i>GPM</i>	<i>GPD</i>	<i>GPM</i>
2024	158	73,250	51	227,075	158
2025	166	73,982	51	238,572	166
2030	174	77,756	54	250,742	174
2035	183	81,723	57	263,532	183
2040	193	85,891	60	276,975	192
2045	203	90,273	63	291,103	202

4. EVALUATION OF EXISTING WATER SYSTEM

A. Water Sources

The North Well has a pumping capacity of 300 gpm, as does the South Well. With a projected peak day of 291,103 gallons (202 gpm) the well's production is capable of meeting existing 20-year projected demands. Emergency power is provided by a diesel generator at the site of the wells to keep them in service should there be an extended power outage. State well logs for the North Well pumped 450 gpm for an hour when it was drilled in 2004. The South Well pumped 350 gpm for an hour when it was deepened in 2000. Both were air tests. In general, both wells perform very well in quality and consistent quantity of water.

B. Chlorination System

The chlorination system housed in the corner of the pumphouse is approximately 20 years old. While it has not been necessary to connect the chlorine solution line to the injection manhole, the line has been accessed on a regular basis to test the chlorine dilution process. If Grass Valley is ever required to start disinfecting its water, such as in the case of an emergency like a loss of pressure or a repeated positive Coliform test, the solution line can be swiftly connected. Since chlorine tablets have a limited life, in the event of a sudden need for chlorination, the City has an arrangement with the City of the Dalles to obtain chlorination tablets on short notice. While no improvements in the chlorination system itself are anticipated, the ventilation system has an air intake at the floor level with an exhaust out the ceiling. Chlorine fumes are heavier than air. The air flow in the room should be reversed to discharge air out the lower air intake.

C. Distribution System

The distribution system does appear to have significant water loss, but the actual severity of the losses could not be accurately determined from a comparison of the production and service meters, since the service meters have not been read in almost 20 years. It is not known whether the meters can measure water usage accurately. A number of them may need to be replaced due to a lack of maintenance, and indeed replacement of such meters is a priority listed in Table 21. Leaking pipes may explain a substantial portion of the estimated 26 percent water loss. If there are leaks on the private side of a meter, the homeowner will be made aware of it when the system is fully metered

and individual water bills reflect actual usage. Leaks on the public side are currently being repaired as quickly as possible. Since some leaks are difficult to detect, it is recommended that older pipe be replaced with new C900 on a pre-determined schedule, possibly combined with a leak detection study.

D. Existing Water Storage

1. Existing Conditions

The reservoir just off Sharp Street has a 222,700-gallon capacity to the overflow. The condition of the reservoir is good, there are no signs of failure or fatigue, and it appears to be functioning properly. No improvements are anticipated for the reservoir. The reservoir water level is transmitted to the pump house, and the reservoir water level is monitored and recorded daily along with well production.

2. Storage Capacity for Domestic Use and Fire flow

The reservoir has a storage capacity of approximately 222,700 gallons. Engineering standards call for three days Average Day Demand (3*) or one peak day (whichever is larger) plus mandated fire flow to calculate the total required storage capacity. As determined by Oregon Fire Code Appendix B, Section B105, Table B105.1(1) fire flow demand for the City requires a minimum fire flow of 1,000 gpm for 1 hour (60,000 gallons) for typical residential fires. Since the peak day's demand for City use is currently more than the reservoir can hold, the reservoir is technically not large enough to supply both fire flow and drinking water on the peak day.

ADD for the most recent year is $26,736,200/365 = 73,250$ gpd. Table 19 summarizes the resulting storage capacity based on a peaking factor of 3.1 multiplied by ADD and then projected to the 20-year design period. Fire flow demand of 1,000 gpm for one hour (60,000 gallons) is then added to the calculated peak volume and then compared to the capacity of the existing reservoir. Based on reservoir storage capacity, the required flow of 1,000 gpm cannot be provided for protection of residential or commercial buildings now or over the next 20 years.

Table 19 - Required Water Storage Capacity for Peak Day and Fire Flow

<i>Year</i>	<i>Population</i>	<i>Gallons</i>		
		<i>Peak Day</i>	<i>With 1,000 gpm Fire Flow*</i>	<i>Deficiency</i>
2024	158	227,075	287,075	60,000
2025	166	238,572	298,572	72,000
2030	174	250,742	310,742	84,000
2035	183	263,532	323,532	97,000
2040	193	276,975	336,975	110,000
2045	203	291,103	351,103	124,000

*Fire flow for 1 hour =60,000 gallons

As shown above, the existing City reservoir does not have adequate capacity to meet even peak day demands for the 20-year planning period, much less fire flow requirements. The current and projected storage deficiency is shown in the last column of Table 19 and this deficiency will increase over the 20-year planning window, necessitating the construction of over 100,000 gallons of additional storage.

If the City were to work to get water usage to reasonable levels in the summer, the existing storage tank would meet regulations now and for most of the planning period. To compare a more reasonable scenario, Table 20 repeats the storage projection in Table 19 but with assumed water usage. A reasonable but still conservative assumption is that peak usage in summer is three times what it is during the rest of the year. Averaging Grass Valley's non-summer months usage in the last three years (2022-2024) yields an ADD of 16,609,000 gallons per day. Projecting this assumed ADD through to 2045 with the same assumptions of 1.0 percent growth, Table 20 shows that the existing reservoir could provide sufficient storage until near the end of the planning period. By 2040 the reservoir will begin to be deficient. However, the deficiency is fairly small and could potentially be avoided if the City continues to repair leaks and discourage unnecessary irrigation.

Table 20 - Required Water Storage Capacity for Peak Day and Fire Flow with Reduced Summer Usage

<i>Year</i>	<i>Population</i>	<i>Gallons</i>		
		<i>Peak Day*</i>	<i>With 1,000 gpm Fire Flow**</i>	<i>Deficiency</i>
2024	158	136,512	196,512	
2025	166	143,424	203,424	
2030	174	150,740	210,740	
2035	183	158,429	218,429	
2040	193	166,511	226,511	3,811
2042	197	169,858	229,858	7,158
2045	203	175,005	235,005	12,305

*Peak day is assumed to be 3xADD

ADD is the non-summer average day usage for the years 2022-2024

**Fire flow for 1 hour =60,000 gallons

The system's groundwater wells have proven to be reliable, and even if the South Well was out of service, the North Well could pump up to 300 gpm and vice versa. Operating one pump for four hours at this rate would provide enough water to meet the deficiency on the peak day in 2024, and six and a half hours of continuous operation would provide enough to meet the deficiency on the peak day demand at the end of the 20-year planning window. If the reservoir was depleted below 70 feet in the event of a fire, the 40 Hp booster pump in the pump station was designed to provide a residential fire flow of approximately 1,250 gpm to the distribution system. If the reservoir is out of service, such as after being depleted by fire flow needs, a single well should be able to provide pressure and flow to the system.

E. Operation and Maintenance Requirements

The City's facilities are maintained and serviced as required. There is an Operation and Maintenance (O&M) Manual which explains the water system and how it is to be operated on a day-to-day basis.

F. Sanitary Survey Review

In September 2021, Sherman County conducted a Sanitary Survey of the City's water system. The survey only no deficiencies in the system and the system was granted "Outstanding Performer" status. The next survey is due to be performed in 2026.

G. Water System Security

There is fencing around the reservoir and pump station, but it does not enclose the well locations.

5. WATER MANAGEMENT AND CONSERVATION PLAN

The City of Grass Valley does not have a Water Management and Conservation Plan and is not currently required to produce one. Municipal water suppliers are encouraged to prepare a water management and conservation plan but are not required to do so unless a plan is prescribed by a condition of a water use permit, a permit extension, or another order or rule of the Water Resources Commission, which is not the case in Grass Valley.

6. WATER SYSTEM ALTERNATIVES ANALYSIS

Master planning efforts for the City must take into consideration various alternatives for correcting existing deficiencies and meeting future needs. The following is an examination of various alternatives for elements of the existing water system. All costs assume State or Federal funding for projects and the higher of BOLI or Davis-Bacon wages for labor.

A. Source Alternatives

The City's existing wells are adequate to provide for current and future demands. Their location is convenient for normal operations and maintenance. However, the wells tap the same aquifer, and should the water table drop, or for other unforeseen reasons the wells are both out of service, the City does not have a secondary source of production. The nearest sources of year-round surface water are the Deschutes River and Rosebush Creek, but since the closest they come to Grass Valley is approximately 4 miles to the northwest and northeast respectively, they are too far away to be a viable source.

1. Wholesale Water Purchase

Wholesale purchase of water from adjacent communities or water districts is possible through intergovernmental agreements and construction of water transmission lines. The nearest community that may have adequate capacity to supply water to the City of Grass Valley is the City of Moro, approximately 10 miles north of the City. A water transmission line would need to be constructed along highway 97. However, there is a significant elevation difference which would require the construction of pump stations along the route. Construction of the

transmission line along the highway and county roads would also require coordination and approval from the state of Oregon and Sherman County. No discussion of this alternative has taken place with the City of Moro, and the viability of this approach is unlikely.

7. RECOMMENDED WATER SYSTEM IMPROVEMENTS

A. Distribution System

Although the distribution system overall is in good condition, there are a few waterlines and fire hydrants that are in poor condition that need to be replaced. These improvements are identified in the Table 21.

B. Storage

The existing 224,000-gallon storage reservoir is in good condition and has adequate capacity to meet present and future domestic and fire flow needs if water usage is metered and appropriately distributed as recommended in Section 4D.

C. Telemetry System and Security System Improvements

The City needs to consider automating the data entry process so daily flow and water levels can be consistently and accurately entered. It would then be possible to chart the data to see trends which could point to possible water system problems or issues. All data would be available online to authorized personnel through a Supervisory Control and Data Acquisition System (SCADA).

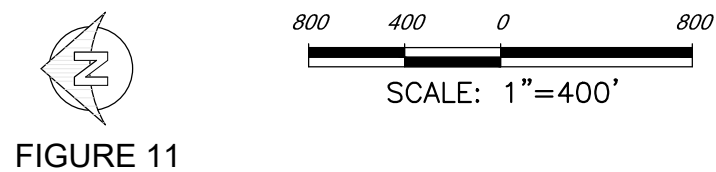
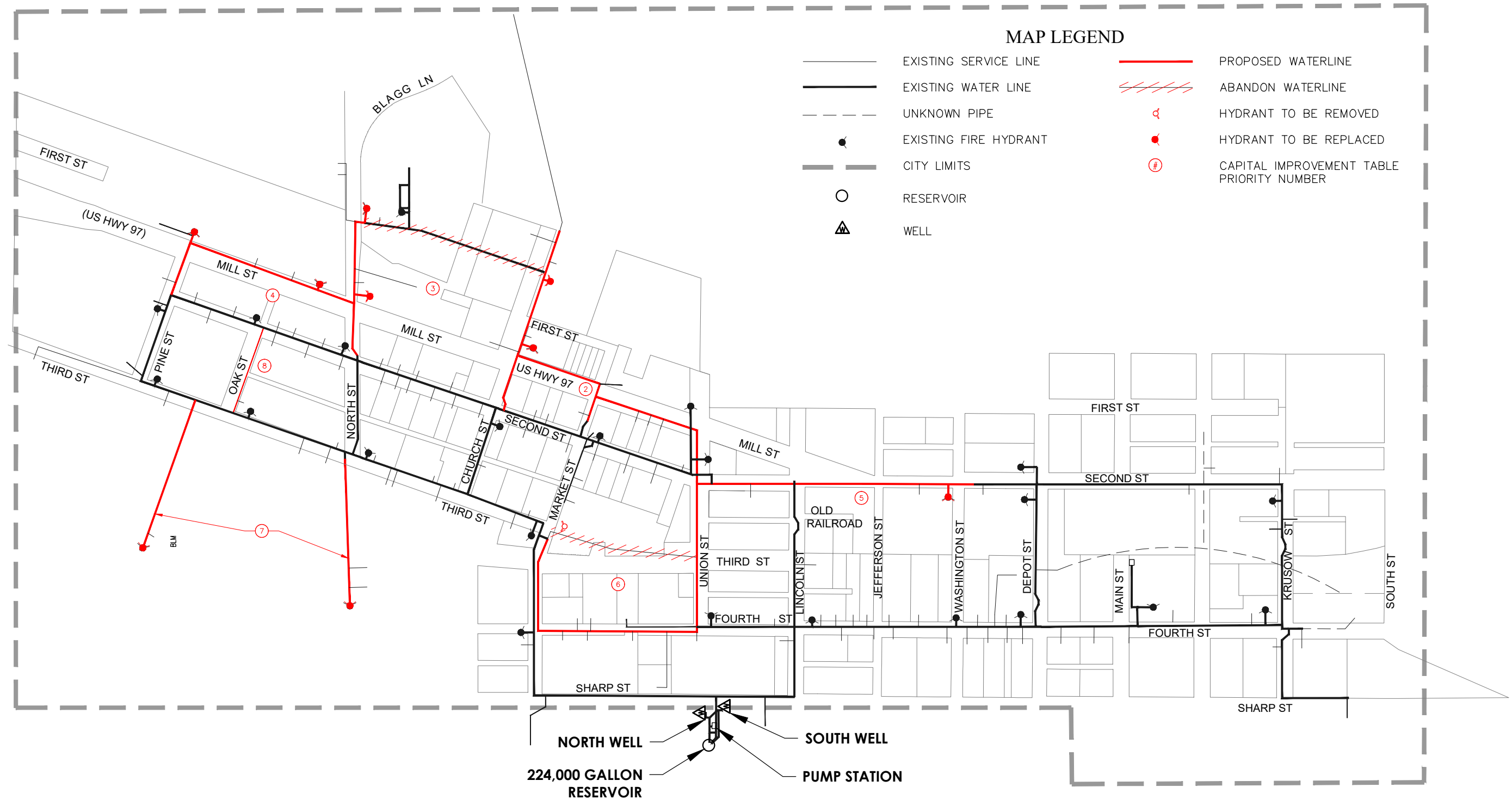
Security is also an issue that needs some attention. The fencing that encloses the reservoir should be expanded to include the well locations. The City can lock the pump house, but intrusion sensors should be installed at the building and on the reservoir hatch. Security monitoring could be combined with SCADA.

D. Summary of Costs and Priority of Recommended Improvements

A summary of recommended improvements, costs and order of priority is shown in the Table 21. See Figure 11 for a map of the capital improvement pipe projects listed in the table.

Table 21- Water System Estimated Costs and Priority of Recommended Alternatives

<i>Item</i>	<i>Improvement</i>	<i>Priority</i>	<i>Estimated Cost</i>
B. Distribution System Improvements			
1	Install New Remote-Read Meters on All Services	1	\$300,000
2	Replace 2" and 4" Galvanized and 6" AC water lines with 1,350 feet of 6" C900 PVC on Mill Street from Union Street to Church Street and from Mill Street to 2 nd Street on Church, Market, and Union Streets. Reconnect services.	2	\$310,000
3	Disconnect and plug 6" line at Church and North Streets where water line crosses private property east of Mill Street. Replace 850 feet of 6" water lines with 6" C900 PVC on Church and North Streets between Mill Street and both locations of plugged lines. Replace four hydrants. Reconnect services.	3	\$165,000
4	Replace 1,100 feet of 6" water lines with 6" C900 PVC on Mill Street from Pine Street to North Street and from Mill Street to 2 nd Street on Pine and North Streets. Replace two hydrants. Reconnect services.	4	\$185,000
5	Replace 1,100 feet of 6" water lines with 6" C900 PVC on 2 nd Street from Union Street to Washington. Replace one hydrant. Reconnect services.	5	\$170,000
6	Replace 1,550 feet of 6" water line with 6" C900 PVC in the Union Street right of way from 2 nd Street to 4 th Street, on 4 th Street from Union Street to Market Street, and on Market Street from 4 th Street to 3 rd Street. Abandon 4" line and remove hydrant between Union and Market Streets in the 3 rd Street right of way. Reconnect services.	6	\$230,000
7	Replace 1,200 feet of 6" water lines with 6" C900 PVC on North Street and the BLM access road west of 3 rd Street to the hydrants at the end of both lines. Replace two hydrants. Reconnect services.	7	\$200,000
8	Replace 350 feet of 2" water line with 6" C900 PVC on Oak Street between 2 nd and 3 rd Streets.	8	\$50,000
Total			1,610,000
A. Telemetry System and Security System Improvements			
8	Master Control Panel Upgrades and SCADA system	1	\$60,000
9	Security Fencing	1	\$2,000
Total Project Cost			\$1,672,000



CITY OF GRASS VALLEY
CAPITAL IMPROVEMENT PROJECTS
 SHERMAN COUNTY, OREGON

CURRAN-McLEOD, INC.
 CONSULTING ENGINEERS
 6655 S.W. HAMPTON ST., SUITE 210 PORTLAND,
 OREGON 97223 PHONE (503) 684-3478

FIGURE 11

8. FINANCING ALTERNATIVES AND WATER RATES

The City will require securing funding from governmental or private agencies through grant/loan programs or other financial mechanisms. A list of funding options to finance capital improvement projects for the City is summarized below.

A. General Obligation Bonds

General Obligation (GO) Bonds are the traditional means of funding capital improvements that benefit the entire community. GO bonds require a positive vote from the community, and the debt service is allocated based on property valuations and collected with annual property tax payments. The cost allocation with GO bonds impacts all residents with guarantee of the full faith and credit of the City. Due to the small population of the City, this option is likely not practical.

B. Governmental Grant/Loan Programs

1. Business Oregon Infrastructure Finance Authority (IFA)

a. State Drinking Water Revolving Loan Fund (SDWRLF)

This loan and grant program funds planning, design, and construction of drinking water facility improvements in Oregon.

b. Community Development Block Grant (CDBG)

Grants and technical assistance are available through this program to develop livable urban communities for persons of low and moderate incomes by providing housing and suitable living environments.

2. USDA Rural Development Water and Environmental Programs (WEP)

Through Rural Utilities Service WEP, rural communities obtain the technical assistance and financing necessary to develop drinking water and waste disposal systems. WEP provides funding for the construction of water and waste facilities in rural communities of 10,000 or less. The following is a list of programs pertaining to the City's projects that fall under the WEP.

a. Water and Waste Disposal Loan and Grant Program

This program provides low-income communities, which face significant health risks, access to safe, reliable drinking water and waste disposal facilities and services.

b. Special Evaluation Assistance for Rural Communities and Households (SEARCH)

This program helps very small, financially distressed rural communities with predevelopment feasibility studies, design and technical assistance on proposed water and waste disposal projects.

C. Recommended Funding Program & Schedule

The City is potentially eligible for grant funding from multiple agencies and should make efforts to obtain them for as much of the projected cost as possible. For example, other cities have had significant success with funding projects through IFA's SDWRLF, which has given grants of up to 50 percent on recent projects.

The Community Development Block Grant Program (CDBG) is available for communities where the proposed activities benefit low and moderate-income (LMI) individuals, and at least 51 percent or more of the population in the community is classified as LMI. In 2024, the City was classified as having 41 percent LMI, so Grass Valley does not currently qualify for a grant through the CDBG. Low- and Moderate-Income Statistical Data (LMISD) data is revised annually, so it is worth checking in the *Community Development Block Grant Method of Distribution* publication from Business Oregon.

A typical scenario for this type of project would be for the City to finance the improvements through the SDWRLF. This program provides grants up to 50 percent and low interest loans with payback periods up to 30 years. As an example, for a \$1,000,000 capital outlay, the use of SDWRLF with a 50% grant and a 30-year term at 2% interest, the annual payments on the \$500,000 loan would be approximately \$1,850 per month or \$21 per month per connection over a 30-year period. The City's current monthly water rate is \$32 per residential or business customer. Implementing a SDWRLF funding program could potentially increase rates to approximately \$53 per user for 30 years, depending on the loan terms.

The WEP loan/grant funding possibility through USDA Rural Development provides loans and grants for up to a 40-year term at interest rates that can be less than market rate depending on income criteria. A \$500,000 loan as in the example above would result in an annual payment of \$2,170 to \$2,500 per month or \$17 to \$24 per connection per month over a period of 40 years. Implementing a WEP funding program could potentially increase rates to approximately \$56 per user for 40 years, depending on the loan terms.

The City should anticipate obtaining a governmental grant and loan package that would be serviced by revenues, similar to the examples above. The City can be informed of all funding agency options through Business Oregon's One-Stop process. The One-Stop process provides the City exposure to all funding options and a variety of funding scenarios at one meeting and an understanding of the next steps needed for the project. The City should schedule a One-Stop meeting before selecting a funding mechanism.

APPENDICES

Appendix 1

Water Rights and Well Logs

STATE OF OREGON

COUNTY OF

SHERMAN

CERTIFICATE OF WATER RIGHT

This Is to Certify, That CITY OF GRASS VALLEY

of Box 173, Grass Valley, State of Oregon 97029, has made proof to the satisfaction of the Water Resources Director, of a right to the use of the waters of two wells

a tributary of Grass Valley Canyon
municipal

for the purpose of

under Permit No. G-7607 and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from June 24, 1977

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 0.78 cubic foot per second, being 0.56 c.f.s. from Well No. 1 and 0.22 c.f.s. from Well No. 2

or its equivalent in case of rotation, measured at the point of diversion from the well. The well is located in the NE $\frac{1}{4}$ NE $\frac{1}{4}$, Section 34, T. 2 S., R. 16 E., W.M., Well No. 1 - 25 feet South and 41 feet West; Well No. 2 - 10 feet South and 31 feet West from the NE Corner of Section 34

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to ----- of one cubic foot per second per acre,

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

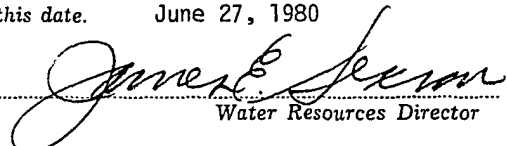
A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

SW $\frac{1}{4}$
Section 26
SE $\frac{1}{4}$ SE $\frac{1}{4}$
Section 27
SE $\frac{1}{4}$ NE $\frac{1}{4}$
Section 34
NW $\frac{1}{4}$
Section 35
T. 2 S., R. 16 E., W. M.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described.

WITNESS the signature of the Water Resources Director, affixed

this date. June 27, 1980


Water Resources Director

**BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON**

In the Matter of Transfer Application	)	FINAL ORDER APPROVING A
T-9885, Sherman County	)	CHANGE IN POINT OF
	)	APPROPRIATION

ORS 537.705 and 540.505 to 540.580 establish the process in which a water right holder may submit a request to transfer the point of appropriation, place of use, or character of use authorized under an existing water right. OAR Chapter 690, Division 380 implements the statutes and provides the Department's procedures and criteria for evaluating transfer applications.

Applicant

City of Grass Valley
P.O. Box 191
Grass Valley, Oregon 97029

Findings of Fact

1. On March 11, 2005, City of Grass Valley filed a transfer application to change the point of appropriation under Certificate 49289. The Department assigned the application number T-9885.
2. On May 2, 2005, Jess Holt, agent for City of Grass Valley, authorized modification of the transfer to include the entire water right certificate. Mr. Holt stated change is necessary to replace Well No. 1.
3. The right to be transferred is as follows:

Certificate: 49289 in the name of City of Grass Valley (perfected under Permit G-7607)

Use: Municipal

Priority Date: June 24, 1977

Quantity: 0.78 cfs, being 0.56 cfs from Well No. 1 and 0.22 cfs from Well No. 2.

Source: Two wells within the Grass Valley Canyon Basin

Authorized Point of Appropriations:

Township		Range		Meridian	Sec	¼ ¼	Survey Coordinates
2	S	16	E	W.M.	34	NE NE	Well No. 1 – 25 feet South and 41 feet West from NE corner, Section 34
2	S	16	E	W.M.	34	NE NE	Well No. 2 – 10 feet South and 31 feet West from NE corner, Section 34

This is a final order in other than contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 you may either petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

Authorized Place of Use:

Township		Range		Meridian	Sec	¼ ¼	Use
2	S	16	E	W.M.	26	SW	MUNICIPAL
2	S	16	E	W.M.	27	SE SE	MUNICIPAL
2	S	16	E	W.M.	34	SE NE	MUNICIPAL
2	S	16	E	W.M.	35	NW	MUNICIPAL

4. Application T-9885 proposes to move the authorized point of appropriation for well #1 approximately 40 feet South to a well located:

Township		Range		Meridian	Sec	¼ ¼	Survey Coordinates
2	S	16	E	W.M.	34	NE NE	80 feet South and 11 feet West from NE corner, Section 34

5. Notice of the application for transfer was published pursuant to ORS 540.520 and OAR 690-380-4000. No comments were filed in response to the notice.
6. Water has been used within the last five years according to the terms and conditions of the right, and no evidence is available that would demonstrate that the right is subject to forfeiture under ORS 540.610.
7. A pump, pipeline, and sprinkler system sufficient to use the full amount of water allowed under the existing right is present.
8. The proposed change would not result in enlargement of the right.
9. The proposed change would not result in injury to other water rights.

Conclusions of Law

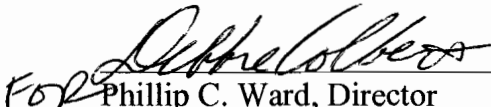
The change in point of appropriation proposed in application T-9885 is consistent with the requirements of ORS 537.705 and 540.505 to 540.580, and OAR 690-380-5000.

Now, therefore, it is ORDERED:

1. The change in point of appropriation proposed in application T-9885 is approved.
2. Water right certificate 49289 is cancelled.
3. The right to use of the water is restricted to beneficial use at the place of use described, and is subject to all other conditions and limitations contained in Certificate 49289.
4. Water shall be acquired from the same aquifer (water source) as the original point of appropriation (well #1).

5. The approved changes shall be completed and full beneficial use of the water shall be made on or before **October 1, 2011**. A Claim of Beneficial Use prepared by a Certified Water Rights Examiner shall be submitted by the applicant to the Department within one year after the deadline for completion of the changes and full beneficial use of the water.
6. The quantity of water diverted at the new point of appropriation, shall not exceed the quantity of water lawfully available at the original point of appropriation.
7. Prior to diverting water at the new point of appropriation, the water user shall install and maintain an in-line flow meter or other suitable device for measuring and recording the quantity of water appropriated. The type and plans of the measuring device must be approved by the Department prior to beginning construction and shall be installed under the general supervision of the Department.
8. When satisfactory proof of the completed change is received, a new certificate confirming the right transferred will be issued.

Dated at Salem, Oregon this 30th day of January, 2006.


For Phillip C. Ward, Director

Mailing Date: FEB 15 2006

STATE ENGINEER
Salem, Oregon

Sher
50061

Well Record

RECEIVED

STATE WELL NO.
DEC 10 1997 COUNTY Sherman
APPLICATION NO. G-8235

OWNER: City of Grass Valley

WATER RESOURCES DEPT.
MAILING ADDRESS, OREGON

LOCATION OF WELL: Owner's No. #1

CITY AND
STATE:

NE 1/4 NE 1/4 Sec. 34 T. 2 S. R. 16 E., W.M.

Bearing and distance from section or subdivision

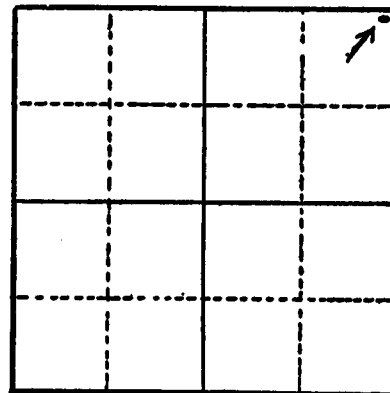
corner 25.3 ft S and 41 ft W

from NE Cor. Sec. 34

Altitude at well

TYPE OF WELL: Drilled Date Constructed 1949

Depth drilled 344 ft Depth cased 126 ft



Section 34

CASING RECORD:

10" casing from 0 to 26 ft
6" casing from 184' to 284'

FINISH:

AQUIFERS:

WATER LEVEL: 100 ft

PUMPING EQUIPMENT: Type H.P.
Capacity G.P.M.

WELL TESTS:

Drawdown ft. after hours G.P.M.

Drawdown ft. after hours G.P.M.

USE OF WATER Municipal Temp. °F., 19....

SOURCE OF INFORMATION Application for Water Right G-8235

DRILLER or DIGGER Frank Bennett

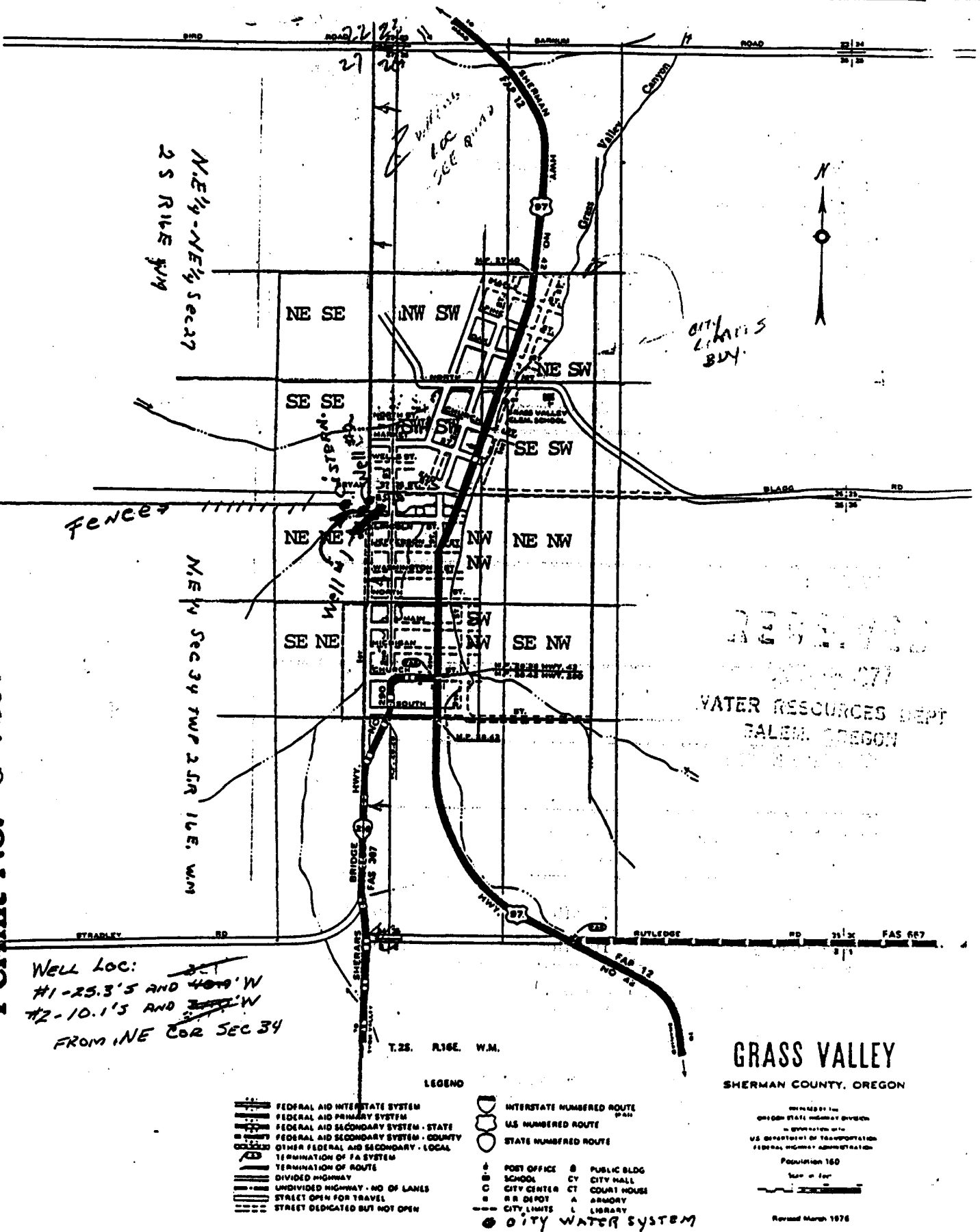
ADDITIONAL DATA:

Log Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

Application No. G-8235
 Permit No. G 7607

Well Loc:
 #1-25.3'S AND 40.9'W
 #2-10.1'S AND 30.1'W
 FROM INE COR SEC 34



NOTICE TO WATER WELL CONTRACTOR

The original and first copy
of this report are to be
filed with the

STATE ENGINEER, SALEM, OREGON 97310
within 30 days from the date
of well completion.

RECEIVED
MAY 20 1970
STATE OF OREGON
(Please type or print)
(Do not write above this line)
STATE ENGINEER
SALEM, OREGON

SHER

State Well No. 2/16-2700
State Permit No. _____

(1) OWNER:

Name City of Grass Valley
Address Grass Valley, Oregon

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

CASING INSTALLED:

Threaded ☐ Welded ☒
10" Diam. from 0 ft. to 42 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No

Type of perforator used

Size of perforations	in.	by	in.
perforations from	ft.	to	ft.
perforations from	ft.	to	ft.
perforations from	ft.	to	ft.
perforations from	ft.	to	ft.
perforations from	ft.	to	ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No

Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.
Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.

(8) WATER LEVEL: Completed well.

Static level 60 ft. below land surface Date 4/18/70
Artesian pressure _____ lbs. per square inch Date

(9) WELL TESTS:

Drawdown is amount water level is
lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

Yield: _____ gal./min. with 207 ft. drawdown after _____ hrs.
Air Test 200 gpm " " "

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Artesian flow _____ g.p.m. Date

Temperature of water 55 Was a chemical analysis made? ☐ Yes ☒ No

(10) CONSTRUCTION:

Well seal—Material used Cement Grout
Depth of seal 42' ft.
Diameter of well bore to bottom of seal 14 in.
Were any loose strata cemented off? ☐ Yes ☒ No Depth _____
Was a drive shoe used? ☐ Yes ☒ No
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? _____ depth of strata _____
Method of sealing strata off _____
Was well gravel packed? ☐ Yes ☒ No Size of gravel: _____
Gravel placed from _____ ft. to _____ ft.

(11) LOCATION OF WELL:

County Sherman Driller's well number _____
NE 1/4 NE 1/4 Section 27 T. 2S R. 16 E. W.M.
Bearing and distance from section or subdivision corner

(12) WELL LOG:

Diameter of well below casing 10"

Depth drilled 290 ft. Depth of completed well 290 ft.

Formation: Describe color, texture, grain size and structure of materials;
and show thickness and nature of each stratum and aquifer penetrated,
with at least one entry for each change of formation. Report each change
in position of Static Water Level as drilling proceeds. Note drilling rates.

MATERIAL	From	To	SWL
Soil	0	3	
Basalt, Brown	3	22	
Clay, Brown	22	32	
Basalt, Black, Hard	32	70	
Basalt, Gray, Hard	70	83	
Basalt, Broken, Blk. and Brown	83	87	Water
Basalt, Gray, Hard	87	240	
Basalt, Brown & Black broken yellow clay	240	260	
Basalt, Brown Broken, green claystone	260	285	Water
Basalt, Hard, Gray	285	290	

Work started 4-15-70 19 Completed April 18 70
Date well drilling machine moved off of well April 18 1970

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Don Parry ik Date 4/18/, 1970
(Drilling Machine Operator)

Drilling Machine Operator's License No. 640

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME PROJECT:Corporation
(Person, firm or corporation) (Type or print)
Address 1 So. Second, Walla Walla, Wn. 99362

[Signed] Gary Hiesey ik
(Water Well Contractor)

Contractor's License No. 527 Date May 11/ 1970

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL ID. # L 72729
START CARD # 169079

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number _____
Name CITY OF GRASS VALLEY c/o BILL BOOKER CONST
Address 30600 E. SPRINGHILL RD
City TROUTDALE State OR Zip 97060

(2) TYPE OF WORK
☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other _____

(4) PROPOSED USE:
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other _____

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 450 ft.
Explosives used ☐ Yes ☒ No Type _____ Amount _____

HOLE			SEAL			
Diameter	From	To	Material	From	To	Sacks or pounds
19"	0	7	Cement	0	7	
14"	7	285	Cem/Bent	4	285	215 Sacks
10"	285	450				

How was seal placed: Method ☐ A ☒ B ☒ C ☐ D ☐ E
☐ Other _____

Backfill placed from _____ ft to _____ ft. Material _____
Gravel placed from _____ ft to _____ ft. Size of gravel _____

Diameter		From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:								
16"		0	7	250	☒	☐	☒	☐
10"		+1	284	250	☒	☐	☒	☐
Liner:								

Drive Shoe used ☐ Inside ☐ Outside ☒ None
Final location of shoe(s) _____

Diameter		From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:								
16"		0	7	250	☒	☐	☒	☐
10"		+1	284	250	☒	☐	☒	☐
Liner:								

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gain/min		Drawdown		Drill stem at		Flowing Time	
400+				450		1 hr.	
200+				200		"	

Temperature of water 54°F Depth Artesian Flow Found _____

Was a water analysis done? ☒ Yes By whom A.M.J.

Did any strata contain water not suitable for intended use? ☐ Top little

☐ Salty ☒ Muddy ☐ Odor ☐ Colored

Depth of strata 36-60/235-242

(9) LOCATION OF WELL by legal description:

County Sherman Latitude _____ Longitude _____
Township 2S N or S Range 16E E or W WM
Section 24 NE 1/4 NE 1/4
Tax Lot 3502 Lot _____ Block _____ Subdivision _____
Street Address of Well (or nearest address) Sharp Street
So. of Old Well #1 - Grass Valley, Or

(10) STATIC WATER LEVEL:

103 ft. below land surface. Date 10/20/04
Artesian pressure _____ lb. per square inch Date _____

(11) WATER BEARING ZONES:

Depth at which water was first found 36/319

From	To	Estimated Flow Rate	SWL
319	349	50+	103
400	408	100	103
424	440	250	103

(12) WELL LOG:

Ground Elevation _____

Material	From	To	SWL
Brn cly & boulders	0	4	
Gry brn frac basalt	4	26	
Gry brn weathered basalt w/clay.	26	36	
Gry brn muddy basalt	36	60	35
Gry brn frac basalt	60	70	
Hard gry basalt	70	235	35
Firm gry-gry brn basalt	235	242	35
Brn-yellow clay	242	277	
Gry basalt	277	319	
Gry-gry blk frac baslt	319	350	103
Hard gry basalt	350	367	
Gry-gry brn basalt	367	379	
Gry-gry blk basalt	379	400	
Gry brn & brn basalt	400	408	103
Gry basalt, hard	408	424	
Brn basalt interbed	424	427	103
Red, brn & gry-brn basalt	427	440	
Gry-blk basalt, hard	440	450	103

Date started 8-16-04 Completed 10/20/04

(unbonded) Water Well Constructor Certification:

I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number 1492

Signed _____ Date 10/20/04

(bonded) Water Well Constructor Certification:

I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 573

Signed _____ Date 10/20/04

OCT 22 2004

ORIGINAL - WATER RESOURCES DEPARTMENT FIRST COPY - CONSTRUCTOR SECOND COPY - CUSTOMER
WATER RESOURCES DEPT
SALEM OREGON

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STATE OF OREGON

WATER SUPPLY WELL REPORT

(as required by ORS 537.765)

MAR 15 2005

WELL I.D. # L N/A

START CARD # 172756

Instructions for completing this report are on the back page

WATER RESOURCES DEPT

(1) LAND OWNER

Well Number

Name City of Grass Valley

Address PO Box 191

City Grass Valley State OR Zip 97029

(2) TYPE OF WORK

☐ New Well☐ Deepening ☐ Alteration (repair/recondition) ☒ Abandonment ☐ Conversion

(3) DRILL METHOD

☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud☐ Other

(4) PROPOSED USE

☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION

Special Construction: ☐ Yes ☒ No

Depth of Completed Well -0- ft.

Explosives used: ☐ Yes ☒ No Type Amount

BORE HOLE			SEAL			Sacks or Pounds
Diameter	From	To	Material	From	To	

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E☐ Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:					☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☒ Outside ☐ None

Final location of shoe(s)

(7) PERFORATIONS/SCREENS

☐ Perforations

Method

☐ Screens

Type

Material

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump☐ Bailer☐ Air☐ Flowing Artesian

Yield gal/min

Drawdown

Drill stem at

Time

Temperature of water Depth Artesian Flow Found

Was a water analysis done? ☐ Yes By whomDid any strata contain water not suitable for intended use? ☐ Too little☐ Salty ☐ Muddy ☒ Odor ☐ Colored ☐ Other

Depth of strata:

(9) LOCATION OF WELL (legal description)

County Sherman

Tax Lot 3502

Lot

Township 2S N or S Range 16E E or W WM

Section 27 NE 1/4 SE 1/4

Lat " or (degrees or decimal)

Long " or (degrees or decimal)

Street Address of Well (or nearest address) Sharp Street

Grass Valley, OR

(10) STATIC WATER LEVEL

97 ft. below land surface.

Date 03/09/2005

ft. below land surface.

Date

Artesian pressure lb. per square inch

Date

(11) WATER BEARING ZONES

Depth at which water was first found

From	To	Estimated Flow Rate	SWL

(12) WELL LOG

Ground Elevation

Existing well "Sher 50061"

Original drill log enclosed &
 Engineers report of video inspection 02/24/03
 Concrete Vault removed by Contractor
 Existing 8" casing below grade -2ft
 8" casing bent/tipped, not accessible 2-12 ft.
 8" bore hole, open bore to +183' (SWL 97')
 Crushed rock fill in 6" bore 344-210 ft.
 Cement grout (50 sks mix) 210-1 ft.
 Crushed rock, parking lot 1-0

Date Started 03/09/2005 Completed 03/09/2005

(unbonded) Water Well Constructor Certification

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number Date

Signed

(bonded) Water Well Constructor Certification

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 573 Date 03/10/2005

Signed

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MAR 15 2005

CITY OF GRASS VALLEY WELL
WATER RESOURCES DEPT
SALEM, OREGONBennett & Sons, Contractor
The Dalles, OregonClyde Root, Driller
Mosier, Oregon

0-2 Soil
 2-44 Soft rock
 44-67 Soft. Probably sandstone. A small amount of water
 at 55-60 ft.
 67-96 Very hard rock
 96-167 Medium hard rock
 167-177 A little softer rock
 177-216 Hard rock
 216-234 Medium hard rock
 234-244 Blue clay
 244-260 Brown clay
 260-266 Green clay
 266-280 White clay
 280-303 Tan clay.

At 264 ft the well pump tested 20 gpm. At 292 ft the well pump tested 30 gpm. At this point drilling was discontinued. When drilling was continued 100 ft of 6 inch pipe was installed, the top of this sleeve being 184 ft from the top of the well.

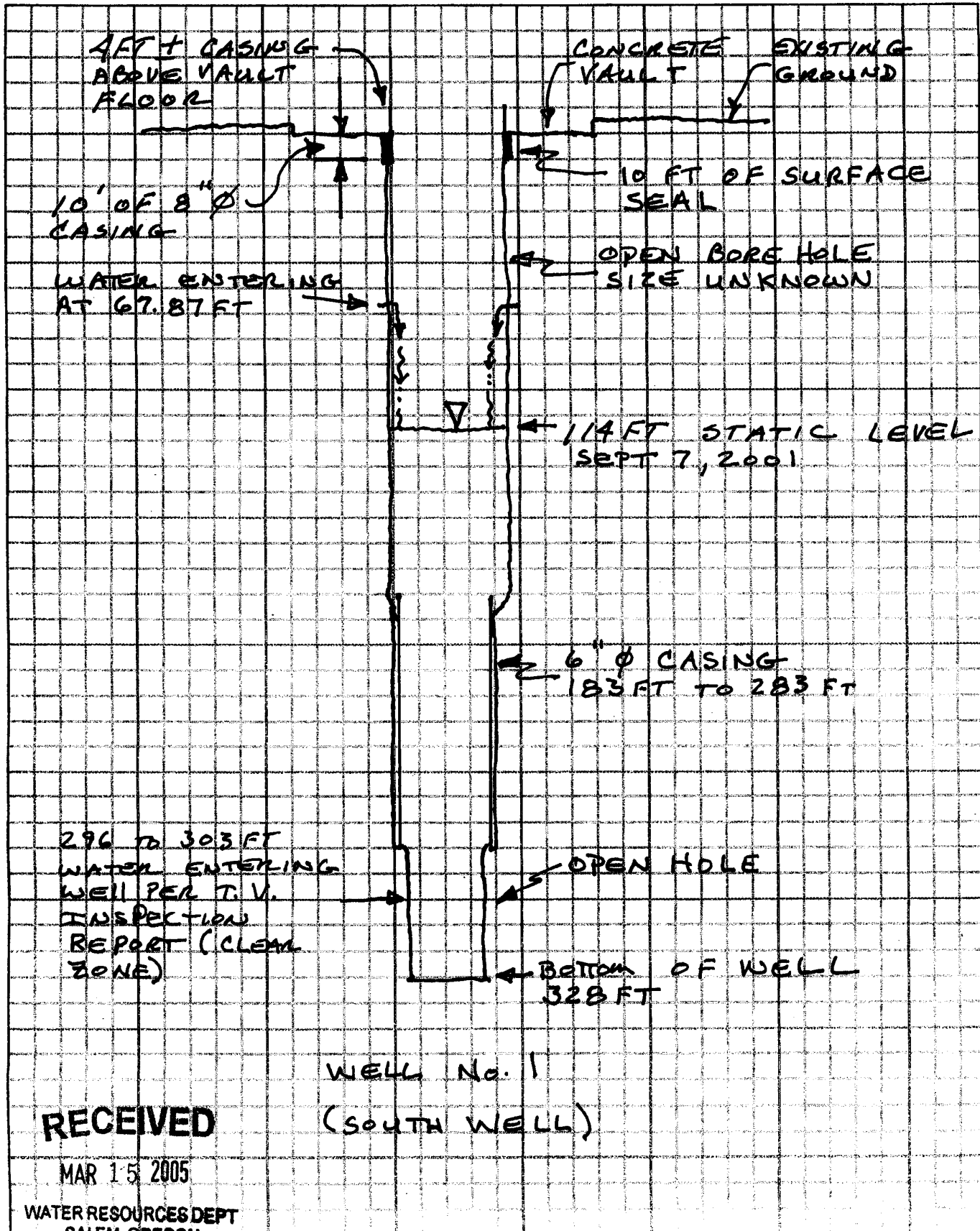
303-344 Soft rock. The water level dropped 30 ft from 12 ft to 42 ft at the 334-8 ft depth and then dropped 58 ft from 42 ft to 100 ft at the 342 ft depth.

Water level 100 ft.

Pump tested 100 gpm.

Amount of casing at the surface of the well not given.

Drilled 1949



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MAR 15 2005

WATER RESOURCES DEPT
SALEM, OREGON

Appendix 2

2021 Sanitary Survey

Deficiency Summary

Surveyor: Nicole Bailey

Date Corrective Action Plan is due: N/A

County: Sherman

Yes	No	Significant Deficiencies and Rule Violations:	Date to be corrected	Date corrected
☐	☒	Source: <i>Well construction:</i>		
		<i>Spring/other source:</i>		
☐	☒	Treatment: <i>Surface water treatment:</i>		
		<i>Disinfection:</i>		
		<i>Other treatment:</i>		
☐	☒	Finished Water Storage:		
☐	☒	Distribution:		
☐	☒	Monitoring:		
☐	☒	Management & Operations:		
☐	☒	Operator Certification:		
☐	☒	Other Rule Violations:		

Database Updates: ☐ None ☒ Inventory ☐ Treatment ☒ Monitoring ☐ Page:

Comments:

☐ **Source Deficiencies:**

Well Construction Deficiencies:

- ☐⊕ Sanitary seal and casing not watertight
- ☐⊕ Does not meet setbacks from hazards
- ☐⊕ Wellhead not protected from flooding
- ☐⊕ No raw water sample tap
- ☐⊕ No treated sample tap (if applicable)
- ☐⊕ No screen on existing well vent

Spring Source Deficiencies:

- ☐⊕ Springbox not impervious durable material
- ☐⊕ No watertight access hatch/entry
- ☐⊕ No screened overflow
- ☐⊕ Does not meet setbacks from hazards
- ☐⊕ No raw water sample tap
- ☐⊕ No treated sample tap (if applicable)

☐ **Treatment Deficiencies/Violations:**

Surface Water Treatment Deficiencies:

- ☐+ Turbidity standards not met - 0030(3)
- ☐+ Turbidimeters not calibrated per manufacturer or at least quarterly - 0036(5)(b)(A)(ii)
- ☐⊕ Incorrect location for turbidity monitoring
- ☐⊕ If serving > 3,300 people no alarm or auto plant shut off for low chlorine residual
- ☐+ For conventional or direct filtration: No alarm or plant shut off for high turbidity
- ☐⊕ For conventional filtration: Settled water not measured daily
- ☐⊕ For conventional or direct filtration: Turbidity profile not conducted on individual filters at least quarterly
- ☐⊕ For cartridge filtration: Filters not changed according to mfg. rec. pressure differential
- ☐⊕ For cartridge filtration: No pressure gauges before and after cartridge filter
- ☐+ For membrane filtration: Direct integrity testing does not meet requirements under -0036(5)(d)(B)
- ☐+ For membrane filtration: Indirect integrity testing does not meet requirements under -0036(5)(d)(C)
- ☐⊕ For diatomaceous earth filtration: Body feed not added with influent flow.

Disinfection Deficiencies/Violations:

- ☐+ DPD/EPA approved method not used - 0036(9)(e)
- ☐+ Free chlorine residual not maintained - 0032(3/5)
- ☐+ Chlorine not measured & recorded - 0036(9)
- ☐+ Minimum CT required not met all times - 0032(3/5)
- ☐⊕ No means to adequately determine flow rate on contact chamber effluent line
- ☐+ pH, Temperature, and chlorine residual not measured daily at first user - 0036(5)(a/b)

- ☐⊕ Failure to calculate CT values correctly
- ☐⊕ No means to adequately determine disinfection contact time under peak flow and minimum storage conditions

UV Disinfection Violations (OAR 333-0050(5)(k)):

- ☐+ Bypass around UV system
- ☐+ Lamp sleeve not cleaned
- ☐+ Lamp not replaced per manufacturer
- ☐+ No intensity sensor with alarm or shut-off

Other Treatment Violations:

- ☐+ Non-NSF approved chemicals - 0087(6)
- ☐+ Corrosion control parameters not met - 0034

☐ **Distribution System Violations:**

- ☐+ System pressure < 20 psi - 0025(7)

Cross Connection (OAR 333-061-0070):

- ☐+ No ordinance or enabling authority (CWS)
- ☐+ Annual Summary Report not issued (CWS)
- ☐+ Testing records not current (CWS, NTNC, TNC)
- ☐+ No Cross Connection Control Specialist (CWS ≥ 300 connections)

☐ **Finished Water Storage Deficiencies:**

- ☐⊕ Hatch not locked or adequately secured
- ☐⊕ Roof and access hatch not watertight
- ☐⊕ No flap valve, screen, or equivalent on drain
- ☐⊕ No screened vent

☐ **Monitoring Violations:**

- ☐+ Monitoring not current - 0025(1)
- ☐+ Unaddressed MCL violations or LCR AL exceedances - 0030
- ☐+ No Coliform Sampling Plan - 0036(6)(a)(I)

☐ **Management & Operations Violations:**

- ☐+ No operations and maintenance manual - 0065(4)
- ☐+ Emergency response plan not completed - 0064(1)
- ☐+ Major modifications not approved (plan review) - 0050
- ☐+ Master plan not current (≥ 300 con.) - 0060(5)
- ☐+ Annual CCR not distributed (CWS) - 0043(1)(a)
- ☐+ PNC or out of compliance with AO
- ☐+ Public notice not issued as required - 0042

☐ **Operator Certification Violations:**

- ☐+ No certified operator at required level - 0065(2)
- ☐+ No protocol for under certified operator - 0225(2)

☐ **Other Rule Violations:** _____

⊕ Significant deficiency per OAR 333-061-0076
+ Rule violation per OAR 333-061-XXX

Inventory and Narrative

☒ Outstanding Performer					
Type:		Status	Size	Season:	☒ All year ☐ Seasonal
☒ Community (C)		Population:	184	Begins:	/
☐ Non-Transient Non-Community (NTNC)		Connections:	92	Ends:	/
☐ Transient Non-Community (TNC)					
☐ Non-EPA (NP)					
License:	☒ Not Lic. ☐ Health Dept. ☐ Ag		Service Area Characteristics:		MU
Responsible Agency:	☐ State ☒ County ☐ Ag		Owner Type:		4
Minimum WS Certification Requirements:	WD:	WT:	☐ FE	☒ Small WS	☐ N/A

For changes in operations staff contact Operator Certification: dws.opcert@dhsosha.state.or.us

Primary Administrative Contact (mailing address):			
Contact Name:	Neil Pattee	Phone:	(541) 333-2424
Title:	Mayor	Cell:	(541) 705-7376 Whitney Cabral
Street Address:	PO Box 191	Emergency #:	()
City/State/Zip:	Grass Valley, OR 97029	Email:	cityofgrassvalley1901@gmail.com
Center of Service Area (for public maps):			
decimal degrees (e.g., 45.894357, -123.960433) or address	45.361348, -120.784699		

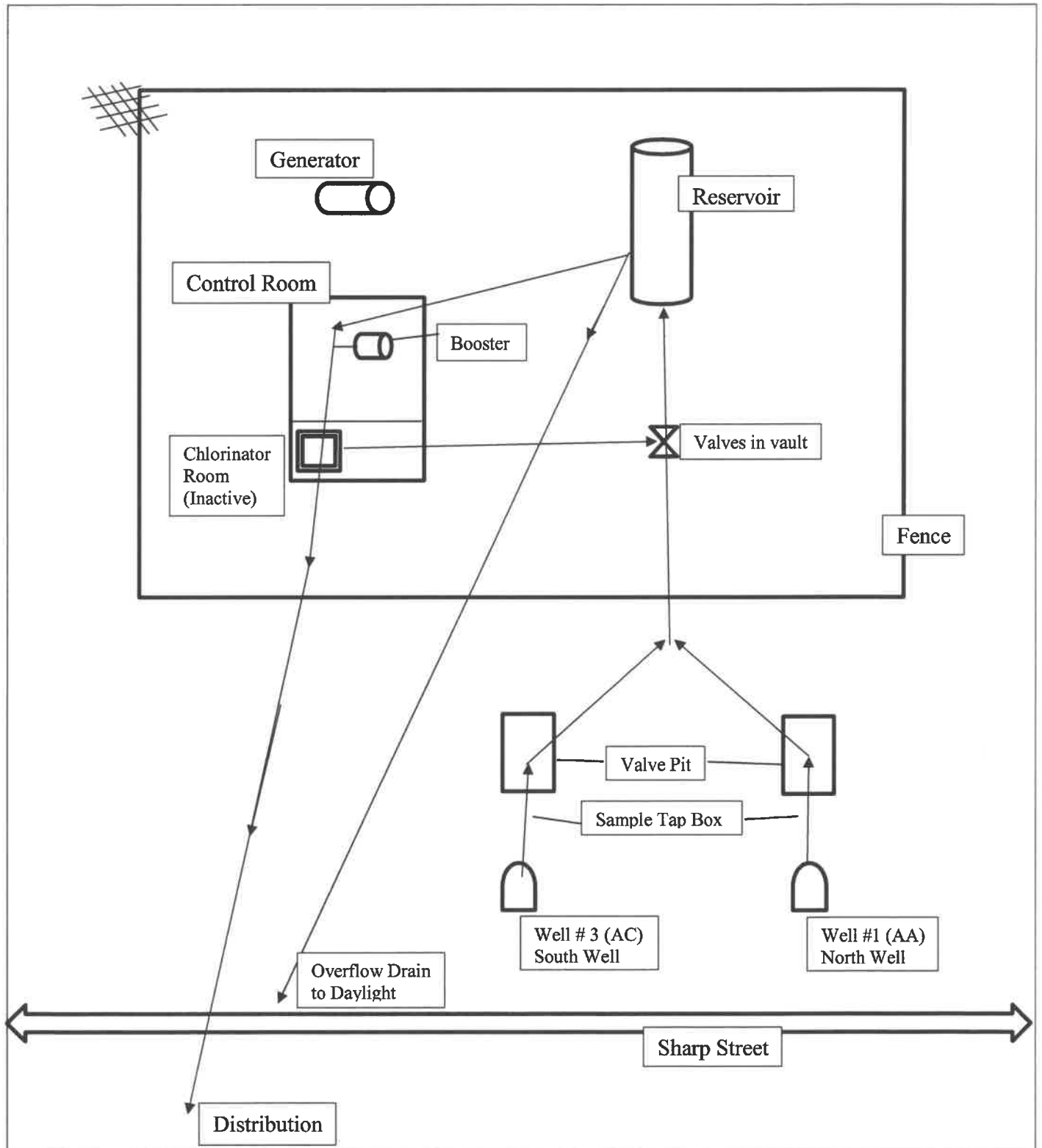
Legal/Owner/Secondary Contact (optional/not entered in SDWIS):			
Contact Name:	City of Grass Valley	Phone:	(541) 333-2434
Title:	Legal Owner	Cell:	()
Street Address:	PO Box 191	Emergency #:	()
City/State/Zip:	Grass Valley OR 97029	Email:	cityofgrassvalley1901@gmail.com

System Physical Address (optional/not entered in SDWIS):			
Contact Name:	Walter Grzeszczyk	Phone:	(541) 705-7375
Title:	Water System Operator	Cell:	()
Street Address:		Emergency #:	()
City/State/Zip:		Email:	tpolarski@gmail.com

Emergency Systems Available:			
Name:		PWS ID#:	41

Narrative:
This is a community water system with 2 wells. Well #1, AA (North well) and Well #3, AC (South well). The wells are pumped alternately and directly enter into a 230,000 gal. reservoir. The system has the ability to chlorinate water as it flows to the reservoir but is not doing so, nor are they required to at this time. This system has an auxiliary power source (diesel generator) if primary power fails. A booster pump(40HP) is designed to operate when fire flows are needed.

Water System Schematic



Source Information

ID	Entry Points (Location where water enters distribution and is sampled)	Source Type (Ground, Surface, GWUDI, Purchased ground, Purchased surface)	Availability (Permanent, Seasonal*, Emergency) *If seasonal, indicate begin/end dates			
			Begin (M/D)		End (M/D)	
A	EP FOR WELLS #1 & #3	Ground	Permanent			

ID	Sources (Contributing to Entry Point)	Land Use*	Capacity (GPM)	Source Type (Ground, Surface, GWUDI, Purchased ground, Purchased surface)	Availability (Permanent, Seasonal, Emergency, Abandoned, Disconnected)
AA	Well #1 (North)	H	300	Ground	Permanent
AC	Well #3 (South)	H	300	Ground	Permanent

*Land Use Codes: (A) Pristine Forest (B) Irrigated Crops (C) Non-Irrigated Crops (D) Pasture (E) Light Industry (F) Heavy Industry (G) Urban-Sewered Area (H) Rural On-Site Sewage Disposal (I) Urban On-Site Sewage Disposal (J) Rangeland (K) Managed Forest (L) Commercial (M) Recreational Use

Yes No

- ☒ ☐ Has the water system implemented strategies to protect their drinking water sources? (e.g., posting source area signs, notifying residents of hazardous waste collection events, provide residents information about maintaining their septic systems, abandoning unused wells, etc.)
- ☐ ☒ Is the water system interested in protecting their drinking water sources from contamination? If yes, contact regional geologist at 541-726-2587.

Comments:

Well Information

Source ID#: SRC-	AA	AC				
Source Name:	Well #1	Well #3				
Well log available?*	☒ Y ☐ N	☒ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N	☐ Y ☐ N
Well log ID (e.g., COLU123, L12345)	L41128	L72729				
	Yes	No	Yes	No	Yes	No
Well active?	☒	☐	☒	☐	☐	☐
Pitless adaptor?	☒	☐	☒	☐	☐	☐
• Sanitary seal & casing watertight?	☒	☐	☒	☐	☐	☐
• Raw water sample tap?	☒	☐	☒	☐	☐	☐
• Treated water sample tap? ☒ N/A	☐	☐	☐	☐	☐	☐
• If vented, properly screened? ☒ N/A	☐	☐	☐	☐	☐	☐
• Wellhead protected from flooding?	☒	☐	☒	☐	☐	☐
Concrete slab around casing?	☒	☐	☒	☐	☐	☐
Casing height ≥12-in. above slab/grade?	☒	☐	☒	☐	☐	☐
Flowmeter?	☒	☐	☒	☐	☐	☐
Pressure gauge?	☒	☐	☒	☐	☐	☐
Pump to waste piping?	☒	☐	☒	☐	☐	☐
• Well meets setbacks from hazards?	☒	☐	☒	☐	☐	☐
If no, identify list of hazard(s) within the setback and the distance to the hazard.....						
HAZARD:						
DISTANCE (ft.):						
Protective housing?	☒	☐	☒	☐	☐	☐
If yes, does it have:						
Heat?	☐	☒	☐	☒	☐	☐
Light?	☐	☒	☐	☒	☐	☐
Floor drain?	☒	☐	☒	☐	☐	☐
Well pump removal provision?	☒	☐	☒	☐	☐	☐
Pump Type: (vertical turbine, submersible, centrifugal, shallow jet, deep jet)	sub	sub				
Bearing lubrication: (oil, or water)	water	water				
Pumping capacity (gpm)	300	300				

*If no well log available, record any known information regarding depth of well, depth of grout seal, year of installation, or casing diameter in the comments section below.

Comments:

No vents on the pitless adapter well locations. Wells are set up to automatically switch to keep both pumps exercised. The well pumps kick on when the reservoir's fill level goes down to a set draw depth. There is an even lower depth set on the reservoir where a booster pump can kick on if needed. The booster pump is also exercised.

Potential Sanitary Hazards

(From OAR 333-061-0050(2)(a)(E))

The following sanitary hazards are not allowed within 100 feet of a well or spring:

- Any existing or proposed pit privy
- Subsurface sewage disposal drain field
- Cesspool
- Solid Waste disposal site
- Pressure sewer line
- Buried fuel storage tank
- Animal yard, feedlot, or animal waste storage
- Untreated storm water or gray water disposal
- Chemical (including solvent, pesticides, and fertilizers) storage, usage, or application)
- Fuel transfer or storage
- Mineral resource extraction
- Vehicle or machinery maintenance or long term storage
- Junk / auto / scrap yard
- Cemetery
- Unapproved well
- Well that has not been properly abandoned or of unknown or suspect construction
- Source of pathogenic organisms
- Any other similar public health hazards

The following are not allowed within 50 feet of a well or spring:

- Gravity sewer line
- Septic Tank

Exemptions to these setbacks must be listed and documented within the plan approval letter and in an approved construction waiver standard.

If a surface water source is located within 500 feet of a well or spring, please note the water body name and the distance to the well or spring. All groundwater sources within 500 feet to a surface water source should be considered for potential surface water influence. Check the file for correspondence. If a review has been done indicate results in comment section. If not, contact the Springfield office 541-726-2587.

Storage and Pressure Tanks

Number	Name	Tank Type (G)round, (E)levated, (P)ressure	Tank Material (Concrete, Steel, Redwood, Plastic, Other)	Year Built	Volume (gal.)
1	Reservoir	Ground	Steel	2007	230,000

Total Volume: 230,000

Reservoir Number: 1		Yes		No		Yes		No		Yes		No		Yes		No	
Reservoir Features		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Fence/gate?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
● Hatch secured (e.g. locked, bolted, etc.)?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
● All tank access points watertight?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
● Screened vent?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Overflow?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
● Overflow protected (screen/flap/valve)?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Drain to daylight?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Water level gauge?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bypass piping? (● if used for contact time)		☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Alarm for high or low levels?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Separate inlet/outlet?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Approved interior coating?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Exterior in good condition?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Annual interior/exterior inspection?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Cleaning schedule?		☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Continuously disinfected? (● post '81 redwood)		☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pressure Tanks																	
Accessible for maintenance?		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bypass piping?		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Drain?		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pressure relief device?		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Air bladder/diaphragm?		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Valve for adding air?		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Comments

10 years ago there were divers that checked the interior of the tank. In terms of saving for the next time that the interior is planned to be checked with divers every 20 years. Will recommend more frequent cleaning/interior inspection schedule.
Exterior inspection including the top annually.

Distribution System Information

Service Area and Facility Map

Yes No

☒ ☐

Does the system have a service area and facility map (indicate features on map):

☒ Water lines (including size and material)

☒ Sources-wells & withdrawal points

☐ Treatment facilities

☐ Pressure zones

☒ Storage facilities (reservoirs)

☒ Pressure regulating valves

☐ Sampling points

☐ Booster pumps

Distribution Data

Yes No

☒ ☐

• System pressure $\geq$ 20 psi?

☒ ☐

Water system leakage $<10\%$?

☒ ☐

Hydrants or blowoffs on all dead ends? ☐ N/A

☒ ☐

Routine flushing? (How often)

☒ ☐

Adequate valving?

☒ ☐

Routine valve turning? (How often)

☐ ☒

Does the distribution system have asbestos cement (AC) pipe?

If yes, verify asbestos sampling is completed on Water Quality Monitoring Page (CWS, NTNC).

Comments

Hot Tap machine to keep pressure during repairs

See below for additional comments:

Once a year

Cross Connection Control (CWS, NTNC, and TNC)

Yes No N/A

☒ ☐ ☐

• Assemblies tested annually? (CWS, NTNC, TNC)

☒ ☐ ☐

• Ordinance or enabling authority? (CWS)

☒ ☐ ☐

• Annual Summary Report submitted? (CWS)

☐ ☐ ☒

• Certified Cross Connection Control Specialist? (CWS $\geq$ 300 connections)

Comments

3 assemblies: Hemp Factory, City Park, and Fire Station

Comments:

The City of Grass Valley was provided a grant in 2007 to make sweeping changes to the water system, including new mains lines and meters. The City has not utilized the meters, and charge each system user a flat fee for water. This has only recently been slightly changed to address a few commercial users for the system's additional water use.

The lack of monitoring of the meters makes it difficult to help with determining overall water loss. The customers useage on the meters cannot be subtracted from the wells overall useage to find a water loss amount.

Water Quality Monitoring

Contaminant	N/A	Number & Frequency	Next Tests Due
Entry Point Sampling:			
Arsenic	☐	Once every 9 years	2028
Inorganic Chemicals (Including Nitrite) (sw)	☒		
Inorganic Chemicals (Including Nitrite) (gw)	☐	Once every 9 years	2022
Nitrate.....	☐	Once every year	2022
Radionuclides (Community Water Systems Only):			
Gross Alpha	☐	Once every 6 years	2025
Radium 226/228.....	☐	Once every 9 years	2029
Uranium.....	☐	Once every 6 years	2025
SOCs.....	☐	Once every 3 years	2023
VOCs (sw)	☒		
VOCs (gw)	☐	Once every 3 years	2023
Distribution System Sampling:			
Coliform Bacteria.....	☐	Once a month	October 2021
Asbestos (for AC pipe/asbestos geologic areas) ...	☒		
TTHMs and HAA5s	☒		
Lead and Copper # sites: _____	☐	5 samples every 3 years	2023
Other Sampling:			
TOC.....	☒		
Turbidity	☒		
Source Water Coliform.....	☒		
Other (specify) _____	☒		
Yes No	☒ ☐	● Is all required monitoring current?	
Yes No	☒ ☐	Are samples collected at the correct locations in the system?	
Yes No	☐ ☐	● Have all MCL violations or LCR AL exceedances been addressed? ☒ N/A	
Yes No	☐ ☐	DBP's collected at correct locations? ☒ N/A	
Yes No	☒ ☐	● Does the system have a written coliform sampling plan?	
Does the plan include:		Yes No	Yes No
☒	☐	Sample collection protocol	☐ ☒
☒	☐	Distribution map	☐ ☒
☒	☐	Sample site locations	☒ ☐
			Rotation schedule
			Repeat locations
			Source locations ☐ N/A

Comments:

BOX R Water is contracted to collect all samples for the City of Grass Valley. They have a method and plan for if repeat samples were needed to be taken within a 24 hour window. Box R Water would take these samples to limit variation in sampling methods, in order to ensure proper confirmation of any issues.

Ref rule OAR333-061-0036(2)(a)(C): IOCs that have been monitored in a minimum of three rounds with results under the MCL are applicable for a waiver to monitoring frequency. Arsenic has consistently tested under the MCL since 2010. Request for waiver will be added with survey.

Ref rule OAR333-061-0036(7)(a)(B): Radionuclides that have tested and had a detection, but are under half the MCL are applicable for a reduced 6 year sampling frequency. Gross Alpha and Uranium were detected in 2019 and will have their schedule changed to once per 6 years

Management & Operations

O&M Manual and Emergency Response Plan

Yes No

☒ ☐
☒ ☐
☒ ☐

- Does system have an operation and maintenance manual?
- Does system have an emergency response plan?
- Do any system components have auxiliary power?
If yes, describe: Diesel Generator

Operator Certification

Yes No N/A

☒ ☐ ☐
☐ ☐ ☒
☐ ☐ ☒

- Is the DRC identified and certified at the appropriate level?
If the DRC is a contract operator, how do they work with the system?
- Does system have written protocols for under-certified operators?

Plan Review/Master Plan

Yes No N/A

☒ ☐ ☐
☐ ☐ ☒

- Have all major modifications been approved by DWS?
- Does the system have a current (<20 yr. old) master plan? (Not required if < 300 connections)
What year was the plan completed?

Compliance Status

Yes No N/A

☒ ☐ ☐
☐ ☐ ☒
☒ ☐ ☐

- Is water system in compliance (all orders resolved and not a priority non-complier)?
- Does the system issue public notice as required?
- Are consumer confidence reports sent to users each year?

Comments:

Operations and maintenance manual, and emergency response plan created in 2005 but has been slowly updated over time. Recommend continual updates every 5 years, system contacts required to be updated annually.

No violations in previous 5 years.

Appendix 3

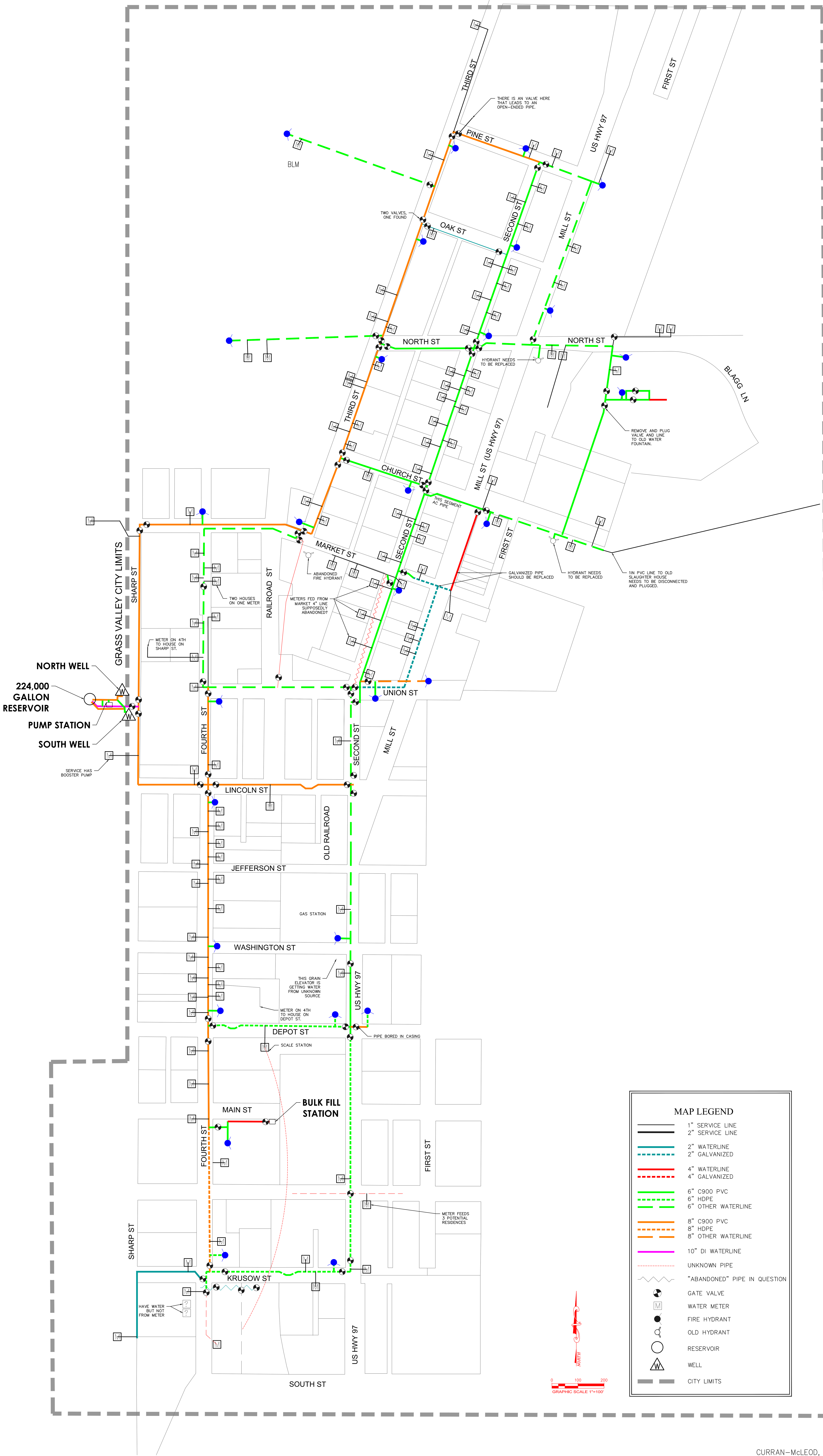
System Wall Map

36'' x 62'' Map in PDF
and paper map in bound report

CITY OF GRASS VALLEY WATER DISTRICT

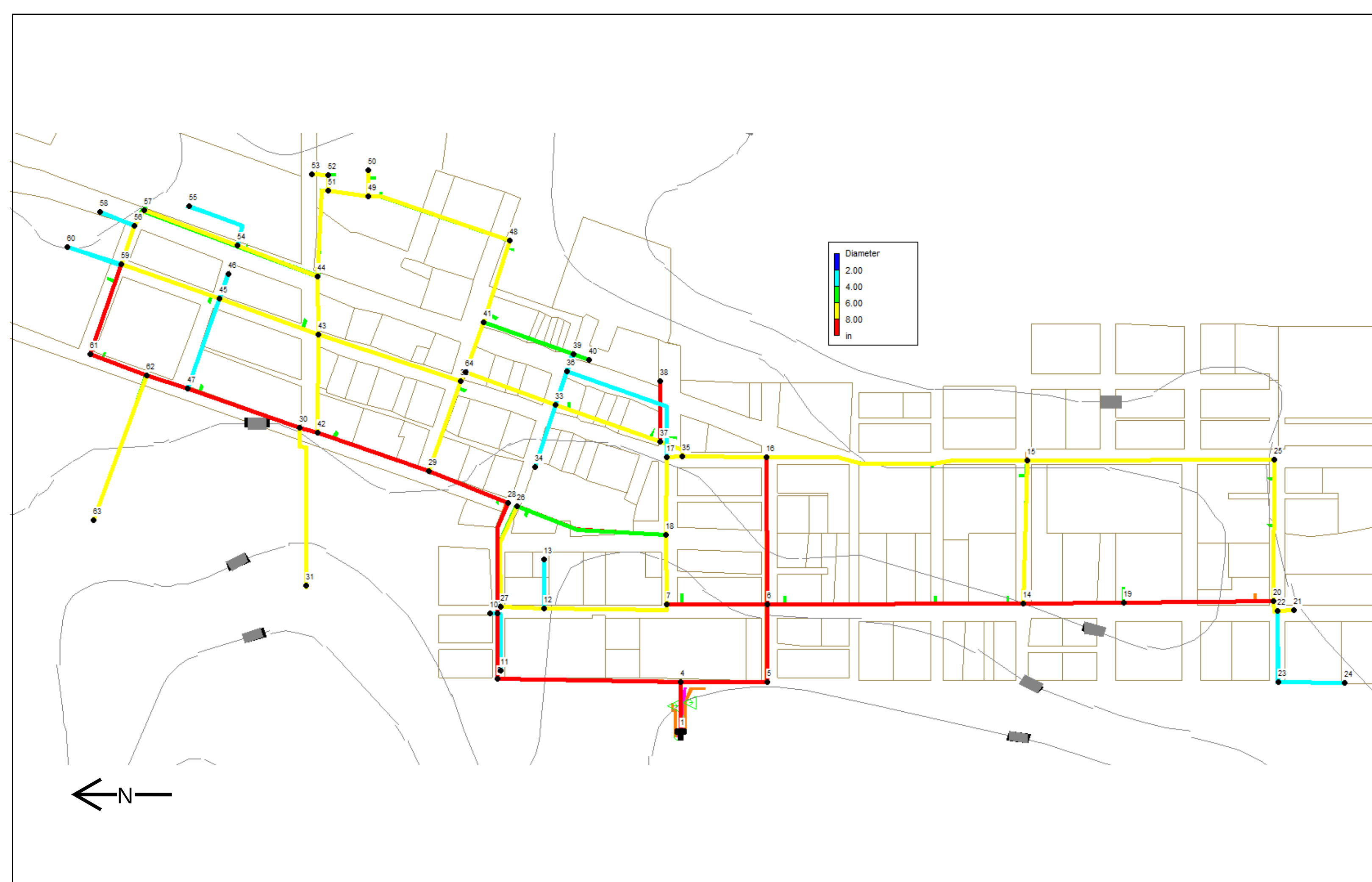
EXISTING WATER SYSTEM 2025

SCALE: 1" = 100'



Appendix 4

EPANET 2 Model Simulation Map



Digital Drive: *Water Master Plan 1998*

Flash Drive in bound report