CITY OF SEBASTOPOL CITY COUNCIL
AGENDA ITEM REPORT FOR MEETING OF: May 5, 2026

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To:	Honorable Mayor and City Councilmembers
From:	Oriana Hart, Public Works Director
	Toni Bertolero, Public Works Engineer
Responsible Department:	Public Works
Subject:	Water Master Plan Update Report

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RECOMMENDATIONS:
That the City Council receive the final draft Water Master Plan Update prepared by GHD, Inc., and provide any comments prior to finalization.

PROCESS OF AGENDA ITEM:

a. Presentation of the agenda item by the Public Works Director
b. Introduction of Consultant
c. Questions and Discussion from Councilmembers
d. Public Comment Period
e. Council Deliberation and Motion

EXECUTIVE SUMMARY:
The City initiated the Water Master Plan Update (CIP #0821-23.09) in March 2025 to update the City's 2005 Water Master Plan and identify near- and long-term capital improvements needed to maintain a reliable and resilient water system. The final draft of the report is now complete and included as Attachment 1.

The updated plan reflects current system conditions and evaluates water supply, storage, distribution, and water quality. It identifies infrastructure deficiencies and operational needs and includes a prioritized list of capital improvement projects with planning-level cost estimates to guide investment over the next 5- and 10-year planning horizons.

The analysis indicates that while the system generally meets current demand, there are localized deficiencies in pressure and fire flow. Much of the system infrastructure is aging and will require phased replacement. The City continues to rely entirely on groundwater sources, with ongoing treatment needs, and the plan identifies a set of capital projects focused on improving reliability, addressing aging assets, and maintaining regulatory compliance.

BACKGROUND
On March 4, 2025, the City Council approved a contract amendment with GHD, Inc. for the preparation of the Water Master Plan Update (CIP #0821-23.09). The scope of work included data collection and review, evaluation of the existing system, development of 5-year and 10-year capital improvement programs, and preparation of an updated master plan report.

Due to limitations with the City's legacy hydraulic model, the update focused on using the City's GIS data, historical leak records, field observations, and fire flow testing to identify infrastructure deficiencies and prioritize improvements. The resulting plan provides a practical and focused approach to system planning in a largely built-out community, where the primary need is replacement of aging infrastructure rather than expansion for growth.

DISCUSSION:
A draft list of capital improvement projects was previously presented to the Budget Committee and City Council, and the final draft report does not include substantive changes to that project list.

STAFF ANALYSIS:
The Water Master Plan Update identifies approximately $10.8 million in recommended capital improvements over the planning horizon based on planning level cost estimates. These projects are primarily focused on addressing aging infrastructure, improving system reliability, and maintaining regulatory compliance.

The recommended projects include:

- Well 4 Replacement
- Pleasant Hill Loop
- Structural Assessment of Existing Water Tanks
- Seismic Retrofit Design for Existing Water Tanks
- Gwendolyn Place Water Service Connection Replacement
- Installation of Automated Flow Meter
- 500 South Main Street Watermain Replacement
- Replacement of Existing Pressure Reducing Valves
- Well 6 Water Treatment System
- Valley View Drive Water Service Connection Replacement
- Covert Lane CI Watermain Replacement
- Ellis Court CI Watermain Replacement
- Installation of Isolation Valves
- Painting and Relining of Existing Water Tanks

While the current Capital Improvement Program includes funding for ongoing water system replacement projects, additional projects identified in the Master Plan will need to be prioritized and incorporated into future CIP cycles.

BUDGET COMMITTEE AND ENTERPRISE FUND OVERSIGHT COMMITTEE: The committees held a joint meeting and received a presentation from the consultant. The committee requested that the consultant include cost estimates for non-routine repairs and items, and provide a prioritized list ranked from highest to lowest need.

CITY COUNCIL GOALS/PRIORITIES/AND OR GENERAL PLAN CONSISTENCY:
This agenda represents the City Council goals/priorities as follows:

- Goal 3 – Infrastructure. Maintaining high quality infrastructure, facilities and services includes repairing/ replacing outdated city facilities, improving streets, stormwater and wastewater infrastructure.

This agenda item represents the City Council General Plan Consistency (if applicable):

- Community Services and Facilities (CSF 1-5). Require development, infrastructure, and long-term planning projects to be consist with all applicable City infrastructure plans, including the Water Master Plan.

FISCAL IMPACT:
There is no immediate fiscal impact associated with receiving and filing the Water Master Plan Update (CIP #0821-23.09).

The Plan identifies approximately $10.8 million in recommended capital improvements over the next 5- to 10-year planning horizon. These projects are not currently fully funded and will need to be prioritized and incorporated into future Capital Improvement Program budgets.

Implementation of these projects is anticipated to be funded through the Water Capital Fund and supported by previously adopted water rate increases. An implementation schedule is outlined in the Water Master Plan.

COMMUNITY OUTREACH:
This item has been noticed in accordance with the Ralph M. Brown Act and was available for public viewing and review at least 72 hours prior to the scheduled meeting date.

As of the writing of this staff report, the City has not received any public comment on this item. However, if staff receives public comment from interested parties following the publication and distribution of this staff report, such comments will be provided to the City Council as supplemental materials before or at the meeting. In addition, public comments may be offered during the public comment portion of this item.

RESTATED RECOMMENDATION:
Receive and file the final draft Water Master Plan Update (CIP #0821-23.09) and provide any comments prior to finalization.

CITY COUNCIL OPTION(S):
City Council can request revision to the draft plan for the projects proposed. Discussion of any projects other than those listed would require a separate agenda item to be returned to a future City Council meeting.

ATTACHMENTS:
1. Final Water Master Plan

APPROVALS:
Department Head Approval: Approval Date: 04/14/2026
CEQA Determination (Planning): Approval Date: 04/14/2026
The proposed action is Exempt from CEQA pursuant to §15306.
Administrative Services (Financial) Approval Date: N/A
Costs authorized in City Approved Budget: ☐ Yes ☐ No ☑ N/A (see Fiscal Analysis)
Account Code (f applicable) _____
City Attorney Approval: Approval Date: N/A
City Manager Approval: Approval Date: 04/21/2026

Water Master Plan Update

City of Sebastopol

April 29, 2026

Project name		City of Sebastopol- Water Master Plan Update					
Document title		Water Master Plan Update | City of Sebastopol					
Project number		12658893					
File name		12658893 - Water Master Plan Update (Final-v2).docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S3	1	Anjali Peter	Abhishek Kumar		Matt Kennedy		
S4	2	Aldon Fung	Abhishek Kumar		Matt Kennedy		
S4	3	Aldon Fung	Abhishek Kumar		Matt Kennedy		4/21/2026
S4	4	Aldon Fung	Abhishek Kumar		Matt Kennedy		4/29/2026
[Status code]							

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Executive Summary

GHD was retained by the City of Sebastopol to update the City's Water System Master Plan. The Master Plan Update consisted of:

- A study of the existing service area and land use plans;
- An assessment of existing water sources, storage, water quality, and distribution;
- An assessment of existing and future water demands;
- The development of a preliminary hydraulic computer model of the existing water distribution system;
- An explanation of water system evaluation criteria;
- An evaluation of the existing and future water distribution, storage, and fire protection system;
- Recommendations for water system improvements;
- An estimation of water system improvement costs.

This Water System Master Plan Update is intended as an instrument for planning water system improvements necessary to provide continued water supply to the City's current and future population.

Given criteria, the City's existing hydraulic model was updated using water production and usage statistics from 2018 to 2024, the General Plan, the Growth Management Ordinance and communication with Public Works and Planning Department staff. The hydraulic model was loaded and adjusted to reflect the City's most recent yearly production data.

The model indicates that, under current conditions, there are a few areas in the City with low water pressure and low fire flows. Not all of these areas can be brought up to standards by increasing line size, but most of the areas can be brought up to standards and all areas can be improved. The report recommends fourteen (14) infrastructure projects, including new pipelines, pipe replacement, and valve and meter installations to address aging infrastructure, increase service pressures, and fire flows, as well as asset data monitoring. Estimates for each of these projects are also provided. These projects are summarized below:

1. Replacement of the City's municipal Well #4 that has groundwater that has been contaminated and is required to be replaced.
2. Pleasant Hill Road water system connection loop from Pleasant Hill Tanks at Lynch Road to the intersection at Pleasant Hill Road at Mitchell Crescent.
3. Study of structural assessment of First Street Tank and Pleasant Hill Tanks.
4. Design for seismic retrofit and construction project for First Street Tank and Pleasant Hill Tanks.
5. Replace approximately 9 existing service connections with ¾-inch diameter HDPE service lateral pipes, along Gwendolyn place from the intersection of Litchfield Avenue.
6. Installation of automated flow meter for the Public Works Yard water filling station tower at Johnson Street to supply potable water to local customers.
7. Replace approximately 215 feet, 8-inch watermain along 500 South Main Street from the intersection of Gravenstein Highway South, south of Walker Avenue.
8. Replacing of the existing pressure reducing valves at Healdsburg Avenue, Fircrest Avenue, and at Dutton and Huntley Avenue.
9. Addition of water treatment system at Well #6 to remove arsenic from the water at the well.
10. Replace approximately 94 water service laterals using approximately 20 feet, ¾-inch diameter HDPE service lateral pipes, along Valley View Drive from the intersection of Ragel Avenue.

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11. Replace approximately 360 feet 6-inch cast iron water line on Covert Lane between Norlee Street and Zimpher Drive.
12. Replace approximately 195 feet 6-inch diameter old cast iron pipe between Ellis Court and High School Road.
13. Installation of valves at different locations for system isolation during repair works at Parquet Street and Litchfield Avenue
14. Painting and relining of First Street Tank and Pleasant Hill Tanks.

The estimated costs of these projects are shown in the table below. The table includes estimated construction costs and total project costs, including design, environmental, administration, and construction management.

Table 1 Estimated Costs of Recommended Projects

Project No./ Priority	Ranking of Importance	Description	Start Year	Construction Cost [1]	Project Cost [2]
1	High	Well 4 Replacement	2027	$2,912,410	$3,352,000
2	High	Pleasant Hill Loop	2027	$750,680	$952,780
3	High	Structural Assessment of Existing Water Tanks	2027	N/A	$126,000
4	High	Seismic Retrofit Study for Existing Water Tanks	2027	N/A	$141,750
5	High	Gwendolyn Place Water Service Connection Replacement	2027	$57,690	$73,240
6	High	Installation of Automated Flow Meter	2027	$58,640	$74,430
7	High	500 South Main Street Watermain Replacement	2027	$120,110	$152,460
8	High	Replacement of Existing Pressure Reducing Valves	2027	$202,350	$256,830
9	Medium	Well 6 Water Treatment System	2030	$3,323,570	$3,635,700
10	Medium	Valley View Drive Water Service Connection Replacement	2030	$605,200	$682,870
11	Medium	Covert Lane CI Watermain Replacement	2030	$210,190	$237,190
12	Medium	Ellis Court CI Watermain Replacement	2030	$125,440	$141,550
13	Low	Installation of Isolation Valves	2032	$148,500	$154,930
14	Low	Painting and Relining of Existing Water Tanks	2032	$894,900	$827,490
			Total	**$9,409,680**	**$10,809,220**

Notes:
[1] Considered construction cost with inflation or 4% annual escalation.
[2] Included soft cost and construction cost without inflation or 4% annual escalation

This report is subject to, and must be read in conjunction with, the limitations set out in Section 1 and the assumptions and qualifications contained throughout the Report.

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1. Introduction

This report presents a comprehensive study of the City of Sebastopol's water supply, storage, and distribution system. It represents the latest in a series of studies conducted to establish the effects of existing and long-range demands on the system. The following sub-sections provide a modified history of the water system and background information regarding the development of this report.

1.1 Background

The City of Sebastopol (City) owns, operates, and maintains approximately 38 miles of water mains and pipelines, three (3) storage facilities, one (1) booster pump station, one (1) blending pump station, four (4) active groundwater wells, one (1) granular activated carbon treatment system, and two (2) arsenic treatment systems to produce, treat, and distribute water to the City's water customers. **Figure 1** shows the limits of the City of Sebastopol – the study area.

The City had identified the need to update its Water Master Plan, initially completed in 2005. Since the previous master plan study, most system improvements have focused on serving limited new developments within the City limits and replacing aging infrastructure that requires the most frequent repair. The City is mostly developed, and little new development potential remains that will draw new demand. The City's water infrastructure, particularly pipelines and services, is aging and in need of renewal. Because the City is mostly developed, meeting new and growing demands is less of a concern. The hydraulic capacity to meet water demands and fire flows was checked, and improvements to meet them identified. Leveraging the recently completed water GIS enables a focused effort on capital projects that address aging infrastructure.

1.2 Aims and Objectives

This study aims to evaluate whether the City's existing water infrastructure can meet water demands and fire flows in the existing and future horizons. To address this, the objective is to review and analyze the water supply sources, storage capabilities, and distribution capacity of the water system that the City owns and maintains for domestic, commercial, and firefighting uses. This study identifies system deficiencies and outlines existing system improvements necessary to meet current and 30-year projected demands (for the year 2045). From this information, improvement projects, costs, and construction phasing are addressed.

1.3 Master Plan Update

The efforts undertaken in this master plan update are as follows:

- Update the current Master Water Plan.
- Update the City's water distribution system hydraulic model.
- Simulate pressure and available fire flow for the City's water distribution system.
- Analyze and identify solutions to remedy current system deficiencies.
- Analyze future demands, treatment, storage needs, and distribution modifications to support the build-out of the City.
- Develop recommended improvement projects.
- Provide cost estimates for all identified improvement projects.

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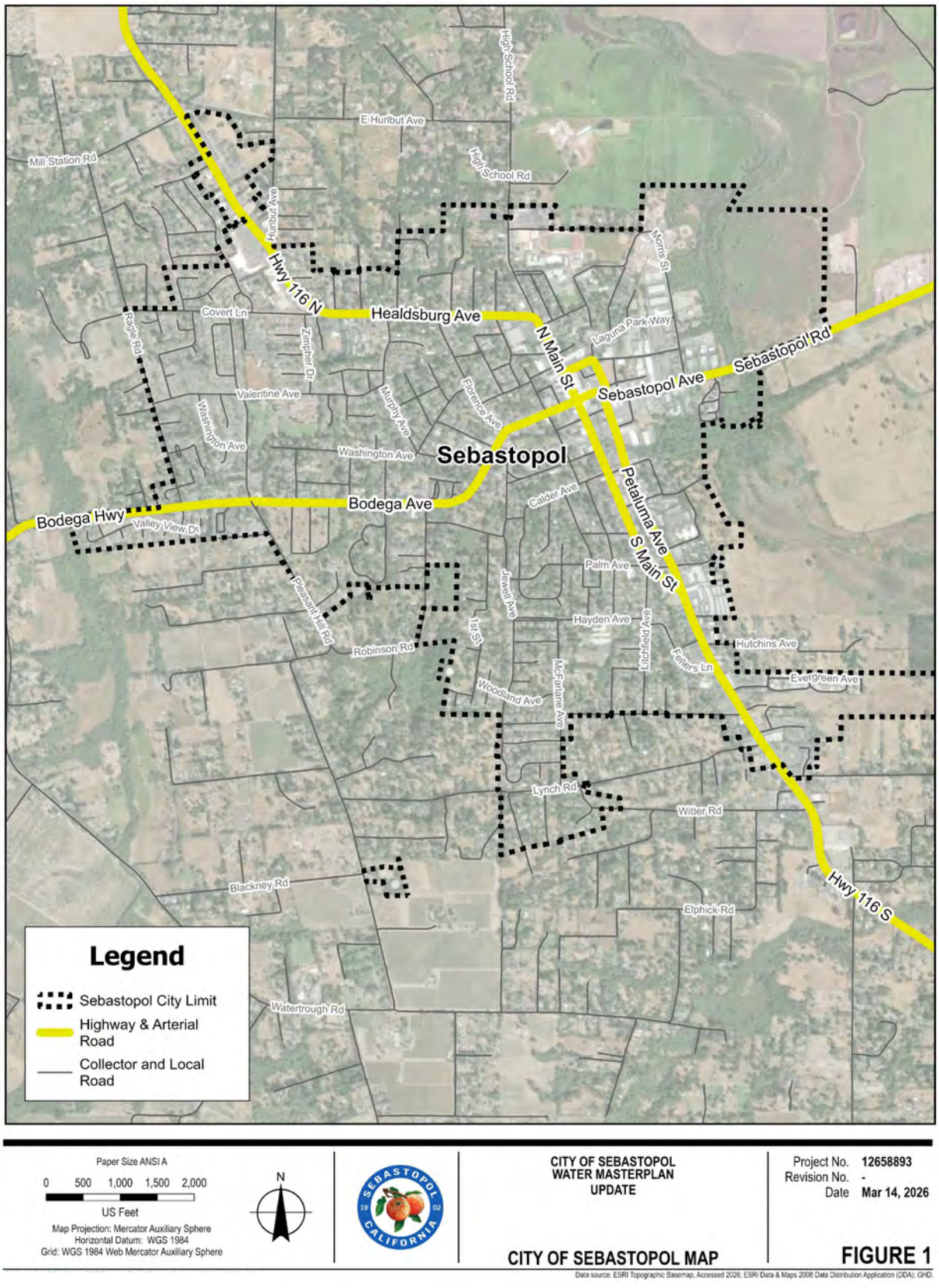

Figure 1 *Study area*

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1.4 Conduct of Study

The information developed in this report is based on data provided by the City, including existing water demand, water production, reports, maps, utility information, and fire flow test data. The City's operational staff identified problem areas within the water system that required attention to address aging infrastructure, redundancy, and performance of the existing water system.

Surface elevations were obtained from the digital terrain model (DTM) in the Sonoma Countywide Lidar Products, produced by NV5 Geospatial and Tukman Geospatial, and transferred to the hydraulic modelling program.

U.S. Census data were used to determine the projected population densities within the City and the projected water needs for the land uses. The projected water requirements and flows were evaluated to determine the adequacy of water main sizes, pump station sizes, and storage facilities for current and future conditions. Hydraulic modelling of the distribution system was performed for each of the two pressure zones based on maximum hour demands and fire flow events. Fire flow criteria were based on the minimum fire flow requirement as suggested in the 2025 California Fire Code.

Facility improvement projects with implementation plans required to meet current and future storage demands and production needs are recommended. The capital costs required for these improvements are presented as part of this report.

Sections 2, 3, and 4 of this report discuss the study area, the existing water supply, storage, and distribution system, the development of projected water demands the generation of computer model analysis. Sections 5, 6, and 7 discuss the results of hydraulic modelling, recommended system improvements, costs, and phasing.

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2. Study Area and Existing Water System

This section describes the Sebastopol Municipal Water System (SMWS) service area, the status of land use planning for the area, and the SMWS distribution system.

2.1 Existing Service Area and Land Use Plans

The City of Sebastopol is a semi-urban incorporated community located in western Sonoma County, approximately 50 miles north of San Francisco and 7 miles west of Santa Rosa. The area is bounded by the Laguna De Santa Rosa to the west and Atascadero Creek to the east. Highway 12 and Bodega Avenue are the main transportation corridors and bisect the community into north-south quadrants. Highway 116 bisects the community into east-west quadrants.

Appendix A shows the City's land-use map as provided in the General Plan. The commercial areas are generally located along the Highway 116 corridor, with the majority of commercial and industrial space in the northeast quadrant of the City. The remaining areas are primarily residential with a scattering of parks and institutional land use for schools.

The City owns, operates, and maintains the SMWS under permit from the State of California, Water Resources Control Board, Division of Drinking Water (DDW). The City's sole source of drinking water comes from four (4) wells that distribute water to two (2) pressure zones. A fifth well remains offline at this time due to detected amounts of soil contamination from perchloroethylene (PCE).

2.1.1 Land Use Plans

Land use planning for the service area is performed under the auspices of the City's Planning Commission, Planning Department, the Design Review Board, citizen committees, and the Sonoma County Local Agency Formation Commission (LAFCO), as detailed in the General Plan.

The officially recognized General Plan was adopted in 1994 with updates in 1995, 1996, 1998, 2003, and 2016. The Housing Element, which is a required component of the General Plan, was separately updated, and adopted on January 3, 2023 to comply with California's Sixth Cycle housing requirements. Consistent with the goals outlined in the General Plan, the City has adopted measures to limit urban sprawl by reducing the City's Sphere of Influence (SOI) and by encouraging infill, a means of concentrating new development within the City limits. The community, in agreement with these ideals, adopted the Urban Growth Boundary (UGB) Measure (Measure O) in 1996, which extended the UGB through December 31, 2040. In essence, Measure O prohibits additions to the SOI by the City Council for a period of 20 years unless they are endorsed by voters' approval.

In keeping with the General Plan, the City adopted a Growth Management Ordinance (GMO) which established maximum allowable growth rates based on the community's ability to provide key resources (water, wastewater, roads, and schools, for example). This ordinance, which limited the number of new residential units to 50 per year and total residential allocations to 750 residential units through 2035, was rendered invalid as of January 1, 2020 with the passage of Senate Bill (SB) 330, the Housing Crisis Act.

The General Plan November 15, 2016, also establishes level of service (LOS) standards for all utilities including the water system. Each year since 2016 the City publishes an LOS report that includes annual statistics for water usage and outlines studies and improvements to the system. However, there has not been an annual LOS Report published for the last few years because the requirement for the annual LOS Report was contained within the GMO, and since the GMO was rendered invalid, so too was the requirement for an Annual LOS Report.

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2.2 Zoning and General Plan's Land Use Designation

As mentioned in the previous section, the City of Sebastopol General Plan establishes land use designations for all areas within the SOI. These designations establish the City's zoning regulations as described in the Zoning Ordinance and as illustrated in the Land Use Designations Map. The map in **Appendix A** reflects current zoning within the City's SOI, in accordance with the 2016 General Plan. The eleven (11) land use zones identified on this map include Open Space, Parks, Community Facilities, Very Low Density Residential, Medium Density Residential, High Density Residential, General Commercial, Office, Downtown Core, Light Industrial, and Office/Light Industrial.

2.3 Existing Water System

To map a course for future improvements to the City's water system, it is vital to evaluate the development and level of service of the existing system, identify existing deficiencies, and develop alternatives to remedy them. Refer to **Figure 2** for the map of the City's existing water system

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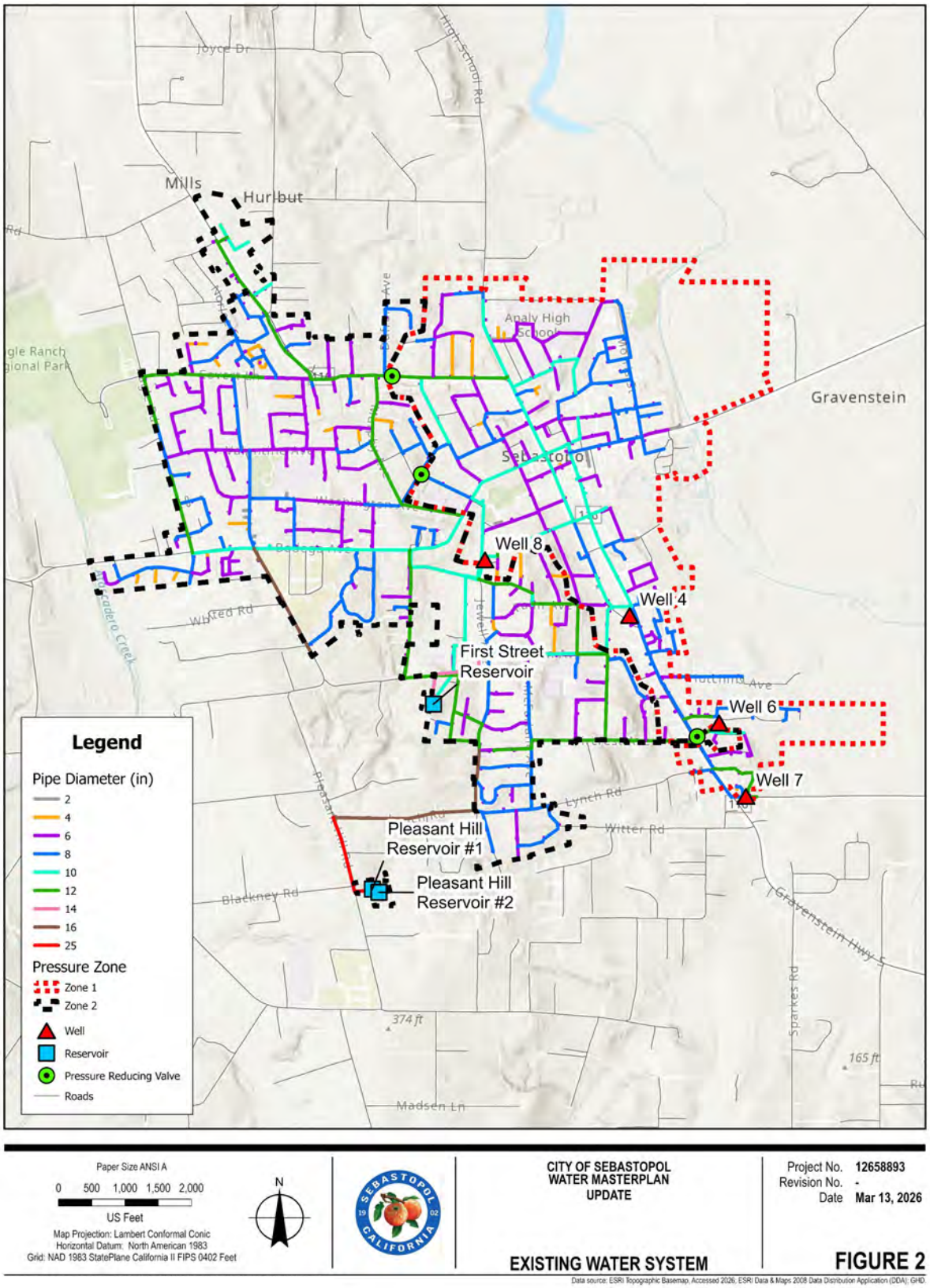

Figure 2 *Existing Water System*

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2.3.1 Historical Development

The City's first water came from Calder Creek, a tributary that traverses diagonally from the southwest corner of the City through Ives Park. Water was pumped to a reservoir that at one time resided on Parquet Hill, and it was distributed through the City water system. Over time, new reservoirs were built: Pleasant Hill Reservoir 1 (1979, 3 million gallons), Pleasant Hill Reservoir 2 (1986, 3 million gallons), and First Street Reservoir (1994, 1.5 million gallons). The Pleasant Hill reservoirs serve higher-elevation areas, while the First Street Reservoir serves lower-elevation areas.

Wells #4 (1953) and 7 (1996) supply water to Pressure Zone 1 with the average annual production of 157 million gallons (MG) and 89.5 MG, respectively. Wells #6 (1968) and #8 (2007) supply water to Pressure Zone 2 with the average annual production of 26.5 MG and 44.5 MG. Well #3 was drilled around 1950 yet succumbed to settlement shortly after commission. Well #5 was drilled in 1960 but is shut down because of groundwater contamination.

Table 2 summarizes the information of the reservoirs and wells in the City.

Table 2 Summary of Reservoirs and Wells in the City.

Asset Type	Asset Name	Location	Year of Construction	Current Status	Storage Capacity (for Reservoir)/ Average Annual Production (for Wells)
Reservoir	Pleasant Hill Reservoir 1	1281 Pleasant Hill Road	1979	In service	3 million gallons (MG)
	Pleasant Hill Reservoir 2	1281 Pleasant Hill Road	1986	In service	3 MG
	First Street Reservoir	976 Mackey Court	1994	In service	1.5 MG
Well	Well #3	Unknown	1950s	Removed	N/A
	Well #4	710 Petaluma Avenue	1953	In service	150 MG
	Well #5	6848 Fannen Avenue	1960	Not in service due to groundwater contamination	N/A
	Well #6	991 Gravenstein Highway	1968	In service	19 MG
	Well #7	1157 Village Way	1996	In service	83 MG
	Well #8	351 Jewell Avenue	2007	In service	59 MG

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2.3.2 Existing Water Demands

Based on metered sales by connection class, the annual average water billed for 2018 through 2024 is 290 MG, or 552 gallons per minute (GPM). This amount includes residential, commercial, industrial, irrigation, and other water uses, excluding water losses. The average per capita usage for the City including all users from 2018 to 2024 is 104 gallons per capita per day (GPCD). The average water usage for different user categories from 2018 to 2024 is presented in **Table 3**.

Table 3 Annual Average Water Demand Based on Sales Data for the Year 2018-2024

Parameter (Type of User)	Parameter Value
Residential Annual Average Water Demand	193 MG
Commercial Annual Average Water Demand	65 MG
Irrigation Annual Average Water Demand	26 MG
Other Users Annual Average Water Demand	5 MG
Average per capita usage for the City including all users	104 GPCD

Planning future water consumption based on current water use patterns requires making engineering assumptions. These assumptions include evaluating calculated versus reported consumption, changing demographics, and conservation efforts.

To evaluate future water usage and required system upgrades, seasonal peaking factors and fire flow demands are applied to average water usage. Further discussion on these issues is discussed in **Section 4**.

2.3.3 Existing Water Sources

The City obtains all its drinking water from four (4) wells that pump groundwater from depths ranging from 580 to 1,015 feet below ground level. These wells are located approximately one-quarter mile west of the Laguna de Santa Rosa, a tributary of the Russian River. The principal recharge area for the City wells comes from the Wilson Grove Formation located in the hills west of the City, with additional recharge from the east. **Figure 3** shows the map of the groundwater basins in Santa Rosa Plains area, including Wilson Grove Formation. Chlorine is added to the water at each well site to maintain protective disinfection residual levels in the distribution system and prevent microbial contamination.

A fifth well, Well #5, remains offline at present due to detected quantities of PCE exceeding the maximum standards established by the California Code of Regulations. Well data are outlined in **Table 4**.

The City's water system supplies water to two (2) separate pressure zones (i.e., Pressure Zones 1 and 2), a description of which will be addressed in the next sub-section. Two (2) of the wells, Well #4 and Well #7, pump water to the First Street Reservoir, which supplies water to customers in Pressure Zone 1 by gravity. Wells #2 and #6 pump water to the Pleasant Hill Reservoirs, which supplies water to the distribution system of Pressure Zone 2 by gravity. **Figure 4** shows the location of the wells and the corresponding reservoirs they supply to.

The City's only source of water is supplied by the four (4) functioning wells; thus, it is necessary to track groundwater levels over time. If water levels decline, it could indicate a decrease in aquifer supply.

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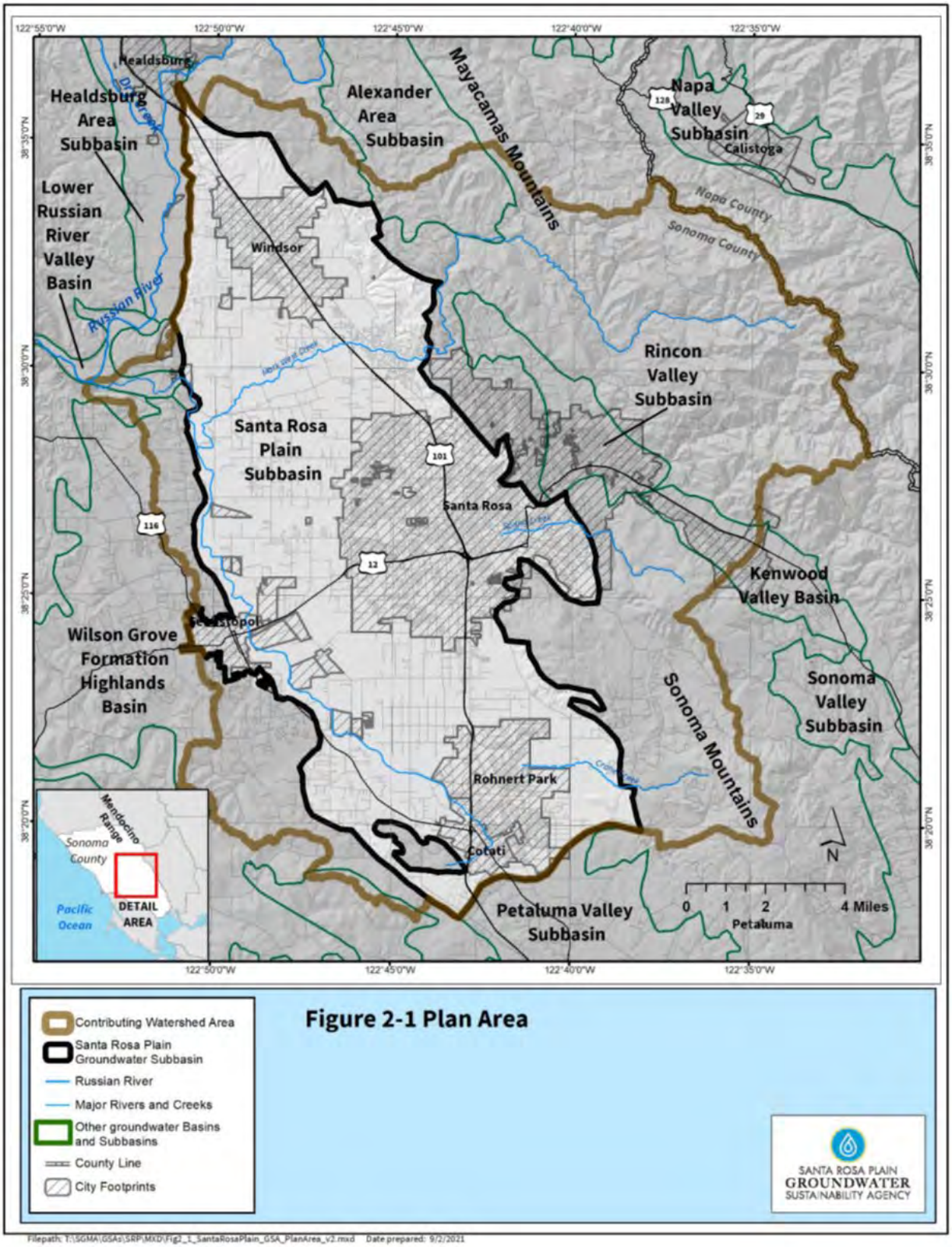

Figure 3 *Santa Rosa Plain Groundwater Basins Map*

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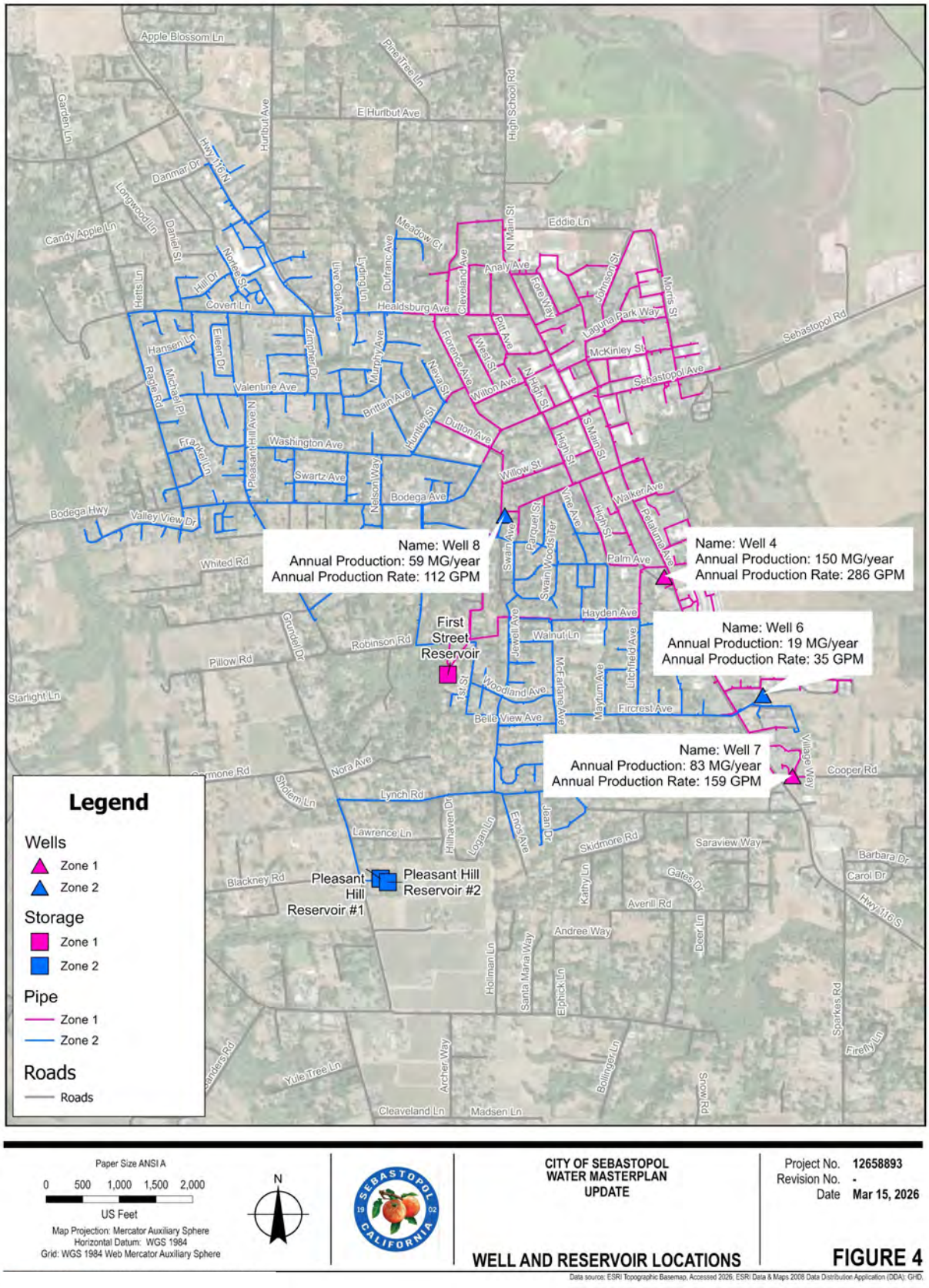

Figure 4 *Well and reservoir locations.*

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Table 4 Well Data

Well #	Pressure Zone	Diameter (inches)	Depth (feet)	Well Pump Set Depth (feet)	Annual Average Production (MG)	Annual Average Production Rate (GPM)	Location	Year of Construction
4	1	14	775	250	150	286	710 Petaluma Avenue	1953
7		8	710	440	83	159	1157 Village Way	1996
8	2	14	580	400	59	112	351 Jewel Avenue	2007
6		14	1,015	220	19	35	991 Gravenstein Highway	1968

Based on water production data for 2018 to 2024, the annual average water production and production rate from the four (4) wells in the City are 311 MG and 592 GPM, respectively.

Figure 5 through **Figure 8** shows the City's rainfall data and the minimum and maximum depth of groundwater from the top of casing for Well #4, Well #6, Well #7, and Well #8. The groundwater level data is collected quarterly and/or annually by service providers including PES Environmental Inc. and NV5. The data is eventually provided by the City. Please note that **Figure 5** through **Figure 8** do not show the groundwater level data in 2024 since it is provided as groundwater elevation (feet) msl, i.e., mean sea level, instead. The figures show that the groundwater level for all four (4) wells has been stable since 2018.

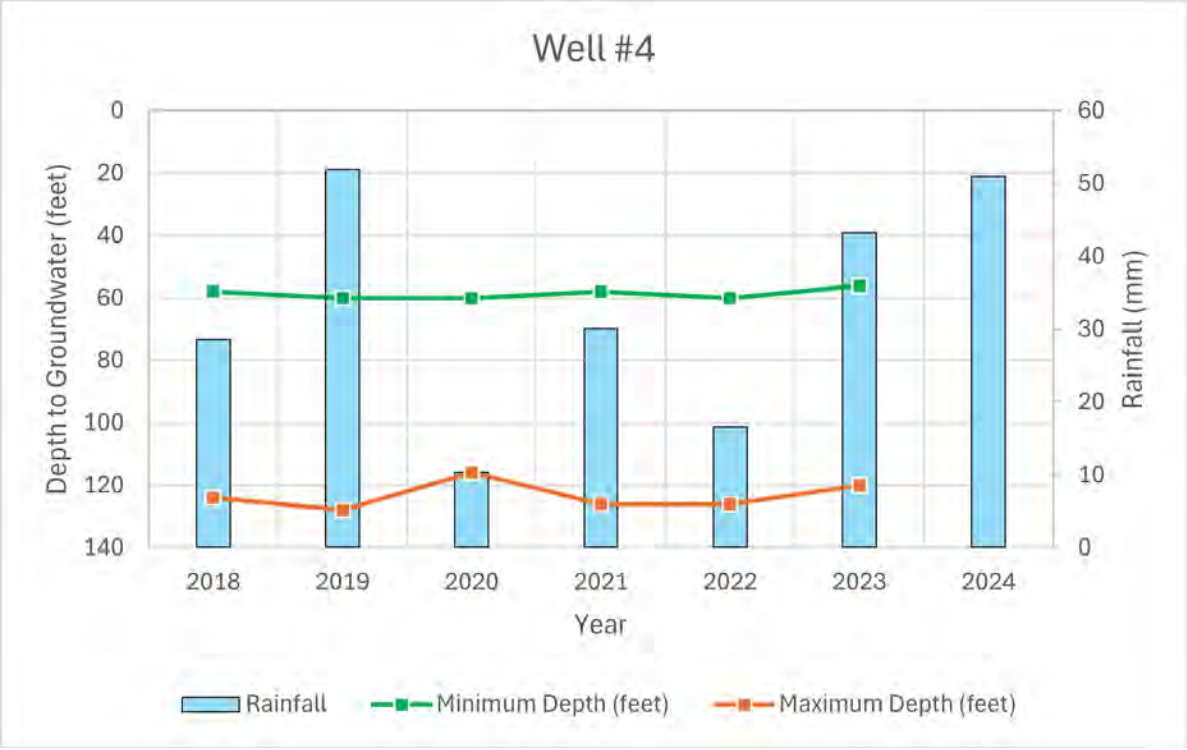

Figure 5 Well #4 levels.

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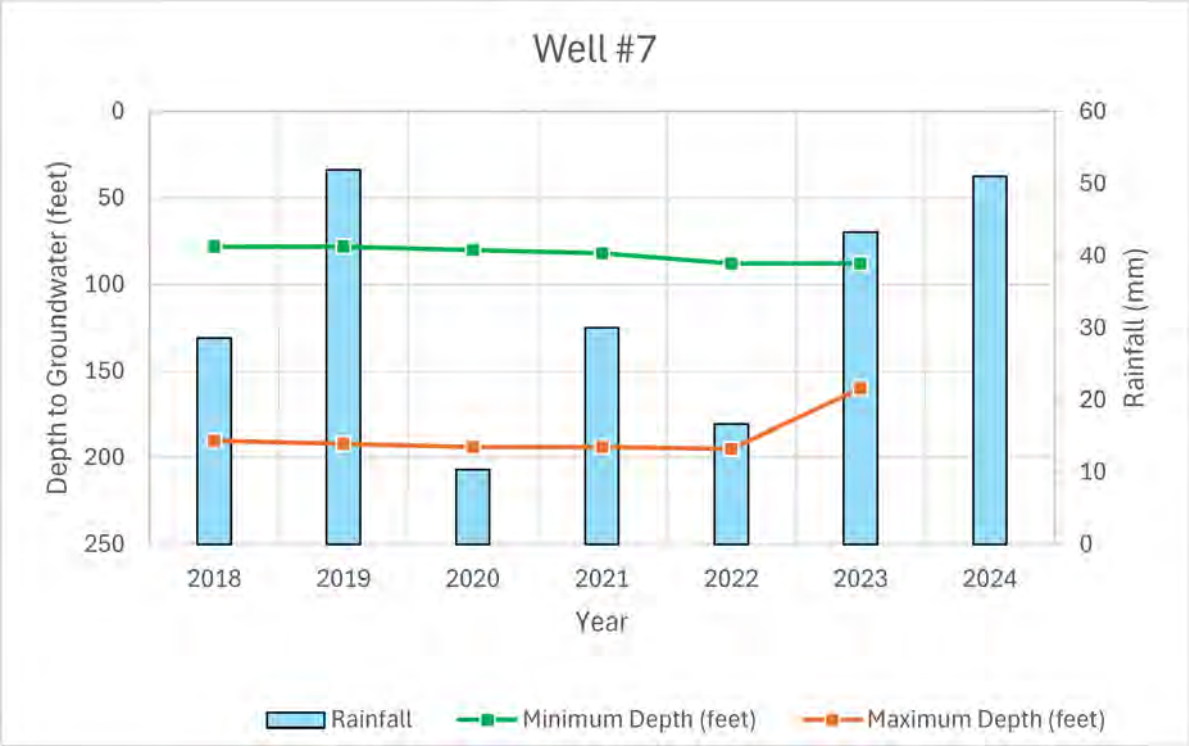

Figure 6 ***Well #7 levels.***

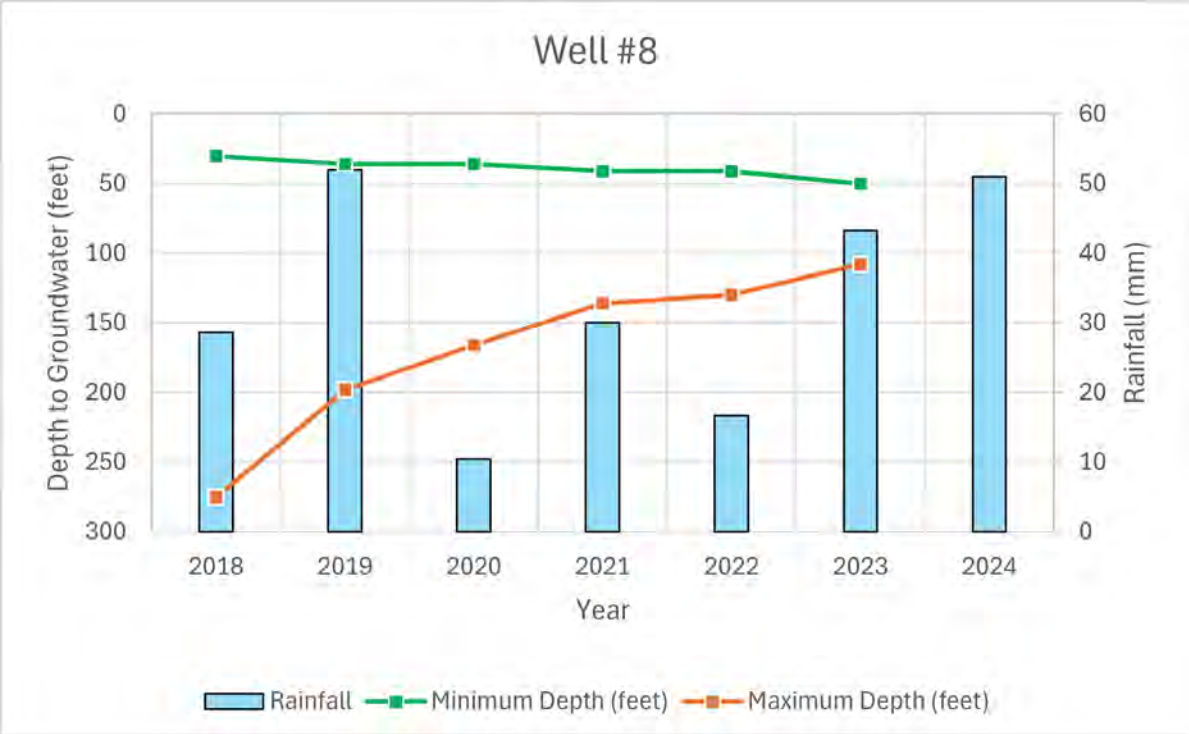

Figure 7 ***Well #8 levels.***

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Figure 8 ***Well #6 levels.***

2.3.4 Raw Water Quality

The City's municipal water supply faces notable water-quality challenges, primarily associated with arsenic and PCE contamination in several of its groundwater wells. The City's wells (4, 6, 7, and 8) draw from the Wilson Grove Formation, a volcanic aquifer known to naturally release low levels of arsenic. Although this arsenic is geogenic, it remains a potential carcinogen. Consequently, the City of Sebastopol employs treatment and dilution strategies to ensure compliance with regulatory standards. These strategies include blending water from higher-arsenic wells with lower-arsenic sources and using ferric oxide treatment media with pH adjustment to reduce arsenic concentrations.

In addition to arsenic concerns, PCE, a volatile organic compound widely used in dry-cleaning operations, has been detected in Well #4. Based on the City's Operational staff, some amount of arsenic is also detected in Wells #6 and #7. To address this issue, Well #4 is equipped with a granular activated carbon (GAC) filtration system, composed of coconut-shell based carbon, which effectively removes PCE prior to distribution. Because PCE is classified as a potential human carcinogen, its presence has necessitated both immediate remediation efforts and long-term infrastructure planning. **Table 5** shows the water source issues and projects in the City, and their current status.

Regulatory requirements play a central role in the city's response to these contaminants. Under California's drinking water regulations, the maximum contaminant level (MCL) for arsenic is 10 parts per billion (ppb) or micrograms per liter (µg/L), consistent with the federal standard. Sebastopol's monitoring data indicate that arsenic levels average approximately 4 µg/L, remain below this limit.

The City is also subject to statewide water source protection mandates. A Drinking Water Source Assessment conducted under California's Source Water Protection Program identified Sebastopol's wells as vulnerable to contamination from nearby dry-cleaning operations, gas stations, and older underground storage tanks. In accordance with the Porter-Cologne Water Quality Control Act, both the California State Water Resources Control Board and the North Coast Regional Water Quality Control Board oversee cleanup and monitoring activities, including remediation at the former dry-cleaning site at 580 Gravenstein Highway North. In 2021, the City and the responsible parties of the

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former dry-cleaning site entered into a settlement agreement for paying the City's costs for treating the PCE at Well #4.

Overall, although Sebastopol's drinking water currently meets applicable state and federal standards, the presence of arsenic and PCE combined with the City's aging water infrastructure necessitates ongoing treatment, vigilant monitoring, and sustained capital investment to ensure continued protection of public health and long-term regulatory compliance.

Table 5 Water Source Issues and Studies

Project	Contaminant(s) of Concern	Course of Action	Status
Well #4 Treatment Facility	PCE	– Granular Activated Carbon (GAC), Disinfection – Replacement of Well 4	A third-party hired by the City is currently conducting the replacement.
Well #6 Arsenic Investigations	Arsenic in the form of As(V)	– Arsenic testing and remediation – Lending and disinfection – Blending with Zone 1 to reduce contaminants	Ongoing
Well #7 Treatment Facility	Arsenic in the form of As(III)	– Packer Plug installed to seal off upper screens – Carbon dioxide pH adjustments – Granular ferric oxide media – Disinfection	Ongoing
Well #8 Treatment Facility	None	– Disinfection	Ongoing
Groundwater Management / Wellhead		– USGS groundwater availability study	Ongoing

2.3.5 Existing Transmission and Distribution System

The City's water distribution system network comprises over 38 miles (202,381 ft) of pipe, up to 24 inches in diameter. Pipe materials include asbestos cement, ductile iron, cast iron, and polyvinyl chloride (PVC). The existing distribution facilities are shown on the Water System Map in **Figure 2**, and an inventory of the distribution system is tabulated in **Table 6** and **Table 7**. Watermains are listed by material, size, and year constructed.

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Table 6 Pipe Lengths by Materials

Pipe Material/ Length (ft)	Pipe Diameter (inch)									Total Length (ft)
	2	4	6	8	10	12	14	16	25	
Asbestos Cement	339	3,207	23,635	13,288	3,673	11,353		958		56,454
Cast Iron			562		26					588
Concrete		2	432							435
Ductile Iron	649	4,166	42,969	44,269	23,891	14,244	1,428	4,056	1,720	137,393
Polyvinyl Chloride (PVC)			1,634	1,187	539					3,360
Steel			36	806						842
Unknown	100		1,001	7	109	2,095				3,311
Total length by diameter (feet)	1,088	7,375	70,269	59,557	28,238	27,692	1,428	5,014	1,720	202,381

Table 7 Pipe Lengths by Year

Year/ Length (ft)	Pipe Diameter (inch)									Total Length (ft)
	2	4	6	8	10	12	14	16	25	
Unknown	100		1,554	73	105	3,709			93	5,634
1930			20							20
1965			2,359							2,359
1966			567							567
1967		127	1,764	1,678	3,727	432				7,728
1968		430	1,378		2,613	7,271				11,692
1969			493							493
1970		285	10,145	1,258	6,325					18,014
1971			14	277						291
1972			1,236	1,798						3,034
1973	254	334	39	1,431						2,058
1974		647	5,727	5,370	4,180					15,924
1975		729	4,688	3,004	4,012					12,433
1976			529	1,426		376				2,330
1977	85		3,715	1,443						5,243
1978	258	1,837	9,276	3,775	3,234	2,300				20,680
1979		100	3,503	1,930	125	3,726	4	3,100	1,627	14,115

Year/ Length (ft)	Pipe Diameter (inch)									Total Length (ft)
	2	4	6	8	10	12	14	16	25	
1980			1,025	294						1,320
1981			495							495
1982		778	1,069	1,455		971				4,272
1983			43	135						178
1984			199	3,406		1,230				4,835
1985	267		3,614	1,558	1,416	1,938				8,793
1986		1,311	4,339	1,299	490	2,572				10,010
1987	78		4,579	2,659	548	963		1,914		10,741
1988			1,843	1,887						3,730
1989			419	1,401						1,821
1990	46	37	1,715	7,764	1,081	1,698				12,340
1991		202	92	1,617		11	1,424			3,346
1992			181	4,826						5,007
1997			1,378	289		4				1,671
1998			54	988						1,042
1999			532	348		27				907
2001			233	688						921
2003			115	3,490						3,605
2007			690							690
2012			335	1,991						2,326
2017						463				463
2023		559	311		383					1,253

In 1968, the water network system was separated into two (2) pressure zones. Pressure Zone 1 customers are located in the eastern portion of the City and consist mostly of commercial users. Zone 2 customers reside at elevations exceeding approximately 130 ft above sea level.

The two (2) pressure zones are separated by three pressure regulating valves located at 1) Healdsburg Avenue, 2) Dutton and Huntley Avenue, and 3) Fircrest Avenue. These valves serve as inter-ties between the two zones. Based on a field visit conducted by GHD with City staff, the pressure-reducing valves are not operational.

Three (3) storage reservoirs serve the City's two (2) pressure zones. They serve to provide water storage for emergencies, to meet peak demand during maximum demand periods (usually July or August) and to maintain hydraulic stability. The total capacity of these tanks is 7.5 million gallons (MG). The details of the reservoirs are presented in **Table 8**.

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Table 8 Existing Reservoir Details

Name of Facility	Number of Tanks	Floor Elevation (ft)	Pressure Zone	Volume (MG)	Total Volume (MG)
First Street Reservoir	1	225	Zone 1-Low Zone	1.5	1.5
Pleasant Hill Reservoirs	2	306	Zone 2-High Zone	3.0	6.0

The First Street reservoir, located on First Street, was constructed in 1991 and serves Pressure Zone 1, the lower elevation of the City. It is an epoxy-coated, welded steel tank, with a concrete slab-on-grade foundation and a capacity of 1.5 MG.

The Pleasant Hill reservoirs are located southwest of the City and were constructed in 1979 and 1986. They have a combined capacity of 6 MG. Like the First Street reservoir, these are also welded steel tanks. The older reservoir has a tar-coated interior; the newer reservoir is epoxy-coated.

The Pleasant Hill reservoirs supply the higher elevations of the City's Zone 2 via gravity, whereas the low elevations of the City's Pressure Zone 1 are supplied by the First Street Reservoir.

The water wells pump directly into the distribution system. When water production surpasses demand, the excess is directed into the reservoir for storage.

Based on field visits, the water well pumps are working based on the water level in the reservoirs. The set points of tank level that triggers the operation of wet well pumps are close implying that the tanks level do not draw much and the water is supplied to the distribution system mainly by the water well pumps. The water stored in the reservoirs is utilized for emergency conditions and to supplement during peak hour demands.

2.4 Santa Rosa Plain Groundwater Sustainability Agency

The Santa Rosa Plain Groundwater Sustainability Agency (GSA) is a public agency formed in 2017 under California's Sustainable Groundwater Management Act (SGMA) to sustainably manage groundwater in the Santa Rosa Plain groundwater basin over a 20-year horizon. The agency has a Board of Directors, an Administrator, and an Advisory Committee.

The Wilson Grove Formation Highlands Basin, from which Sebastopol obtains its groundwater supply, lies entirely within the Santa Rosa Plain Subbasin. Sebastopol became a member agency of the GSA in 2019, signing the Joint Powers Agreement and assuming financial obligations for participation. Sebastopol's groundwater planning is fully integrated with GSA's GSP, ensuring compliance with SGMA. Sebastopol has representation on the GSA Board and Advisory Committee, influencing regional groundwater policy. Sebastopol also contributes to GSA funding through groundwater pumping fees. These fees support basin monitoring, data collection, and implementation of sustainability projects.

The GSA developed a Groundwater Sustainability Plan (GSP) for the Santa Rosa Plain Subbasin. The GSP was submitted to the California Department of Water Resources (DWR) in January 2022 and approved on January 26, 2023. The GSP sets measurable objectives to avoid undesirable results such as chronic lowering of groundwater levels, seawater intrusion, degraded water quality, and land subsidence. The GSP establishes a standard for sustainability of groundwater management and use and determines how the basin will achieve this standard by 2042.

The GSP sets measurable objectives and minimum thresholds for six sustainability indicators:

- Groundwater Levels:
  - Avoid chronic lowering of water tables.
  - Minimum thresholds based on historical low levels and protective depths for municipal wells.
- Groundwater Storage:
  - Maintain sufficient storage to meet long-term demands and drought resilience.

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- Water Quality:
  - Prevent degradation of drinking water quality (e.g., arsenic, nitrates, TDS).
- Land Subsidence:
  - No significant subsidence that damages infrastructure.
- Seawater Intrusion:
  - Not applicable for Sebastopol (inland basin).
- Surface Water Depletion:
  - Protect interconnected streams and ecosystems from excessive pumping.

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3. Development of the Water System Model

A Bentley WaterGEMS water system hydraulic model was created utilizing the City's water GIS data. All the layers from the GIS were imported to develop the base model. The connectivity of the base model was verified against the GIS layers and the hydraulic model previously developed as part of the original 2005 Water Master Plan. The following details the development of the water model used for this study:

- Model junctions were placed at the intersections of pipelines. These are imaginary points in a computer model where pipes connect with each other, where water is used and where pressures are calculated.
- Pressure-regulating valves at pressure zone intersections were added to isolate the two zones as in the real system.
- Nodes were assigned with elevations obtained from the DTM in the Sonoma Countywide Lidar Products and applying a cover of 4.9 ft.
- Pipes were assigned the following attributes:
  - Diameter
  - Length
  - Year installed
  - Material type
  - Hazen-Williams C-factor
- Supply was modelled as:
  - Water wells were modelled as reservoirs with no pumps in the absence of pump data
  - Reservoirs were modelled as tanks with water level obtained from field data.
- Water demand in the model was assigned uniformly across nodes based on water production data to account for losses and non-revenue water in the system.

It is important to note that pressures and flows modeled for master plan purposes are not appropriate for direct use in development or construction projects. Each project should be evaluated on a case-by-case basis using good engineering judgment and sound engineering principles.

3.1 Assumptions and Limitations

The following assumptions were made when developing the water network model.

- The elevation of the junctions, base elevation of reservoirs was obtained from topographic data. A cover of 4.9 ft was applied to all the junctions in the model.
- The elevation of hydrants was modelled at 1.6 ft above the ground surface.
- In the absence of wet well pump details, such as pump curves or pump models, and of data on wet well water levels, the wet wells were modelled as reservoirs without pumps. In the future, it is recommended that the pumps be included in the model to reflect the actual working conditions of the pumps in the field.
- In the absence of SCADA data for the tanks, the minimum and maximum water levels were based on details obtained from a field visit. The operating level of water was adjusted to match field observed pressure in the system.
- In the absence of demand data, the demand in the model was uniformly applied across all the nodes. The demand was calculated based on water production data obtained from the City for the years 2018 to 2024.

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3.2 Steady-state Calibration

The hydraulic model was calibrated using hydrant flow test results collected in the field on July 14, 2025. A total of twenty (20) hydrant flow tests were performed (see **Appendix B** for their locations). In addition, three (3) previous hydrant flow tests completed in 2024 were incorporated to verify the southern portion of the network, as no recent hydrant testing had been conducted in that area.

The calibration results and corresponding deviations between the model results and field measurements are provided in **Table 9**. **Figure 9** shows the location of the hydrants used for calibration. Comparison of the model results against field data indicates that the deviation in static pressure between modelled and measured values generally falls within ±5 psi at all locations, except for one hydrant, where the model closely reflects the observed field conditions.

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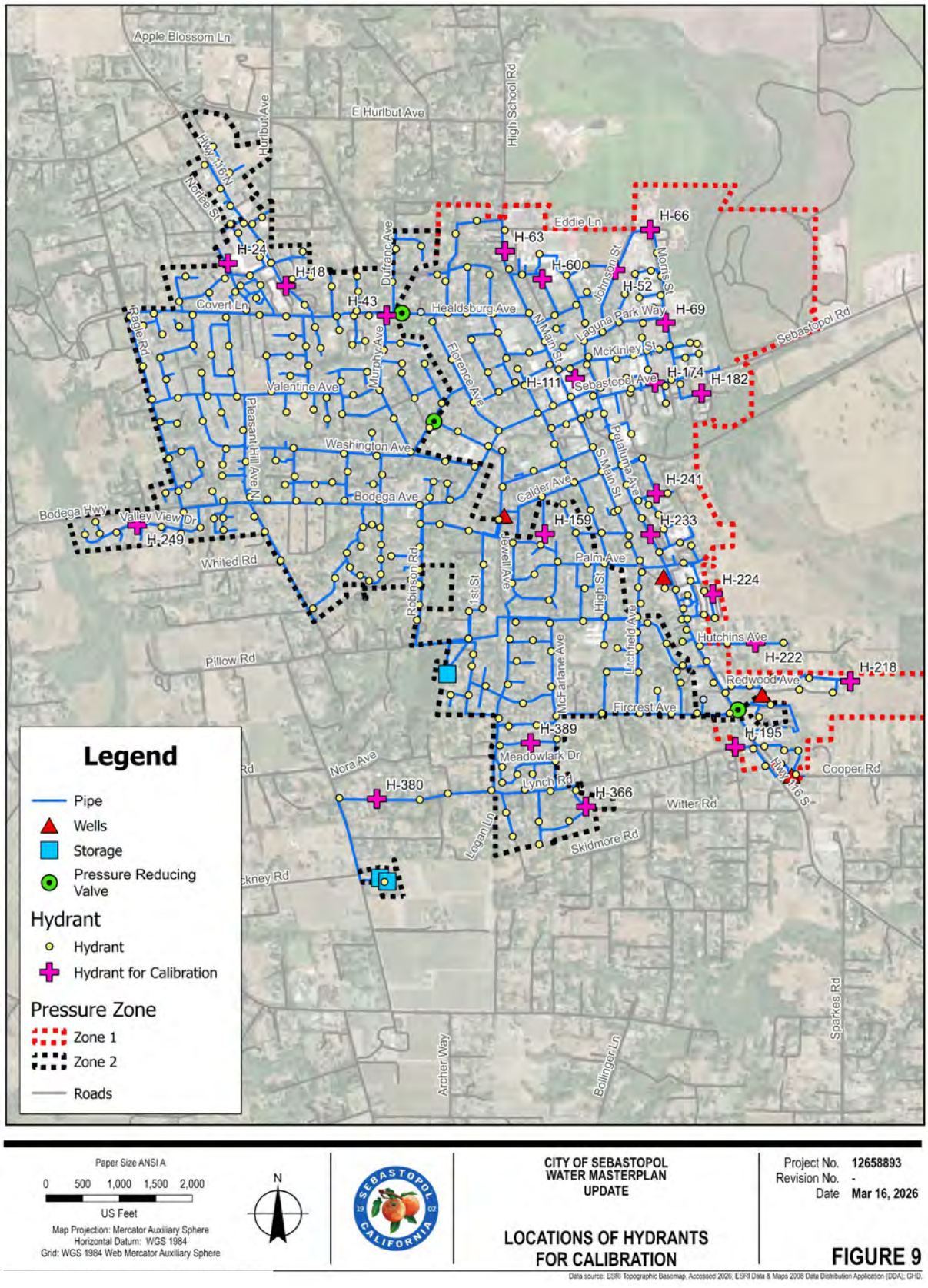

Figure 9 *Locations of hydrants for calibration.*

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Model calibration was achieved by adjusting pipe friction factors (C-factors) based on pipe material and age. Verification also indicated that the PRV located on Fircrest Avenue would be operational with a set pressure of approximately 56 psi. This PRV adjustment was incorporated into the model to match field-observed pressures. Without applying this PRV setting, the model predicted static pressures exceeding 100 psi during hydrant tests, which did not align with field observations.

Table 9 Modelled Pressure to Field Static Pressure Comparison

Hydrant Test #	Label	Modelled Pressure (psi)	Field Static Pressure (psi)	Deviation (Field Pressure - Modelled Pressure) (psi)
Parquet St	H-159	60	56	-4
Dowd Drive	H-389	65	60	-5
HT-01	H-249	81	83	2
HT-02	H-24	52	54	2
HT-03	H-18	61	64	3
HT-04	H-43	86	86	0
HT-05	H-63	60	59	-1
HT-06	H-60	56	56	0
HT-07	H-52	67	66	-1
HT-08	H-111	69	68	-1
HT-09	H-69	69	75	6
HT-10	H-66	73	74	1
HT-11	H-174	73	72	-1
HT-12	H-182	75	72	-3
HT-13	H-241	59	57	-2
HT-14	H-233	63	61	-2
HT-15	H-224	65	61	-4
HT-16	H-222	65	67	2
HT-17	H-218	66	69	3
HT-18	H-195	53	50	-3
HT-19	H-380	26	26	0
HT-20	H-366	68	69	1

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4. Water Demand Projections

This section discusses existing and projected water demands used in the water system model analysis to evaluate reservoir capacities, source supply, and fire flow capacity. Maximum month, day, and hour peaking factors based on historical water production and use statistics provided by the City are also discussed.

4.1 Water Demand Conditions

Demand criteria were developed for the following events:

– Average Daily Demands
– Maximum Hourly Demands as a percentage of Average Hourly Demands (existing and future)
– Maximum Daily Demands as a percentage of Average Daily Demands (existing and future)

4.2 Average Demands – Existing Conditions

Statistics provided by the City regarding water production and usage during 2018 to 2024 show that the annual water production by the City has averaged 311 MG. These same statistics show that over the same period of time, total annual production data exceeds total annual reported use (billed) by an average of 6%, or 21 MG. This non-revenue water (water loss) of 21 MG can be attributed to poorly functioning or inaccurate water meters, unmetered services, theft, and distribution system leaks.

To account for the losses within the distribution system, the average day demand (ADD) in the system was calculated based on the annual water production of 311 MG. This is done by converting the annual water production of 311 MG into an average daily rate of 592 GPM. Since the water demands differentiating each user type was not available, the 592 GPM ADD in the system is equally distributed among all 796 model junctions, which are imaginary points in a computer model where pipes connect with each other, where water is used and where pressures are calculated. As a result, the ADD for each junction is 0.74 GPM, and it is used for the purpose of this water system modelling. **Table 10** shows the breakdown of the total water production and the ADD value used for the modelling.

Table 10 Breakdown of the total water production and the ADD value used for the modelling.

		Total Water Production, Annual Average (MG)	ADD (GPM)	Number of Model Junctions	ADD Per Model Junction (GPM)
Total Non-Revenue Water, Annual Average (MG)	21 (6%)	311	592	796	**0.74** [1]
Total Water Billed, Annual Average (MG)	290				
Note: [1] Used as ADD per model junction for hydraulic modelling purpose.					

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4.3 Peaking Factors

Water use varies by season, by certain days within the season, and by time of day. To account for these variations, peaking factors are commonly used to evaluate water system operating characteristics. Peaking factors are multipliers applied to average water usage, based on data accumulated from historical patterns.

The maximum day demand (MDD) peaking factor is used to analyze the water supply capacity of a distribution system and to design for water supply needs. It is expressed as the ratio of the highest daily water use rate during a year to the average daily demand (ADD). This data allows for storage capacity evaluations.

The maximum hour demand (MHD) is the highest hourly water use rate during the year. The MHD peaking factor is the ratio of MHD to ADD. MHD data is used for evaluating areas where service pressures fail to meet minimum requirements. MHD data is also used with fire flow demands for evaluating the capacity of the distribution system during fires. **Table 11** lists peaking factors used in this study, which are from the previous master plan study as there were no historical data available to verify the peaking factors.

Table 11 Peaking Factors

Demand Type	Peaking Factor
Maximum Day Peaking Factor	2.0
Maximum Hour Peaking Factor	5.0

4.4 Future 2045 Conditions Demands

Based on the United States' Census Bureau, the estimated population in the City fluctuated in the past 25 years, from 8,032 in 2000 and 7,379 in 2010, to 7,521 in 2020. As per **Table 12**, the only period of population increase is during 2010-2015, which is 3%. To make the extrapolated population conservative, the 3% increase over 5-year period is used to calculate the population in 2025 and 2045. In 2025, the population is 7,729, whereas in 2045, the population will be 8,561. As a result, it represents a population increase of 11% over the span of a 20-year period, from 2025 (7,729 of population) to 2045 (8,561 of population). **Figure 10** shows the City's population from 2000 to 2045.

Table 12 Population of the City of Sebastopol from 2000 to 2020.

Year	Population
2000	8,032 [1]
2010	7,379 [1]
2015	7,583 [1]
2020	7,521 [1]

Note:
[1] Based on the population data in the United States Census Bureau.

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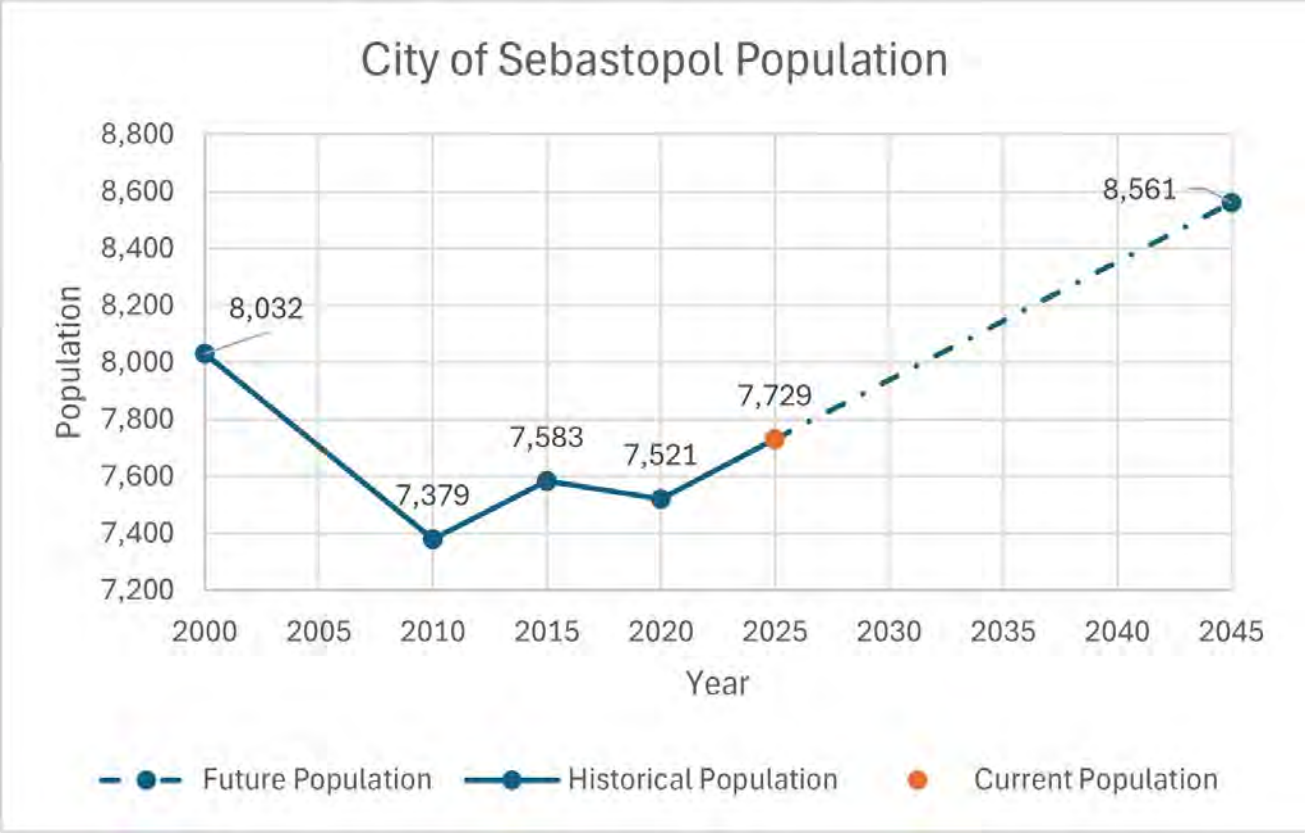

Figure 10 *City's population from 2000 to 2045.*

Since the aforementioned population increase is 11%, GHD used the same factor of 11% to calculate the projected demand. As a result, the projected ADD for each model junction in 2045 is 0.82 GPM. As stated in **Section 3**, model junctions are imaginary points in a computer model where pipes connect with each other, where water is used and where pressures are calculated. The water demands used for each demand condition in the future scenario are summarized in **Table 13**.

Table 13 *Demand Projected for Future Conditions for Normal Demand Conditions*

Demand condition	Demand Per Model Junction Projected for 2045 (GPM)
Average daily demand	0.82
Maximum daily demand	1.65
Peak hour demand	4.12

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5. Results of Water System Analyses

This section describes the criteria used in the analyses of the hydraulic model to assess the performance of the system for existing and future conditions. This section details the results of the analyses based on the criteria and system deficiencies identified.

5.1 Evaluation Criteria

Criteria for evaluating supply, storage, and distribution systems are based on industry standards and are described in the following subsections.

5.1.1 Distribution System

Pipe capacity depends upon ranges of pressure, velocity, and flow specific to pipe types and sizes. Low service pressures experienced by customers usually indicate high service elevations relative to tank elevation within a pressure zone. Low service pressures can also result from bottlenecks, non-looped mains, and leaks within the system. High pressures during low demand conditions can usually occur in areas where customer service connections are located at low elevations. Customers with service connections that tie into water mains carrying high pressures are fitted with pressure-reducing valves to prevent the possibility of rupture.

The following is a list of pipe criteria used in this analysis, based on the National Fire Codes, the California Plumbing Code, municipal standards, and typical engineering practice:

- **Desired Minimum Pressure at Peak Hour Demand:** 40 psi
- **Desired Minimum Pressure at Maximum Daily Demand plus Fire Flow:** 20 psi
- **Desired Maximum Service Pressure:** 100 psi

5.1.2 Fire Protection

One of the main services of the City's water system is to provide fire protection. It is usually evaluated by analyzing the available fire flow in the City's water system under maximum daily demand plus fire flow conditions, with a minimum residual pressure of 20 psi. According to the latest 2025 California Fire Code (CFC), the minimum flow for fire protection is 1,500 gallons per minute (GPM) of flow at residual pressure of 20 psi for 2 hours. **Table 14** further details the minimum flows and durations of flows for fire protection, based on the 2025 CFC, which uses California Building Code construction types designation and area to determine the minimum flow requirements. The "Fire Area" is the aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls, or horizontal assemblies (such as floors or ceilings) of a building. Sprinklered buildings are allowed up to a 75% reduction, but not less than 1,500 GPM. Larger fire areas and more combustible construction types (e.g., Type V-B) require higher flows.

Since the minimum flow for fire protection is 1,500 GPM as per the 2025 CFC, it is used to analyze the available fire flow in the City's water system. The required fire flow for the City is 1,500 GPM at a minimum residual pressure of 20 psi.

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Table 14 Minimum Flows for Fire Protection Requirements

Fire Area (sq ft)					Minimum Flow (GPM)#	Duration (hrs)
Type IA and IB*	Type IIA and IIIA*	Type IV and V-A*	Type IIB and IIIB*	Type V-B*		
0 – 22,700	0 – 12,700	0 – 8,200	0 – 5,900	0 – 3,600	1,500	2
22,701 – 70,900	12,701 – 39,700	8,201 – 25,500	5,901 – 18,400	3,601 – 11,300	1,750 – 2,750	2
70,901 – 83,700	39,701 – 47,100	25,501 – 30,100	18,401 – 21,800	11,301 – 13,400	3,000	3
83,701 – 128,700	47,101 – 82,100	30,101 – 46,400	21,801 – 33,500	13,401 – 20,600	3,250 – 3,750	3
128,701 – 145,900	71,401 – 82,100	46,401 – 52,500	33,501 – 37,900	20,601 – 23,300	4,000	4
145,901 – 225,200	82,101 – 126,700	52,501 – 81,100	37,901 – 58,600	23,301 – 36,000	4,250 – 5,000	4
225,201 – 295,900	126,701 – 166,500	81,201 – 106,500	58,601 – 77,000	36,001 – 47,400	5,250 – 5,750	4
295,901 and greater	166,501 and greater	106,501 and greater	77,001 and greater	47,401 and greater	6,000+	4+

Notes:
*Types of Construction as per the 2022 California Building Code:
- Type I – Fire-resistive (non-combustible)
- Type II – Non-combustible construction
- Type III – Combustible and non-combustible mix
- Type IV – Mass timber
- Type V – Wood frame construction

#Measured at 20 psi residual pressure.

5.1.3 Water Storage Reservoirs

Water storage facilities for a municipal water supply system serve the following purposes:

- Reserve of treated water in the event of plant equipment or pump failure
- Maintain minimum desired pressures
- Reserve for firefighting
- Reduce the necessity for large distribution mains
- Allow pumps to operate at average and not peak flow rates.

The total volume necessary to meet these requirements can be split into three separate components. The details of these components are summarized and explained in **Table 15** and the subsections below. **Figure 11** shows the water storage requirements for each zone.

5.1.3.1 Operational Storage

Operational storage is the volume difference required to maintain storage requirements when the supply source pumps are turned off. Operational storage is typically 100% of the average daily consumption. Average daily consumption in Sebastopol (2018-2024) totals 0.79 MG for the combined pressure zones. However, since the average

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daily consumption for each pressure zone is not available, the average daily water production for each pressure zone is used instead, which are 0.64 MG for Zone 1 and 0.21 MG for Zone 2.

5.1.3.2 Equalization Storage

Equalization storage is the volume sufficient to meet demands in excess of maximum daily demands. It is the storage required to meet water system demands that exceed the supply source's pumping capacity. Typical equalization storage requirements are 25% of the maximum daily use.

5.1.3.3 Fire Storage

Fire storage is the volume of water required to meet fire flow demands and durations for each pressure zone that exceeds maximum daily demands. Fire storage volume is determined by multiplying fire flow rates by durations.

The recommended fire water storage based on the current California Fire Code is 540,000 gallons (3,000 GPM for 3 hours). This volume is based on the maximum size of a new un-sprinklered building with non-fire-rated construction, which is 7,500 ft^2 for type V-B construction and 12,000 ft^2 for type II-B/III-B construction.

Table 15 Water Storage Requirements

Pressure Zone	Classification			
	Operational Storage (gallon)	Equalization Storage (gallon)	Fire Storage (gallon)	Zone Total (gallon)
Zone 1	639,706	319,853	540,000	1,499,560
Zone 2	212,406	106,203	540,000	858,609

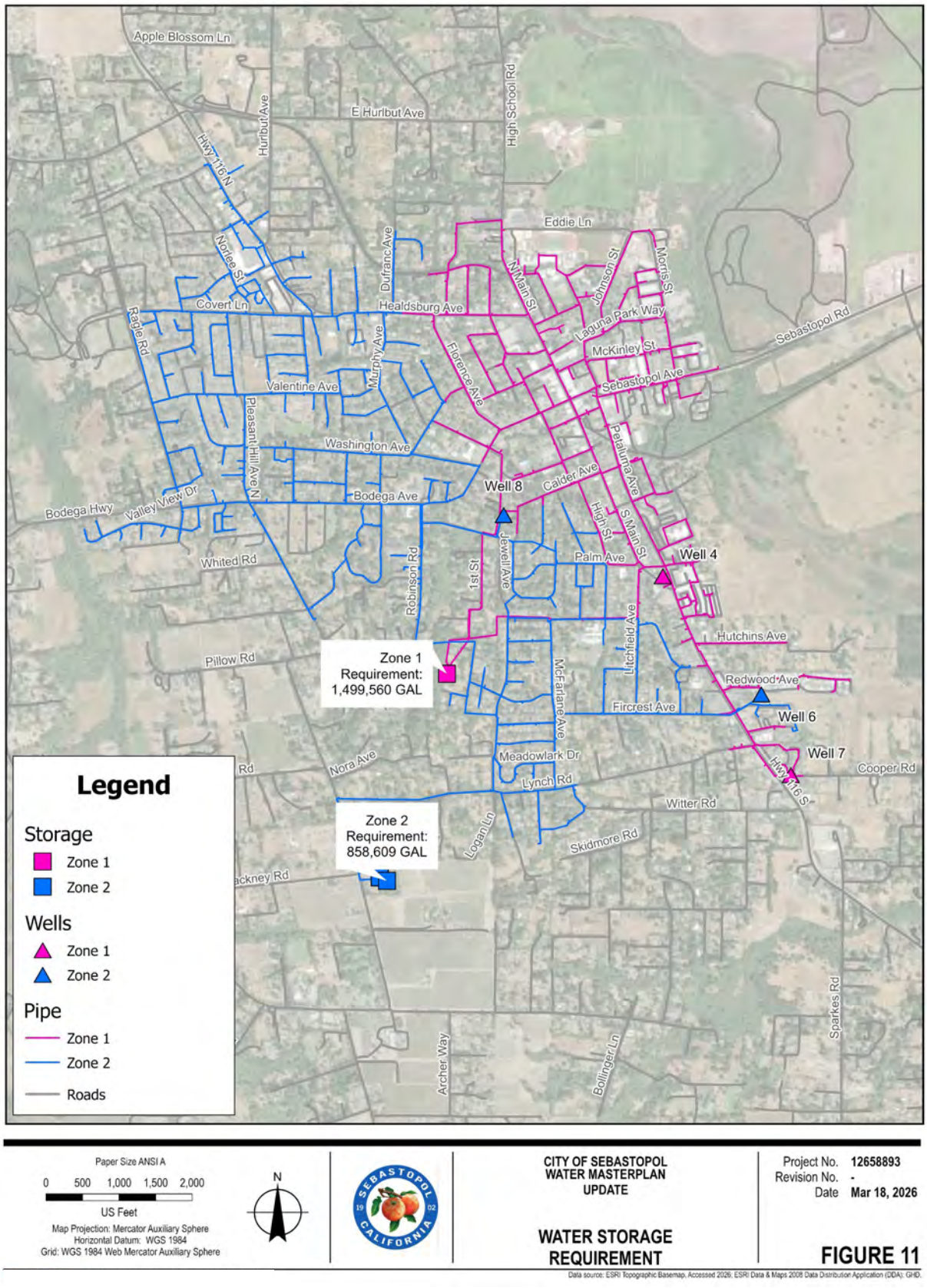

Figure 11 *Water storage requirements for Zone 1 and Zone 2.*

5.2 Analyses of the Existing Water System

Hydraulic analyses of water system were performed using the model described in Section 4. Fire hydrant flow tests provided data necessary to calibrate the model by adjusting the pipe C-factors. Minor variations between field fire hydrant flow test and model fire hydrant flow test pressures are anticipated and result from variations between actual conditions and modelled conditions. Reservoirs were modelled as tanks with the minimum and maximum water levels set according to data obtained from field visits, and pressure zones were analyzed separately as PRV's between the two zones normally remain closed. The following subsections describe the results of the analysis for the existing system.

5.2.1 Working Service Pressures during Peak Hour Demands

As stated in the previous section, the pressure differential between the water supply and the customer connections must remain in a range between 40 psi to 100 psi, or 92.4 ft to 231 ft of pressure head. Pressures below this range are not sufficient for use.

According to model results, most of the City's water distribution system falls within the acceptable range of 40-100 psi. However, there are few locations identified near the Pleasant Hill Road, West Hill Circle, Golden Ridge Avenue, and Hayden Avenue where the pressure is below 40 psi. This is attributed to the higher elevation of these locations. **Figure 12** illustrates areas of the distribution system in both zones where service pressures fail to reach 40 psi.

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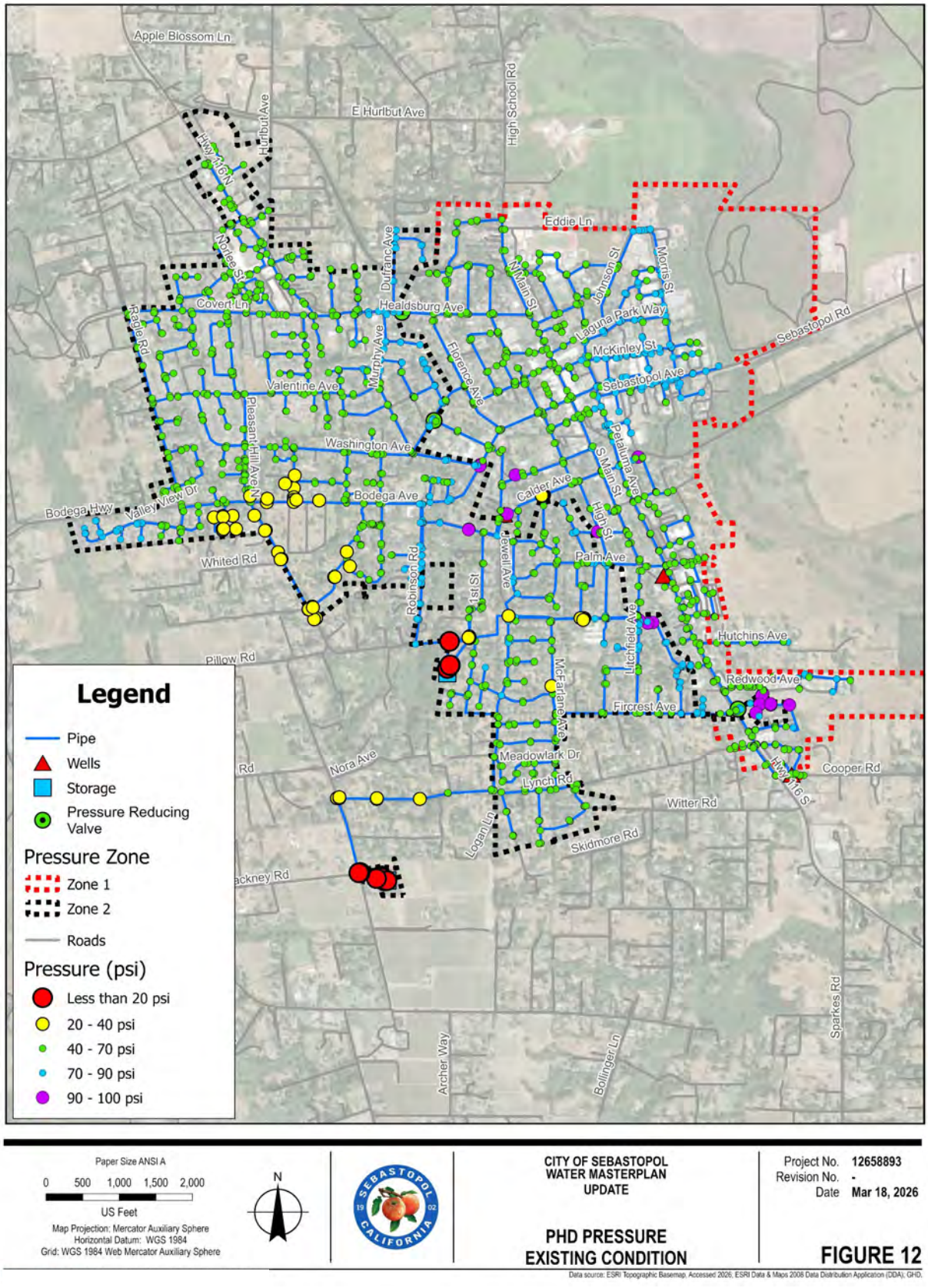

Figure 12 *Modelled pressure under existing PHD condition.*

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5.2.2 Fire Protection

Several aspects of the water system analysis are used to evaluate the adequacy of the existing fire protection capabilities. Proper pipe sizing, hydrant spacing, and residual pressures are all crucial components to achieving operational fire flows. The results of these analyses are described in this section.

Fire flows were modeled at each hydrant in the distribution system. These tests revealed hydrants with inadequate flows at a residual pressure of 20 psi. The hydrants that fall below the minimum fire flow requirement of 1,500 GPM during the MDD conditions are presented in **Figure 13**.

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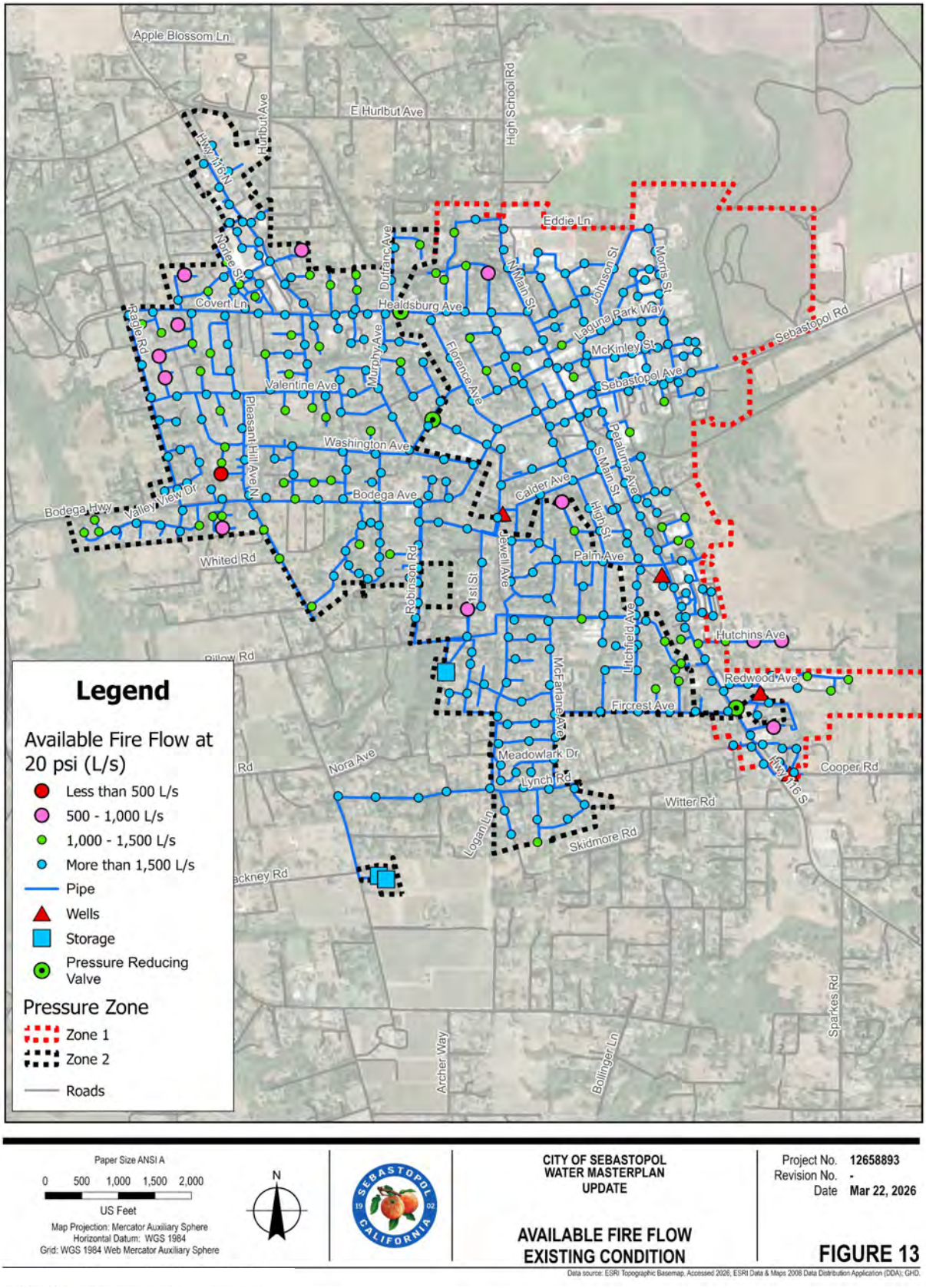

Figure 13 *Available fire flow at 20 psi under the existing MDD+FF condition.*

5.2.3 Reservoirs

As explained in Section 5.1.2, reservoirs must be capable of storing enough water to account for average daily consumption, demands in excess of pumping capacity, and firefighting. The volume required for each pressure zone is necessary to satisfy the evaluation criteria, and the actual reservoir capacities are listed in **Table 16**.

Table 16 Reservoir Capacities versus Storage Requirements

Pressure Zones	Total Storage Requirement (gallon)	Reservoir Capacities (gallon)
Zone 1	1,499,560	1,500,000
Zone 2	858,609	6,000,000

This data indicates that for existing land use and population densities, the reservoir capacities exceed the storage requirements for both pressure zones, which means that the City has more water storage than required. Since excessive storage can lead to stagnant water in the reservoir, it is advised to turn the water over in the reservoir every 2–4 days.

5.3 Analysis of the Water System for Future Conditions

Hydraulic analyses of the water system for the future 2045 conditions were performed using the model development described in **Section 3**.

5.3.1 Working Service Pressures

Figure 14 illustrates areas of the distribution system in both pressure zones for the future 2045 conditions during peak hour demand, where service pressures fail to reach 40 psi.

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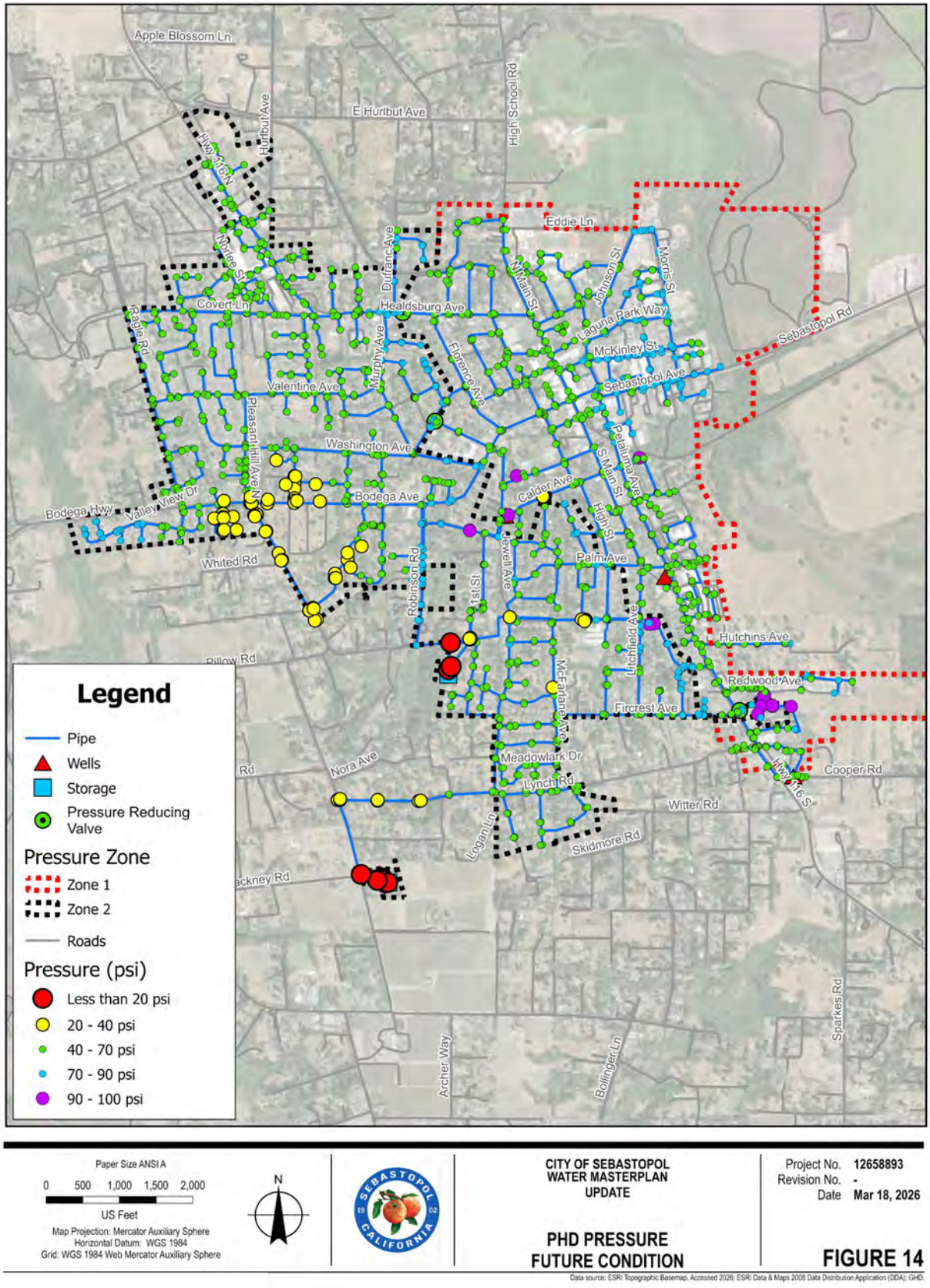

Figure 14 *Modelled pressure under future PHD condition.*

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5.3.2 Fire Protection

Fire flows were modeled at each hydrant in the distribution system for the future 2045 conditions. **Figure 15** highlights the location where the minimum flow requirement of 1,500 GPM cannot be met.

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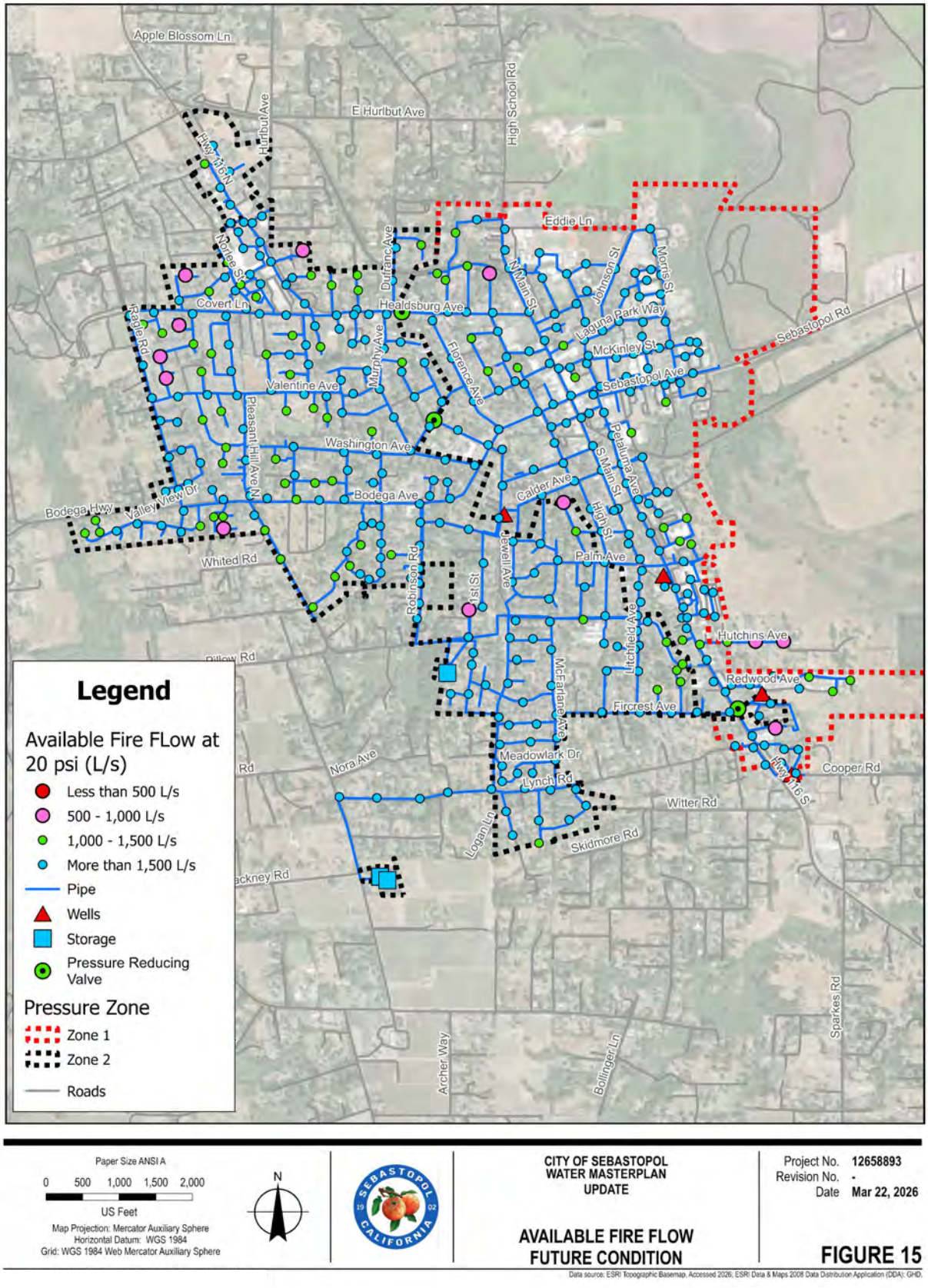

Figure 15 *Locations of hydrants above/below the required fire flow of 1,500 GPM, under the future MDD+FF condition.*

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5.3.3 Reservoirs

The volume required for each pressure zone to satisfy the evaluation criteria for build-out conditions, and the actual reservoir capacities are listed in **Table 17**.

Table 17 Reservoir Capacities versus Future Storage Requirements

Pressure Zones	Total Storage Requirement (gallon)	Reservoir Capacities (gallon)	Additional Required Storage (gallon)
Zone 1	1,602,817	1,500,000	102,817
Zone 2	892,895	6,000,000	0

This data indicates that for build-out land use and population, the Zone 1's water storage requirement in 2045 exceeds the reservoir capacity by 7%. The total storage in the City is sufficient for the City as a whole and there are connections in place that allow water to flow from Pressure Zone 2 to Pressure Zone 1, which will help compensate the storage deficit in Pressure Zone 1.

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6. Recommended Water System Improvements

The hydraulic analyses of the Sebastopol's water system presented in Section 5 revealed various deficiencies in the system including location where the minimum pressure requirement is not met. GHD also identified some operational and maintenance practices for the distribution system. The following sections discuss a sequence of water system improvement recommendations based on the deficiencies found in the existing system.

6.1 Water System Recommended Improvements: Existing Conditions

The analysis of City's existing water system revealed some deficiencies in the distribution system when modeled with current densities during periods of high demand. Although storage capacities for both pressure zones are sufficient during these periods, some parts of the water system infrastructure are inadequate for providing pressures and flows required to meet current standards.

As indicated in **Section 5.1.1**, the desired minimum pressure at the service connection is 40 psi during peak hour demands. **Section 5.2.1** shows areas in the existing system where service pressures failed to meet this standard. Furthermore, **Section 5.2.2** cited fire hydrants that failed to achieve required flows at residual pressures of 20 psi when modeled at flows during maximum day demands.

Upgrades can remedy many of the problems identified. However, there are a few areas of low pressure and low fire flow where upgrades to the existing system are not functionally practical. In some cases, service connections are physically located too high in elevation relative to the tanks to receive sufficient working pressures. In other cases, hydrants are located too close to a terminus in the system to draw proper flow. Upsizing the pipes in these areas is ineffective.

The following sections list the recommended improvements (**Table 18**) and best operation and maintenance practices (**Table 19**). **Table 18** lists the recommended improvements ranked by priority from highest to lowest, where Project No. 1 has the highest priority and Project No. 14 has the lowest priority.

Table 18 presents the recommended improvements ranked by priority from highest to lowest, with Project No. 1 assigned the highest priority and Project No. 14 the lowest.

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Table 18 Recommended Improvements for the Water Distribution System

Project No./ Priority	Ranking of Importance	Project Name	Start Year	Description	Rationale	Expected Positive Impact	Project Cost [1]
1	High	Well 4 Replacement	2027	Replacement of the City's municipal Well #4, which has passed its lifespan and is required to be replaced.	Built in 1953, Well #4 has passed its lifespan. Also, this well supplies water to over half of the City. Therefore, due to its age and criticality for the City's reliable water supply, the well needs to be replaced.	Replacing Well #4 will enhance the reliability of the water supply.	$3,352,000
2	High	Pleasant Hill Loop	2027	Pleasant Hill Road water system connection loop from Pleasant Hill Tanks at Lynch Road to the intersection at Pleasant Hill Road at Mitchell Crescent.	This stretch of watermain is critical as it connects the two main storage tanks that supplies water to Zone 2 area. Due to its length and strategic location, any failure or disruption along this section poses a significant risk to the service area's overall water security. A break, leak, or shutdown could compromise supply continuity, reduce system pressure, and potentially affect many consumers.	Building this watermain can provide a second route for water to supply the Zone 2 area, which makes the water supply more reliable and reduces the risks of pressure drop and service shutdown even if there is a failure in one of the routes.	$952,780
3	High	Structural Assessment of Existing Water Tanks	2027	Study of structural assessment of First Street Tank and Pleasant Hill Tanks	Based on site visit, it was found that the tanks do not have anchorage to the foundation, which is not as per the standards. The operation level of the tank is lower than the design liquid level suggested in the plate for respective tanks hence it is needed to determine the actual structural condition of the tank beyond visual inspection. Required now because previous reports (Aqua Video Engineering, 2022) were only visual and do not meet U.S. standards for structural diagnosis.	This CIP improves safety and compliance, supports seismic retrofit design, and facilitate tanks to be able to hold water up to their intended capacity.	$126,000

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Project No./ Priority	Ranking of Importance	Project Name	Start Year	Description	Rationale	Expected Positive Impact	Project Cost [1]
4	High	Seismic Retrofit Design for Existing Water Tanks	2027	Design for seismic retrofit and construction project for First Street Tank and Pleasant Hill Tanks	Required to upgrade the tank to meet current seismic codes and ensure resilience during earthquakes.	Compliance with ASCE 41 and AISC 342-22, reduced risk of failure, extended service life.	$141,750
5	High	Gwendolyn Place Water Service Connection Replacement	2027	Replace approximately 9 existing service connections with ¾-inch diameter HDPE service lateral pipes along Gwendolyn place from the intersection of Litchfield Avenue.	According to the City operation staff, this location has had multiple repairs (couple replacements) in the past.	Replacing the water service laterals with HDPE will help reduce the risks of pipe breaks and service disruption.	$73,240
6	High	Installation of Automated Flow Meter	2027	Installation of automated flow meter for Yard tower at Johnson Street- to supply potable water to local customers	The installation of automatic flow meters at the yard tower is essential to accurately measure, monitor, and manage water supplied for construction activities and customer use during the dry season. Currently, there is no automated flow meter installed. The absence of flow measurement limits the ability to track water distribution, assess consumption, and ensure accountable usage.	With the installation of automatic flow meters, the City will enable real-time monitoring and accurate billing of the water. Further, the flowmeter will provide improved operational control, and support data-driven decision-making for resource allocation.	$74,430
7	High	500 South Main Street Watermain Replacement	2027	Replace approximately 215 feet, 8-inch watermain along 500 South Main Street from the intersection of Gravenstein Highway South to the south of Walker Avenue	This replacement is suggested by the city's operation staff due to past maintenance works. Replacing this with new pipe will provide enhanced hydraulic efficiency and system performance and also prevents any leakage losses that may have happened during maintenance works.	The watermain replacement will enhance water pressure and fire protection for customers in the area. Also, it will improve the efficiency of the system for water conveyance.	$152,460

Project No./ Priority	Ranking of Importance	Project Name	Start Year	Description	Rationale	Expected Positive Impact	Project Cost [1]
8	High	Replacement of Existing Pressure Reducing Valves	2027	Replacing the existing pressure reducing valves at Healdsburg Avenue, Fircrest Avenue, and at Dutton and Huntley Avenue	Currently the pressure reducing valves present in the network system is not working. Site visit shows that the existing PRV's do not have set pressure, which the pressure zones might not be separated properly. Improper separation could cause over pressure in downstream pressure, leading to leaks or pipe bursts.	By replacing the pressure reducing valve (PRV), proper separation of pressure zones within the water system can be achieved. When functioning correctly, PRVs maintain appropriate downstream pressures, thereby preventing excessive pressure that could result in leaks or pipe bursts.	$256,830
9	Medium	Well 6 Water Treatment System	2030	Addition of an arsenic treatment system to the City's municipal Well #6.	There has been a concern about the naturally occurring arsenic in water produced from Well #6, and the City has been using dilution to maintain arsenic level in the water below the maximum contaminant level of 10 ppb. Adding the treatment system can remove arsenic from the water produced from Well #6.	With the treatment system, the arsenic in the water at Well #6 can be removed, ensuring public health.	$3,635,700
10	Medium	Valley View Drive Water Service Connection Replacement	2030	Replace approximately 94 water service laterals using approximately 20 feet, ¾-inch diameter HDPE service lateral pipes, along Valley View Drive from the intersection of Ragel Avenue.	This location has had many pipe breaks due to corrosive soil and the City has performed multiple repair services in the past.	Replacing the water service laterals with HDPE will help reduce the risks of pipe breaks and service disruption.	$682,870

Project No./ Priority	Ranking of Importance	Project Name	Start Year	Description	Rationale	Expected Positive Impact	Project Cost [1]
11	Medium	Covert Lane CI Watermain Replacement	2030	Replace approximately 360 feet 6-inch cast iron water line on Covert Lane between Norlee Street and Zimpher Drive	This is a 40-year-old CI pipe and would therefore have severe corrosion, resulting in reduced flow.	The watermain replacement will enhance water pressure and fire protection for customers along Covert Lane between Norlee Street and Zimpher Drive. This CIP will improve the system's water conveyance efficiency.	$237,190
12	Medium	Ellis Court CI Watermain Replacement	2030	Replace approximately 195 feet 6-inch diameter old cast iron pipe between Ellis Court and High School Road	The old CI pipe would have been severed corroded, resulting in reduced flow.	The watermain replacement will enhance water pressure and fire protection for customers between Ellis Court and High School Road. Also, it will improve the general system efficiency.	$141,550
13	Low	Installation of Isolation Valves	2032	Installation of isolation valves at different location for system isolation during repair works at Parquet St and Litchfield Avenue	Isolation valves enable pressure zoning and sectional operations. Absence of (or insufficient) isolation valves would lead to wider system shutdown during repair works.	Installation of isolation valves allows sections of the water system to be shut off while keeping the rest in operation. Avoids complete system shutdown and minimizes downtime and water loss.	$154,930

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Project No./ Priority	Ranking of Importance	Project Name	Start Year	Description	Rationale	Expected Positive Impact	Project Cost [1]
14	Low	Painting and Relining of Existing Water Tanks	2032	Painting and relining of First Street Tank and Pleasant Hill Tanks	Recent inspections in 2022 by Aqua Video Engineering reported that blisters and cracks on sidewalls and floor coatings, as well as rust stains on the ceilings were observed in the tanks, with signs of corrosion and calcium chloride seepage. Damaged coating/exposed metal surface and cracks on the tanks could cause corrosion, metal deterioration and shorten service life of the assets	Repainting and relining steel storage tanks prevent corrosion, preserves structural integrity, and supports water quality standards. Protective coatings extend asset life and lower maintenance costs.	$827,490
	[1] Included soft cost and construction cost without inflation or 4% annual escalation.						

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6.2 Best Operation and Maintenance Practices

Table 19 presents the best management and operational practices that can be implemented in the water distribution system.

Table 19 Best Operation and Maintenance Practices

No.	Description	Justification and Benefits	Estimated Effort	Estimated Cost
1	Flushing of dead-end pipes at Huntley, Swartz Avenue, Neva St, Batley Ct, Valley View Drive, Gravenstein Hwy N, Teresa Ct, Ellis Ct	– Flushing of water distribution pipes at dead ends is recommended to maintain water quality and system reliability. Dead-end sections often experience low or stagnant flow conditions, allowing sediment, biofilm, and residual disinfectant depletion to occur over time. This can lead to water discoloration, taste and odor issues, and potential bacterial growth, compromising compliance with drinking water standards. Regular flushing removes accumulated debris and ensures the distribution system maintains adequate water quality and hydraulic performance.	– 30 minutes for two maintenance staff at least once per quarter (3 months) for dead end flushing from hydrant or blow-off.	– $1,000 – Including labor, assuming 2 City's operators for a day at $50/hour. This cost also includes mileage.
2	Hydraulic issues associated with fire hydrants located on dead-end water mains. Several sites—including Hermosa Court, Ellis Court, McKinley Street, Abbot Avenue, Hutchins Avenue, North Main Street (dead end), and Gravenstein Highway North (dead end). City confirmed vibration and pressure problems caused by rapid hydrant operation or inadequate flow control.	– These conditions can lead to pressure surges, water hammer, and potential main collapse, as well as ground vibrations affecting nearby properties. • Conduct flushing operations to remove sediment and air pockets contributing to hydraulic instability. • Provide operator training on proper hydrant opening and closing procedures to prevent sudden pressure changes.	– 30 minutes for two maintenance staff at least once per quarter (3 months) for dead end flushing from hydrant or blow-off.	– $1,000 per location – Including labor, assuming 2 City's operators for a day at $50/hour. This cost also includes mileage.

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No.	Description	Justification and Benefits	Estimated Effort	Estimated Cost
3	Well pump inspection	– Routine inspection of well pumps is essential to ensure that the wells continue to operate at their designed and permitted production capacity. This helps identify issues such as aging equipment, improper pump sizing, mechanical wear, or operational inefficiencies (e.g., incorrect pump settings or motor problems) before they lead to reduced performance. Conducting thorough pump inspections improves overall system reliability, reduces stress on other water supply sources, and minimizes operational costs associated with longer pump run times or inefficient operation.	– Remove and inspect well pumps every 5 to 10 years or earlier if performance indicators, such as loss of flow or pressure, warrant.	– $25,000 per well – This might be by the City's staff with a third-party vendor. The cost includes equipment and machinery to perform the inspection, as well as labor and mileage.
4	Fixing or maintenance of SCADA system - Pleasant Hill Tank water level error	– Fixing the SCADA system for correctly recording the water level at the Pleasant Hill tanks. Perform a maintenance check.	– One time issue resolution with SCADA support vendor	– $5,000 for a single-day site visit and equipment repair. – SCADA vendor estimated charges
5	Periodic drawdown and refilling of the tanks, rather than maintaining full capacity continuously, can improve water quality by minimizing water age	– Currently, the well supplies both the system demands and the storage tanks. However, the tanks do not supply water back into the system. As a result, the water in the tanks remains stagnant, leading to high water age and reduced water quality. Utilizing the tank to supply the demand during peak electricity hour will benefit in reducing the energy consumption.	– No additional effort expected with this operational change.	– $0 – best management practice, which would not require additional labor
6	Regular water loss audits	– The State of California requires urban water suppliers to perform annual water loss audits to identify and reduce water losses, which could provide multiple benefits, including: • Maintain the physical condition of the water distribution system, since performing water loss audits may involve inspecting water assets (e.g., pipe leaks). • Increase water supplies from water losses. Particularly beneficial in the face of drought and other water-shortage issues. • Lower the cost of water supply operations to offset losses. • Lower operating costs could keep the water rate at a reasonable level.	– Two to three days of staff time or consultant time to compare metered water production records with metered water use records. – The cost / effort to perform leak detection varies by number of days. A budgetary estimate is $3,000 per day.	– $50,000 for AWWA Water Audit – This will be done by a third-party vendor that will bring their equipment and labor

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No.	Description	Justification and Benefits	Estimated Effort	Estimated Cost
7	Regular water asset inspection	– Regular water asset inspections, such as checking for pipe leaks, can help maintain the physical condition of the water distribution system and support water loss audits.	– Undetermined	– $0 – This is something that the City already does and should continue doing regularly to inspect key water assets in the system. These include, but not limited to, three PRVs, three tanks, and four wells with treatment.
8	Valve turning exercises	– The American Water Works Association (AWWA) recommends that municipal valves be inspected and operated regularly (at least every three months). Valve exercises could help confirm the current condition of the valves, document valve operation, and identify the need for valve repair. Subsequently, the exercises could address: • The water quality issue in the water distribution system, if any. • The water loss and supply reliability issues. • System isolation capability.	– Exercise all water valves at least once per year.	– $0 – This is something that the City should incorporate as a regular practice.

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No.	Description	Justification and Benefits	Estimated Effort	Estimated Cost
9	Documentation and maintenance of records of water assets and their operations	– Currently, the records of the City's water assets and their operations are high level and could be improved by including more asset details and finer timesteps for the operational data. Creating and maintaining a detailed, up-to-date record of the City's water assets and their operations enables accurate hydraulic modelling of the City's water distribution system, supporting better decision-making on capital projects. The detailed record could include, but not be limited to, the following: • Wet well pump – Pump model – Pump curve – Pump pressure and flow SCADA data in finer timesteps, e.g., hourly or by minute. – Pump control setting • Tank – Maximum, minimum and operational water levels – Inflow and outflow SCADA data at hourly or minute timesteps. • Water meter – Location of water meters – Water consumption data by meter, at hourly or by-minute timesteps.	– This is something that the City should incorporate as a regular practice.	– SCADA vendor estimated charges of $2,000 to train the City's staff and enable the SCADA system to monitor or record the data at desired frequencies.

7. Estimated Cost for Recommended Improvements

This section provides the estimated costs for the recommended improvement projects previously described to meet current and future system performance needs. Estimated costs were averaged from several project bids from recent years, adjusted for inflation. These were compared with other master plan figures adjusted for inflation. Future use of this cost data must be adjusted accordingly.

Each project estimate is based on the number of main connections into the pipe, the number of hydrants replaced, blow-offs, air release valves (ARV) and other appurtenances. Materials are selected based on the current City of Sebastopol Standard Details and Specifications. The standard cost for a pipeline includes the estimated costs for trenching, shoring, backfilling, paving, valves, and connections. Additional costs are added for mobilization, traffic control, and miscellaneous work. The estimate also includes the following prorated estimate mark-ups and escalation:

- Estimating Planning Contingency at 15%: An allowance based on 15% of the construction costs estimate subtotal has been included for Estimating Contingency. This allowance is used during design to provide for a contingency to items of work that may not be included and price variations in the estimate as the design is developing.
- Estimated Construction Contingency at 10%: An allowance based on 10% of the construction costs estimate subtotal including estimating contingency has been included for Construction Contingency. This allowance is intended to provide for a construction contingency to cover change orders during construction.
- Escalation at 4% annually: An allowance of 4% annually for construction materials, equipment & labor cost escalation, and inflation up to the anticipated mid-point of construction is included in the various construction cost estimate items. No allowance has been made for code escalation or technological escalation. Escalation is added to the Construction Subtotal.
- City Project Management at 5%: An allowance of 5% of the soft costs has been included in the total construction cost estimate for the City's staff to manage the projects.
- Engineering and Environmental at 12%: An allowance of 12% of the soft cost is included in the total construction cost estimate items for Contractor's engineering and environmental work associated to the projects.
- Construction Management and Inspection at 15%: An allowance of 15% of the soft costs is included in the total construction cost estimate items to cover the costs of construction management and inspection of the projects.

Since the detailed design and costing have been done for CIP 14, a different set of contingencies is used for that project. The project cost estimates do not include land acquisition or right-of-way costs.

For construction in California, GHD's estimating experience shows the following general results on competitive bids, as a differential from pre-bid cost estimates:

Number of Bids		Percentage Differential
1	……..	+25 to 100%
2-3	……..	+10 to 25%
4-5	……..	0 to +10%
6-7	……..	0 to -10%
8 or more	……..	-10 to -20%

The aforementioned cost estimates are provided at a planning level of accuracy and do not guarantee that a bid price will be received at or below estimates, as price bids are subject to numerous and changing variables. Accordingly, it is important to ensure that a minimum of 4 to 5 valid bids are received, if possible. Since neither the City of Sebastopol

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nor its consultants have any control over market conditions, there is no guarantee that bids will not vary significantly from the estimate, especially if there is not adequate competition among the available contractors.

7.1 Cost Estimates

The cost estimate of each recommended project is presented as follows:

- CIP 01: Well 4 Replacement
- CIP 02: Pleasant Hill Loop
- CIP 03: Structural Assessment of Existing Water Tanks
- CIP 04: Seismic Retrofit Design for Existing Water Tanks
- CIP 05: Gwendolyn Place Water Service Connection Replacement
- CIP 06: Installation of Automated Flow Meter
- CIP 07: 500 South Main Street Watermain Replacement
- CIP 08: Replacement of Existing Pressure Reducing Valves
- CIP 09: Well 6 Water Treatment System
- CIP 10: Valley View Drive Water Service Connection Replacement
- CIP 11: Covert Lane CI Watermain Replacement
- CIP 12: Ellis Court CI Watermain Replacement
- CIP 13: Installation of Isolation Valves
- CIP 14: Painting and Relining of Existing Water Tanks

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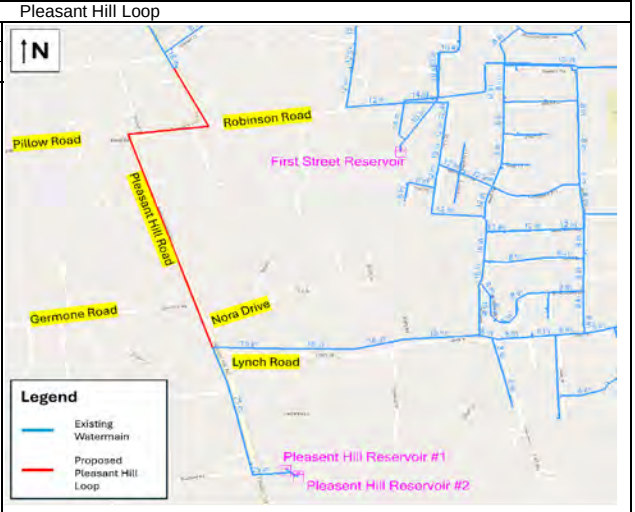
Project Name	Well 4 Replacement
Project No	CIP-05
Category	Water Projects
Project Location	Petaluma Avenue at Palm Avenue

Description	Replacement of the City's municipal Well #4 that has passed its lifespan and is required to be replaced.
Justification	Built in 1953, Well #4 as passed its lifespan. Also, this well supplies water to over half of the City. Therefore, due to its age and criticality for the City's reliable water supply, the well needs to be replaced.
General Plan	
Goals and policies	Community Services and Facilities CSF 1-5: Require development, infrastructure, and long-term planning projects to be consistent with all applicable City infrastructure plans, including the Water Master Plan, and the Capital Improvement Program.

Engineer's Opinion of Probable Construction Costs

ITEM		2026-27	2027-28	2028-29	2029-30	Project Total
1	Pre- construction (design, ROW, Environ)	$ 440,000				$ 440,000
2	Construction		$2,912,000			$ 2,912,000
	Total					$ 3,352,000

Project Name:	Pleasant Hill Loop
Project No	CIP-01
Category	Water Projects
Project Location	Pleasant Hill Road
Description	Pleasant Hill Road water system connection loop from Pleasant Hill Tanks at Lynch Road to the intersection at Pleasant Hill road at Mitchell Cr. This stretch of watermain represents a critical component of the water distribution network, as it connects the two main storage tanks that supply the broader distribution system. Due to its length and location, any failure or disruption along this section poses a significant risk to the overall water security of the service area. A break, leak, or shutdown could compromise the continuity of supply, reduce system pressure, and potentially impact a large number of consumers.
Justification	City has experienced some failures on Lynch Road in the past and the maintaince of it has caused 75% City water network without supply which highlights the improtance of water security issue in this location.



Highlighted pipe is the proposed water loop conection which is not existing currently

Engineer's Opinion of Probable Construction Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Water Pollution Control	1	LS	$ 5,720.00	$ 5,720.00
2	Shoring and Trench Safety	1	LS	$ 23,012.50	$ 23,012.50
3	Temporary Traffic Control	1	LS	$ 10,800.00	$ 10,800.00
4	Utility Clearances	1	LS	$ 6,000.00	$ 6,000.00
5	Utility Conflict Resolution	1	LS	$ 10,610.00	$ 10,610.00
6	Addition of 16 inch PVC watermain	1,052	LF	$ 350.00	$ 368,200.00
7	Addition of valves and other miscellaneous	1	LS	$ 92,050.00	$ 92,050.00
8	Abandoning the watermains	1	LS	$ 46,030.00	$ 46,030.00
9	Landscape Restoration	1	LS	$ 10,000.00	$ 10,000.00
10	Miscellaneous Work	1	LS	$ 5,000.00	$ 5,000.00
	CONSTRUCTION SUBTOTAL				**$ 577,430.00**
	Estimating Planning Contingency (15%)				$ 86,620.00
	Estimated Construction Contingency (10%)				$ 57,750.00
	CONSTRUCTION SUBTOTAL				**$ 721,800.00**
	Escalation (4% Annual)				$ 28,872.00
	CONSTRUCTION TOTAL				**$ 750,680.00**
	SOFT COSTS				
	City Project Management (5%)				$ 36,090.00
	Engineering and Environmental (12%)				$ 86,620.00
	Construction Management & Inspection (15%)				$ 108,270.00
	TOTAL SOFT COSTS				**$ 230,980.00**
	TOTAL CIP CONSTRUCTION ESTIMATE				**$ 952,780.00**

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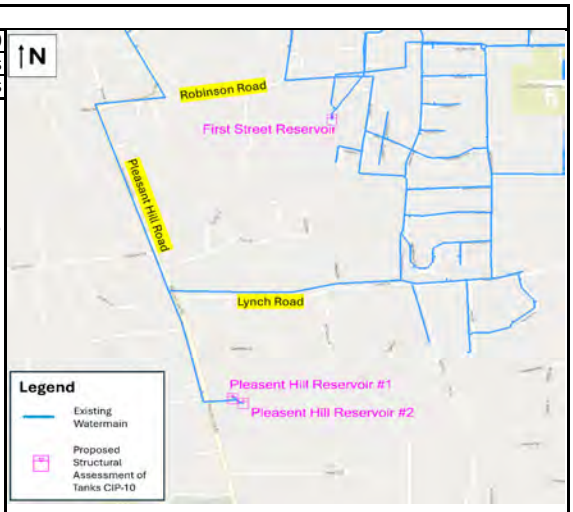
Project Name	Structural Assessment of Existing Water Tanks
Project No	CIP-10
Category	Water Projects
Project Location	First Street and Pleasant Hill Tanks
Description	Study of structural assessment of First Street Tank and Pleasant Hill Tanks.
Justification	Based on site visit it was found that the tanks do not have achorage to the soundation which is is not as per the standards. The operation level of the tank is lower than the design liquid level suggsted in the plate for respective tanks hence it is needed to determine the actual structural condition of the tank beyond visual inspection. Required now because previous reports (2022) were only visual and do not meet U.S. standards for structural diagnosis. Benefits: ensures safety, compliance, and informs seismic retrofit design.



Engineer's Opinion of Probable Project Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Site Visit and Structural Assessment	3	EA	$ 3,000.00	$ 9,000.00
2	Geotechnical Investigation	3	EA	$ 22,000.00	$ 66,000.00
3	Structural Analysis and Reporting	3	EA	$ 10,000.00	$ 30,000.00
4	Miscellaneous	3	EA	$ 5,000.00	$ 15,000.00
	TOTAL				**$ 120,000.00**
	Escalation (4% Annual)				$ 4,800.00
	PROJECT TOTAL				**$ 124,800.00**
	SOFT COSTS				
	City Project Management (5%)				$ 6,000.00
	TOTAL SOFT COSTS				**$ 6,000.00**
	TOTAL CIP ESTIMATE				**$ 126,000.00**

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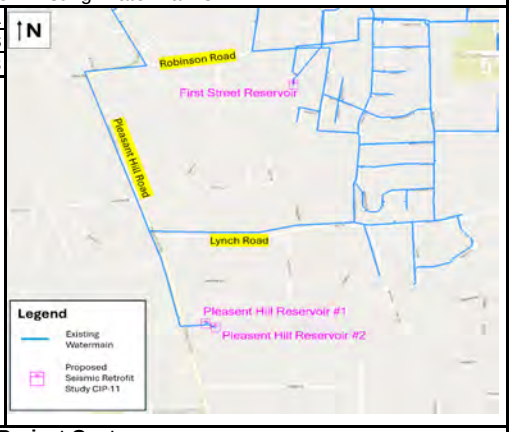
Project Name	Seismic Retrofit Design for Existing Water Tanks
Project No	CIP-11
Category	Water Projects
Project Location	First Street and Pleasant Hill Tanks
Description	Design for seismic retrofit and construction project for First Street Tank and Pleasant Hill Tanks.
Justification	Based on site visit it was found that the tanks do not have anchorage to the foundation which is is not as per the standards. Required to upgrade the tank to meet current seismic codes and ensure resilience during earthquakes. Benefits: compliance with ASCE 41 and AISC 342-22, reduced risk of failure, extended service life.



Engineer's Opinion of Probable Project Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Site Visit	3	EA	$ 5,000.00	$ 15,000.00
2	Calculations and seismic retrofit design	3	EA	$ 15,000.00	$ 45,000.00
3	Drawings	3	EA	$ 20,000.00	$ 60,000.00
4	Miscellaneous	3	EA	$ 5,000.00	$ 15,000.00
	TOTAL				**$ 135,000.00**
	Escalation (4% Annual)				$ 22,930.91
	PROJECT TOTAL				$ 157,930.91
	SOFT COSTS				
	City Project Management (5%)				$ 6,750.00
	TOTAL SOFT COSTS				**$ 6,750.00**
	TOTAL CIP ESTIMATE				**$ 141,750.00**

Agenda Item Number 11

Project Name	Gwendolyn Place Water Service Connection Replacement
Project No	CIP-06
Category	Water Projects
Project Location	Gwendolyn Place
Description	Replace approximately 9 existing service connection with 3/4 inch diameter HDPE along Gwendolyn place from the intersection of Litchfield Avenue.
Justification	According to City operation staff this location has had multiple repairs (couple replacements) in past. Replacing this with new water service pipe will prevents any leakage losses.

Engineer's Opinion of Probable Construction Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Water Pollution Control	1	LS	$ 440.00	$ 440.00
2	Shoring and Trench Safety	1	LS	$ 1,575.00	$ 1,575.00
3	Temporary Traffic Control	1	LS	$ 1,700.00	$ 1,700.00
4	New 3/4-inch diameter HDPE service & appurtenances (20 feet)	9	LS	$ 3,500.00	$ 31,500.00
7	Abandon, Remove and Salvage Water System Components	1	LS	$ 900.00	$ 900.00
8	Landscape Restoration	1	LS	$ 1,000.00	$ 1,000.00
9	Concrete Sidewalk Removal/Replacement	9	EA	$ 250.00	$ 2,250.00
10	Miscellaneous Work	1	LS	$ 5,000.00	$ 5,000.00
	CONSTRUCTION SUBTOTAL				**$ 44,370.00**
	Estimating Planned Contingency (15%)				$ 6,660.00
	Estimated Construction Contingency (10%)				$ 4,440.00
	CONSTRUCTION SUBTOTAL				**$ 55,470.00**
	Escalation (4% Annual)				$ 2,218.80
	CONSTRUCTION TOTAL				**$ 57,690.00**
	SOFT COSTS				
	City Project Management (5%)				$ 2,780.00
	Engineering and Environmental (12%)				$ 6,660.00
	Construction Management & Inspection (15%)				$ 8,330.00
	TOTAL SOFT COSTS				**$ 17,770.00**
	TOTAL CIP CONSTRUCTION ESTIMATE				**$ 73,240.00**

Agenda Item Number 11

Project Name	Installation of Automated Flow Meter
Project No	CIP-13
Category	Water Projects
Project Location	Johnson Street

Description

Installation of automated flow meter for Yard tower at Johnson Street to supply potable water to local customers.

Justification

The installation of automatic flow meters at the yard tower is essential to accurately measure, monitor, and manage water supplied for construction activities and customer use during the dry season. Currently, the absence of flow measurement limits the ability to track water distribution, assess consumption, and accountable usage. Automatic flow meters will enable real-time monitoring, improve operational control, and support data-driven decision-making for resource allocation.

Engineer's Opinion of Probable Construction Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Flow meter and instrumentation	1	LS	$ 20,000.00	$ 20,000.00
2	Piping modifications and mechanical work	1	LS	$ 6,000.00	$ 6,000.00
3	Installation	1	LS	$ 8,600.00	$ 8,600.00
4	Battery (electrical and instrumentation)	1	LS	$ 4,000.00	$ 4,000.00
5	Addition of valves and other miscellaneous	1	LS	$ 1,500.00	$ 1,500.00
6	Miscellaneous Work	1	LS	$ 5,000.00	$ 5,000.00
	CONSTRUCTION SUBTOTAL				**$ 45,100.00**
	Estimating Planned Contingency (15%)				$ 6,770.00
	Estimated Construction Contingency (10%)				$ 4,510.00
	CONSTRUCTION SUBTOTAL				**$ 56,380.00**
	Escalation (4% Annual)				$ 2,255.20
	CONSTRUCTION TOTAL				**$ 58,640.00**
	SOFT COSTS				
	City Project Management (5%)				$ 2,820.00
	Engineering and Environmental (12%)				$ 6,770.00
	Construction Management & Inspection (15%)				$ 8,460.00
	TOTAL SOFT COSTS				**$ 18,050.00**
	TOTAL CIP CONSTRUCTION ESTIMATE				**$ 74,430.00**

Agenda Item Number 11

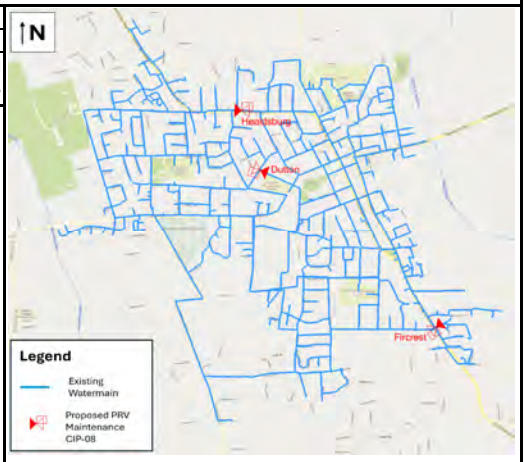
Project Name	500 South Main Street Watermain Replacement
Project No	CIP-07
Category	Water Projects
Project Location	500 South Main Street
Description	Replace approximately 215 feet, 8 inch watermain along 500 South Main Street from the intersection of Gravenstein Highway South south of Walker Avenue.
Justification	This replacement is suggested by the city's operation staff due to past maintainence works.Replacing this with new pipe will provide enhanced hydraulic efficiency and system performance and also prevents any leakage losses that may have happend during maintaince works.

Engineer's Opinion of Probable Construction Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Water Pollution Control	1	LS	$ 920.00	$ 920.00
2	Shoring and Trench Safety	1	LS	$ 3,023.75	$ 3,023.75
3	Temporary Traffic Control	1	LS	$ 3,300.00	$ 3,300.00
4	Utility Clearances	1	LS	$ 6,000.00	$ 6,000.00
5	Utility Conflict Resolution	1	LS	$ 6,640.00	$ 6,640.00
6	8-inch PVC Water Main	215	LF	$ 225.00	$ 48,375.00
7	Addition of valves and other miscellaneous	1	LS	$ 12,100.00	$ 12,100.00
8	Abandon, Remove and Salvage Water System Components	1	LS	$ 3,030.00	$ 3,030.00
9	Reconnect Existing Hydrant	1	EA	$ 2,000.00	$ 2,000.00
10	Landscape Restoration	1	LS	$ 2,000.00	$ 2,000.00
11	Miscellaneous Work	1	LS	$ 5,000.00	$ 5,000.00
	CONSTRUCTION SUBTOTAL				**$ 92,390.00**
	Estimating Planned Contingency (15%)				$ 13,860.00
	Estimated Construction Contingency (10%)				$ 9,240.00
	CONSTRUCTION SUBTOTAL				**$ 115,490.00**
	Escalation (4% Annual)				$ 4,619.60
	CONSTRUCTION TOTAL				**$ 120,110.00**
	SOFT COSTS				
	City Project Management (5%)				$ 5,780.00
	Engineering and Environmental (12%)				$ 13,860.00
	Construction Management & Inspection (15%)				$ 17,330.00
	TOTAL SOFT COSTS				**$ 36,970.00**
	TOTAL CIP CONSTRUCTION ESTIMATE				**$ 152,460.00**

Agenda Item Number 11

Project Name	Replacement of Existing Pressure Reducing Valves
Project No	CIP-08
Category	Water Projects
Project Location	Healdsburg Avenue, Fircrest Avenue and at Dutton and Huntley Avenue
Description	Replacing of the existing pressure reducing valves at Healdsburg Avenue, Fircrest Avenue and at Dutton and Huntley Avenue.
Justification	Currently the pressure reducing valves present in the network system is not working. Site visit shows that the existing PRV's do not have set pressure. By replacing the PRV, the water system can be divided to pressure zones and will be able to maintain steady downstream pressure which will prevent overpressurized sections leading to leaks or even pipe bursts.



Engineer's Opinion of Probable Construction Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Water Pollution Control	3	EA	$ 1,520.00	$ 4,560.00
2	Shoring and Trench Safety	3	EA	$ 3,120.00	$ 9,360.00
3	Temporary Traffic Control	3	EA	$ 3,600.00	$ 10,800.00
4	Utility Clearances	3	EA	$ 6,000.00	$ 18,000.00
5	Utility Conflict Resolution	3	EA	$ 6,720.00	$ 20,160.00
6	Addition of new PRV	3	EA	$ 16,000.00	$ 48,000.00
7	Addition of valves and other miscellaneous	3	EA	$ 4,800.00	$ 14,400.00
8	Abandon, Remove and Salvage Water System Components	3	EA	$ 3,120.00	$ 9,360.00
9	Landscape Restoration	3	EA	$ 2,000.00	$ 6,000.00
10	Miscellaneous Work	3	EA	$ 5,000.00	$ 15,000.00
	CONSTRUCTION SUBTOTAL				**$ 155,640.00**
	Estimating Planned Contingency (15%)				$ 23,350.00
	Estimated Construction Contingency (10%)				$ 15,570.00
	CONSTRUCTION SUBTOTAL				**$ 194,560.00**
	Escalation (4% Annual)				$ 7,782.40
	CONSTRUCTION TOTAL				**$ 202,350.00**
	SOFT COSTS				
	City Project Management (5%)				$ 9,730.00
	Engineering and Environmental (12%)				$ 23,350.00
	Construction Management & Inspection (15%)				$ 29,190.00
	TOTAL SOFT COSTS				**$ 62,270.00**
	TOTAL CIP CONSTRUCTION ESTIMATE				**$ 256,830.00**

Agenda Item Number 11

Project Name	Well 6 Water Treatment System
Project No	CIP-14
Category	Water Projects
Project Location	991 Gravenstein Hwy

Description

Addition of an arsenic treatment system at City's municipal Well #6.

Justification

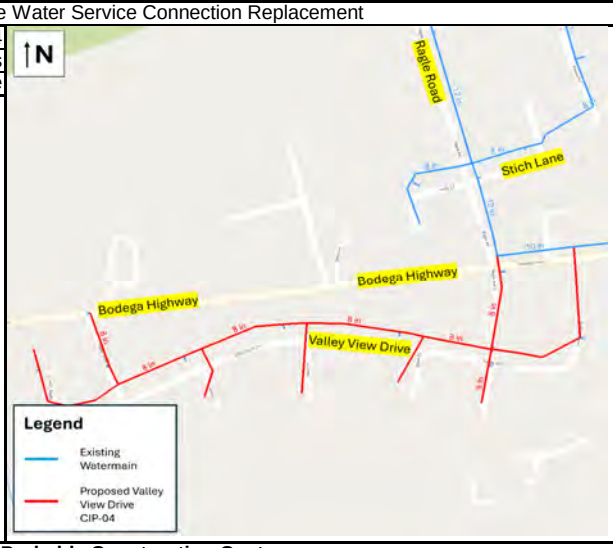
There has been a concern about naturally occurring arsenic at Well 6, and the City has been using dilution to keep arsenic level in the water below the maximum contaminant level of 10 ppb. Adding the treatment system can further remove arsenic from the water at Well 6.

Engineer's Opinion of Probable Construction Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Mobilization/Demobilization	1	LS	$ 122,900.00	$ 122,900.00
2	Demolition	1	LS	$ 58,800.00	$ 58,800.00
3	Site Improvements	1	LS	$ 78,300.00	$ 78,300.00
4	Treatment & Backwash System	1	LS	$ 1,097,700.00	$ 1,097,700.00
5	Site Utility Improvements	1	LS	$ 177,000.00	$ 177,000.00
6	Mechanical Piping	1	LS	$ 157,600.00	$ 157,600.00
7	Well 6 Building Improvements	1	LS	$ 195,800.00	$ 195,800.00
8	Elec & Instrumentation	1	LS	$ 117,900.00	$ 117,900.00
	CONSTRUCTION SUBTOTAL				**$ 2,006,000.00**
	Contractor's Bonds, Insurance, Overhead, and Profit (20%)				$ 401,200.00
	Construction Contingency (15%)				$ 361,080.00
	Market Factor (3%)				$ 72,216.00
	CONSTRUCTION SUBTOTAL				**$ 2,841,000.00**
	Escalation (4% Annual)				$ 482,568.17
	CONSTRUCTION TOTAL				**$ 3,323,570.00**
	SOFT COSTS				
	Check & Update Design Before Bidding (3.5%)				$84,300
	City Project Management (5%)				$142,100
	Construction Engineering (5%)				$142,100
	Construction Management & Inspection (15%)				$426,200
	TOTAL SOFT COSTS				**$ 794,700.00**
	TOTAL CIP CONSTRUCTION ESTIMATE				**$ 3,635,700.00**

Agenda Item Number 11

Project Name	Valley View Drive Water Service Connection Replacement
Project No	CIP-04
Category	Water Projects
Project Location	Valley View Drive
Description	Replace approximately 94 service connections using approximately 20 feet ,3/4 inch diameter HDPE pipe along Valley View Drive .
Justification	This location has had many lateral breaks due to corrosive soils and city has performed multiple repair services in the past. Replacing this section with HDPE pipe will help reduce the issues with the corrosive soil.



Engineer's Opinion of Probable Construction Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Water Pollution Control	1	LS	$ 4,100.00	$ 4,100.00
2	Shoring and Trench Safety	1	LS	$ 16,450.00	$ 16,450.00
3	Temporary Traffic Control	1	LS	$ 17,300.00	$ 17,300.00
4	New 3/4-inch diameter HDPE service & appurtenances (20 feet)	94	EA	$ 3,500.00	$ 329,000.00
6	Abandon, Remove and Salvage Water System Components	1	LS	$ 16,500.00	$ 16,500.00
8	Landscape Restoration	1	LS	$ 2,000.00	$ 2,000.00
9	Concrete Sidewalk Removal/Replacement	94	EA	$ 250.00	$ 23,500.00
10	Miscellaneous Work	1	LS	$ 5,000.00	$ 5,000.00
	CONSTRUCTION SUBTOTAL				**$ 413,850.00**
	Estimating Planned Contingency (15%)				$ 62,080.00
	Estimated Construction Contingency (10%)				$ 41,390.00
	CONSTRUCTION SUBTOTAL				**$ 517,320.00**
	Escalation (4% Annual)				$ 87,871.23
	CONSTRUCTION TOTAL				**$ 605,200.00**
	SOFT COSTS				
	City Project Management (5%)				$ 25,870.00
	Engineering and Environmental (12%)				$ 62,080.00
	Construction Management & Inspection (15%)				$ 77,600.00
	TOTAL SOFT COSTS				**$ 165,550.00**
	TOTAL CIP CONSTRUCTION ESTIMATE				**$ 682,870.00**

Agenda Item Number 11

Project Name	Covert Lane CI Watermain Replacement
Project No	CIP-02
Category	Water Projects
Project Location	Covert Lane

Description Replace approximately 360 feet 6 inch cast iron water line on Covert Lane between Norlee Street and Zimpher Drive.

Justification This is 40 year Old CI pipe and hence would have severe corrsoin resulting in reduced flow. Replacing the Old CI pipe with HDPE will result in enhanced hydraulic efficency and system performance.

Engineer's Opinion of Probable Construction Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Water Pollution Control	1	LS	$ 1,430.00	$ 1,430.00
2	Shoring and Trench Safety	1	LS	$ 5,119.00	$ 5,119.00
3	Temporary Traffic Control	1	LS	$ 5,600.00	$ 5,600.00
4	Utility Clearances	1	LS	$ 6,000.00	$ 6,000.00
5	Utility Conflict Resolution	1	LS	$ 7,080.00	$ 7,080.00
6	8-inch PVC Water Main	364	LF	$ 225.00	$ 81,900.00
7	Addition of valves and other miscellaneous	1	LS	$ 20,480.00	$ 20,480.00
8	Abandon, Remove and Salvage Water System Components	1	LS	$ 5,120.00	$ 5,120.00
9	Reconnect Existing Hydrant	2	EA	$ 2,000.00	$ 4,000.00
10	Landscape Restoration	1	LS	$ 2,000.00	$ 2,000.00
11	Miscellaneous Work	1	LS	$ 5,000.00	$ 5,000.00
	CONSTRUCTION SUBTOTAL				**$ 143,730.00**
	Estimating Planning Contingency (15%)				$ 21,560.00
	Estimated Construction Contingency (10%)				$ 14,380.00
	CONSTRUCTION SUBTOTAL				**$ 179,670.00**
	Escalation (4% Annual)				$ 30,518.49
	CONSTRUCTION TOTAL				**$ 210,190.00**
	SOFT COSTS				
	City Project Management (5%)				$ 8,990.00
	Engineering and Environmental (12%)				$ 21,570.00
	Construction Management & Inspection (15%)				$ 26,960.00
	TOTAL SOFT COSTS				**$ 57,520.00**
	TOTAL CIP CONSTRUCTION ESTIMATE				**$ 237,190.00**

Agenda Item Number 11

Project Name	Ellis Court CI Watermain Replacement
Project No	CIP-03
Category	Water Projects
Project Location	Between Ellis Court and High School Road
Description	Replace approximately 195 feet 6 inch diameter old cast iron pipe between Ellis Court and High School Road.
Justification	This is an Old CI pipe and hence would have severe corrsoin resulting in reduced flow. Replacing the Old CI pipe with HDPE will result in enhanced hydraulic efficency and system performance.

Engineer's Opinion of Probable Construction Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Water Pollution Control	1	LS	$ 850.00	$ 850.00
2	Shoring and Trench Safety	1	LS	$ 2,742.25	$ 2,742.25
3	Temporary Traffic Control	1	LS	$ 3,000.00	$ 3,000.00
4	Utility Clearances	1	LS	$ 6,000.00	$ 6,000.00
5	Utility Conflict Resolution	1	LS	$ 6,580.00	$ 6,580.00
6	8-inch PVC Water Main	195	LF	$ 225.00	$ 43,875.00
7	Addition of valves and other miscellaneous	1	LS	$ 10,970.00	$ 10,970.00
8	Abandon, Remove and Salvage Water System Components	1	LS	$ 2,750.00	$ 2,750.00
9	Reconnect Existing Hydrant	1	EA	$ 2,000.00	$ 2,000.00
10	Landscape Restoration	1	LS	$ 2,000.00	$ 2,000.00
11	Miscellaneous Work	1	LS	$ 5,000.00	$ 5,000.00
	CONSTRUCTION SUBTOTAL				**$ 85,770.00**
	Estimating Planning Contingency (15%)				$ 12,870.00
	Estimated Construction Contingency (10%)				$ 8,580.00
	CONSTRUCTION SUBTOTAL				**$ 107,220.00**
	Escalation (4% Annual)				$ 18,212.23
	CONSTRUCTION TOTAL				**$ 125,440.00**
	SOFT COSTS				
	City Project Management (5%)				$ 5,370.00
	Engineering and Environmental (12%)				$ 12,870.00
	Construction Management & Inspection (15%)				$ 16,090.00
	TOTAL SOFT COSTS				**$ 34,330.00**
	TOTAL CIP CONSTRUCTION ESTIMATE				**$ 141,550.00**

Agenda Item Number 11

Project Name	Installation of Isolation Valves
Project No	CIP-12
Category	Water Projects
Project Location	Parquet Street and Litchfield Avenue

Description

Installation of isolation valves at different location for system isolation during repair works at Parquet Street and Litchfield Avenue.

Justification

Isolation valves enables pressure zoning and sectional operations. This allows sections of the water system to be shut off while keeping the rest in operation.Avoids complete system shutdown and minimizes downtime and water loss.

Engineer's Opinion of Probable Construction Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Water Pollution Control	2	EA	$ 930.00	$ 1,860.00
2	Shoring and Trench Safety	2	EA	$ 1,920.00	$ 3,840.00
3	Temporary Traffic Control	2	EA	$ 2,000.00	$ 4,000.00
4	Utility Clearances	2	EA	$ 6,000.00	$ 12,000.00
5	Utility Conflict Resolution	2	EA	$ 6,390.00	$ 12,780.00
6	Addition of new PRV	2	EA	$ 16,000.00	$ 32,000.00
7	Addition of valves and other miscellaneous	2	EA	$ 3,200.00	$ 6,400.00
8	Landscape Restoration	3	EA	$ 2,000.00	$ 6,000.00
9	Miscellaneous Work	3	EA	$ 5,000.00	$ 15,000.00
	CONSTRUCTION SUBTOTAL				**$ 93,880.00**
	Estimating Planned Contingency (15%)				$ 14,090.00
	Estimated Construction Contingency (10%)				$ 9,390.00
	CONSTRUCTION SUBTOTAL				**$ 117,360.00**
	Escalation (4% Annual)				$ 31,137.84
	CONSTRUCTION TOTAL				**$ 148,500.00**
	SOFT COSTS				
	City Project Management (5%)				$ 5,870.00
	Engineering and Environmental (12%)				$ 14,090.00
	Construction Management & Inspection (15%)				$ 17,610.00
	TOTAL SOFT COSTS				**$ 37,570.00**
	TOTAL CIP CONSTRUCTION ESTIMATE				**$ 154,930.00**

Agenda Item Number 11

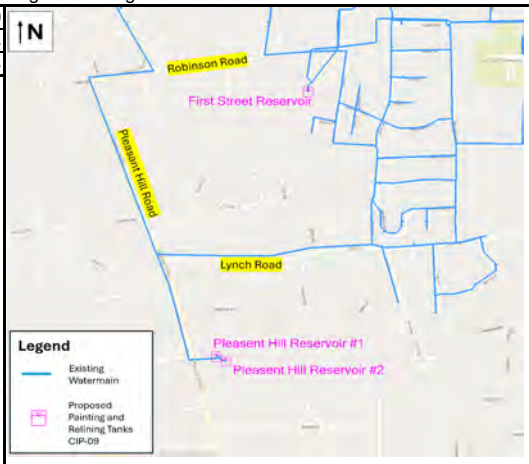
Project Name	Painting and Relining of Existing Water Tanks
Project No	CIP-09
Category	Water Projects
Project Location	First Street and Pleasant Hill Tanks

Description

Painting and relining of First Street Tank and Pleasant Hill Tanks.

Justification

Repainting and relining of the steel storage tanks are essential to prevent corrosion, maintain structural integrity, and ensure water quality compliance. The protective coating system prevents metal deterioration, extends the service life of the assets, and reduces long-term maintenance costs. Previous inspection was conducted in the year 2012 and hence it is recommended to perform an inspection followed by painting and relining of the tanks.



Engineer's Opinion of Probable Project Costs

ITEM		QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Inspection and cleaning of reservoirs	3	EA	$ 50,000.00	$ 150,000.00
2	Interior and exterior recoating of reservoirs	3	EA	$ 150,000.00	$ 450,000.00
3	Miscellaneous Work	3	EA	$ 5,000.00	$ 15,000.00
	SUBTOTAL				**$ 615,000.00**
	Estimating Planned Contingency (15%)				$ 92,250.00
	TOTAL				**$ 707,250.00**
	Escalation (4% Annual)				$ 187,646.88
	PROJECT TOTAL				**$ 894,900.00**
	SOFT COSTS				
	City Project Management (5%)				$ 35,370.00
	Engineering and Environmental (12%)				$ 84,870.00
	TOTAL SOFT COSTS				**$ 120,240.00**
	TOTAL CIP ESTIMATE				**$ 827,490.00**

Agenda Item Number 11

Appendix A

City of Sebastopol Land Use Map

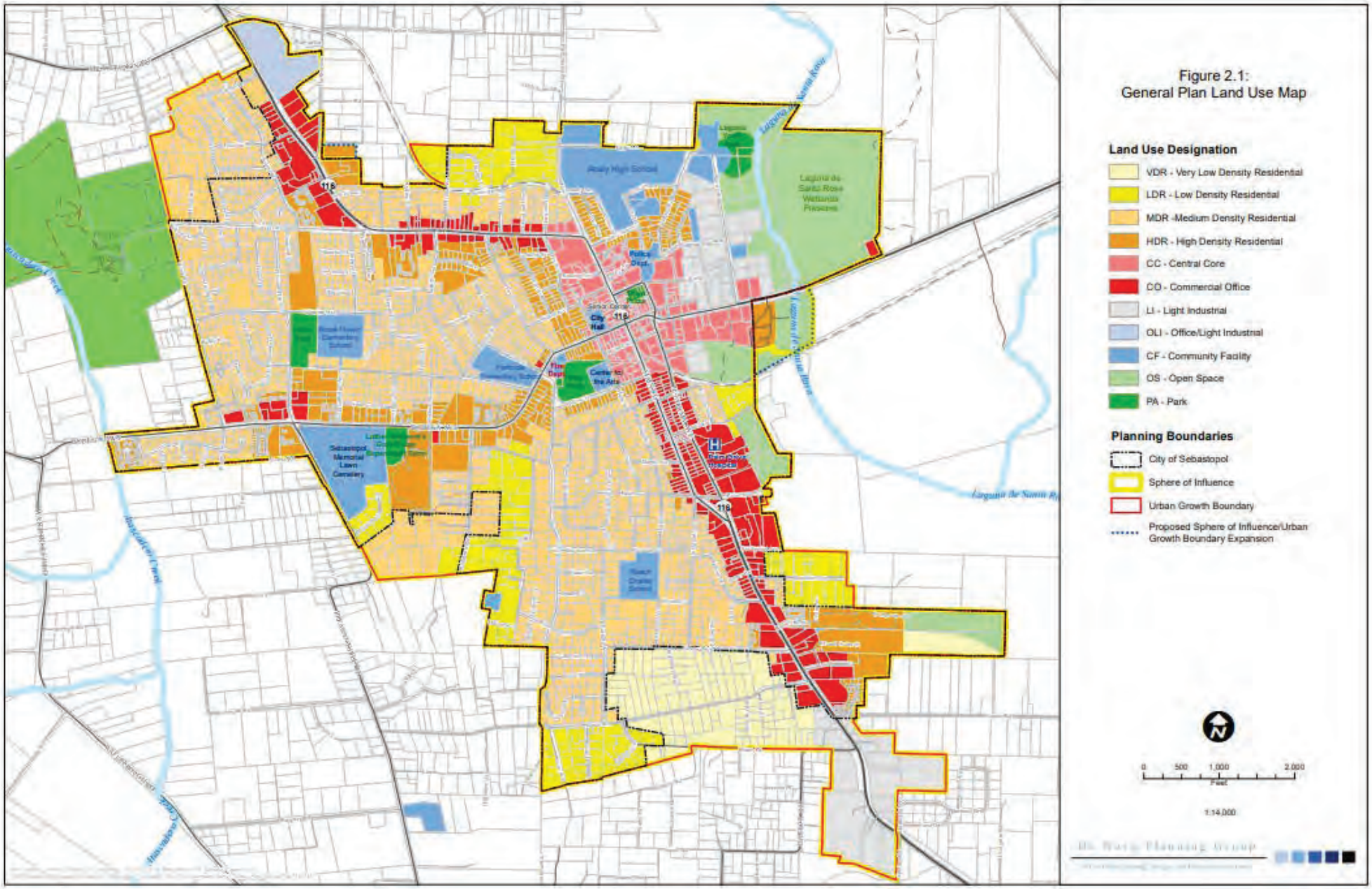
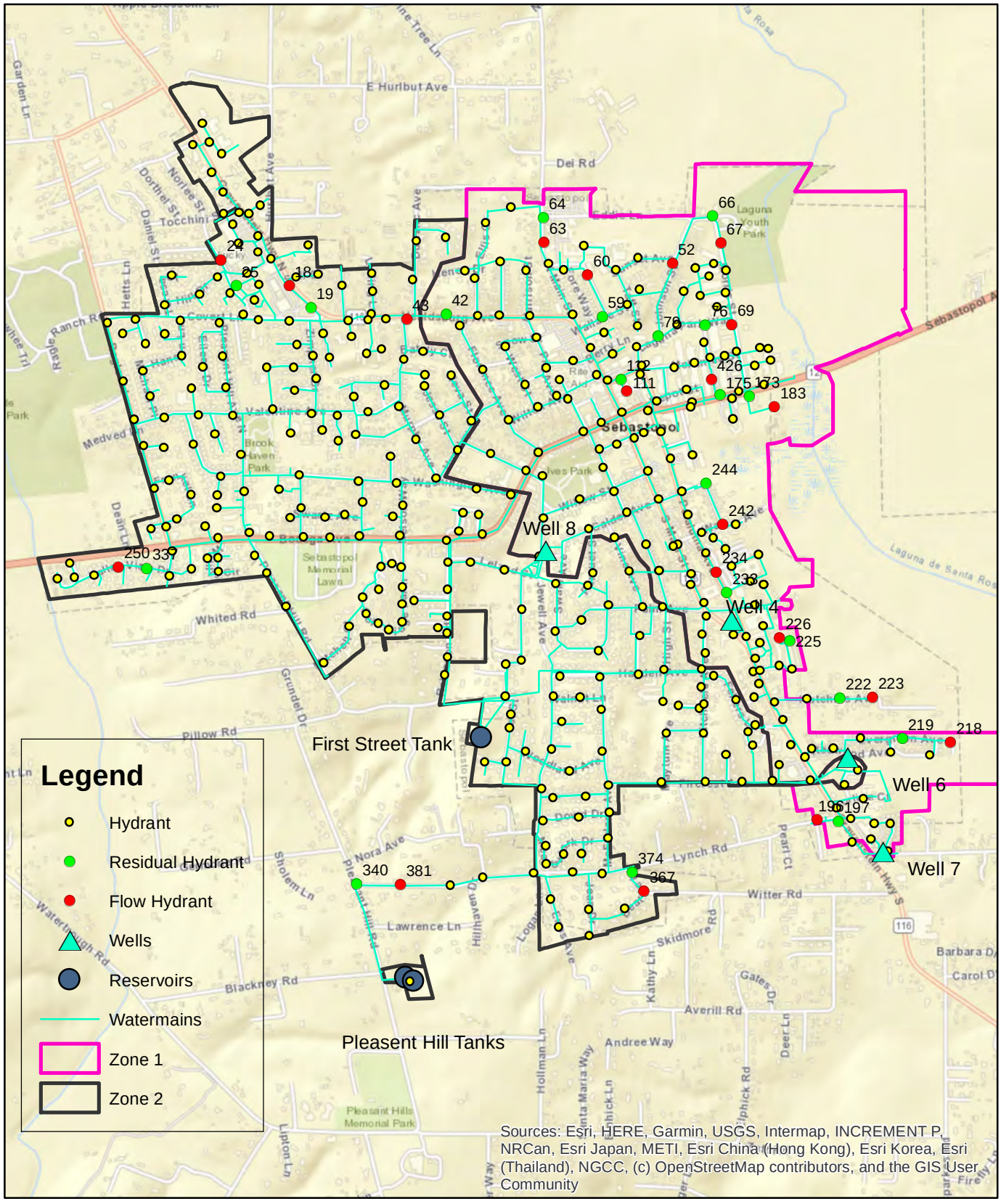


Figure 2.1:
General Plan Land Use Map
Land Use Designation
VDR - Very Low Density Residential
LDR - Low Density Residential
MDR -Medium Density Residential
HDR - High Density Residential
CC - Central Core
CO - Commercial Office
LI - Light Industrial
OLI - Office/Light Industrial
CF - Community Facility
OS - Open Space
PA - Park
Planning Boundaries
City of Sebastopol
Sphere of Influence
Urban Growth Boundary
Proposed Sphere of Influence/Urban Growth Boundary Expansion
0
500
1,000
2,000
Feet
1:14,000

Appendix B

Hydrant Flow Test Locations



Paper Size ANSI A

0 180 360 540 720

Meters

Map Projection: Mercator Auxiliary Sphere
Horizontal Datum: WGS 1984
Grid: WGS 1984 Web Mercator Auxiliary Sphere

CITY OF SEBASTOPOL

Project No. 12658893
Revision No. -
Date 05/02/2025

HYDRANT TEST LOCATIONS

FIGURE B.1

Appendix C

Hydrant Flow Test Results

Valley View #1

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 250 LOCATION Hyd # 6-8

STATIC PRESSURE 83 psi RESIDUAL PRESSURE 78 psi

FLOW HYDRANT # 337 LOCATION Hyd # 6-7

FLOW PRESSURE [Pitot] 60 psi ***LINE FLOW CAPACITY*** 1,300 gpm

TEST DATE: 8-14-25 FLOW TIME 3 GAL 3900 TESTED BY AC/EN
1030

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

H,11 Dr #2

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 24 LOCATION Hyd # 6-50

STATIC PRESSURE 54 psi RESIDUAL PRESSURE 52 psi

FLOW HYDRANT # 25 LOCATION Hyd # 6-52

FLOW PRESSURE [Pitot] 51 psi ***LINE FLOW CAPACITY*** 1198 gpm

TEST DATE: 8-14-25 1020 FLOW TIME 2 GAL 2,396 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Grav N. #3

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 18 LOCATION Hyd # 5-32

STATIC PRESSURE 64 psi RESIDUAL PRESSURE 60 psi

FLOW HYDRANT # 19 LOCATION Hyd # 5-31

FLOW PRESSURE [Pitot] 58 psi ***LINE FLOW CAPACITY*** 1278 gpm

TEST DATE: 8-14-25 0745 FLOW TIME 3 GAL 3.834 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Healdsburg #4

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 43 LOCATION Hyd # 4-7

STATIC PRESSURE 86 psi RESIDUAL PRESSURE 87 psi

FLOW HYDRANT # 42 LOCATION Hyd# 3-18

FLOW PRESSURE [Pitot] 44 psi ***LINE FLOW CAPACITY*** 1113 gpm

TEST DATE: 8-14-25 FLOW TIME 3 GAL 3339 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

North Main #5

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 63 LOCATION Hyd # 2-47

STATIC PRESSURE 59 psi RESIDUAL PRESSURE 56 psi

FLOW HYDRANT # 64 LOCATION Hyd #2-48

FLOW PRESSURE [Pitot] 55 psi ***LINE FLOW CAPACITY*** 1244 gpm

TEST DATE: 8-14-25 1010 FLOW TIME 4 GAL 4,976 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Bonnardel # 6

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 60 LOCATION Hyd # 2-42

STATIC PRESSURE 56 psi RESIDUAL PRESSURE 54 psi

FLOW HYDRANT # 59 LOCATION Hyd # 2-38

FLOW PRESSURE [Pitot] 52 psi ***LINE FLOW CAPACITY*** 1,289 gpm

TEST DATE: 8-14-25 1600 FLOW TIME 4 GAL 5,156 TESTED BY AC/GN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

#7

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 52 LOCATION Hyd# 2-45

STATIC PRESSURE 66 psi RESIDUAL PRESSURE 64 psi

FLOW HYDRANT # 79 LOCATION Hyd# 2-30

FLOW PRESSURE [Pitot] 70 psi ***LINE FLOW CAPACITY*** 1404 gpm

TEST DATE: 8-13-25 1500 FLOW TIME 3min GAL 4212 TESTED BY AC/EV

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Mck st & Weeks #8

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 111 LOCATION Hyd # 2-21

STATIC PRESSURE 68 psi RESIDUAL PRESSURE 65 psi

FLOW HYDRANT # 112 LOCATION Hyd # 2-22

FLOW PRESSURE [Pitot] 64 psi ***LINE FLOW CAPACITY*** 1,342 gpm

TEST DATE: 8-14-25 0710 FLOW TIME 3min GAL 4,026 TESTED BY AC / EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 76 LOCATION Hyd # 2-12

STATIC PRESSURE 75 psi RESIDUAL PRESSURE 76 psi

FLOW HYDRANT # 69 LOCATION Hyd # 2-32

FLOW PRESSURE [Pitot] 66 psi ***LINE FLOW CAPACITY*** 1363 gpm

TEST DATE: 8-13-25 1420 FLOW TIME 3 min GAL 4089 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

#10

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 67 LOCATION Hyd # 2-19

STATIC PRESSURE 74 psi RESIDUAL PRESSURE 74 psi

FLOW HYDRANT # 66 LOCATION 2-20

FLOW PRESSURE [Pitot] 70 psi ***LINE FLOW CAPACITY*** 1404 gpm

TEST DATE: 8-13-25 1400 FLOW TIME 5 min GAL 7020 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Seb Ave & Mck Ave #11

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 175 LOCATION Hyd # 2-25

STATIC PRESSURE 72 psi RESIDUAL PRESSURE 71 psi

FLOW HYDRANT # 426 LOCATION Hyd # 2-3

FLOW PRESSURE [Pitot] 70 psi ***LINE FLOW CAPACITY*** 1,404 gpm

TEST DATE: 8-14-25 0700 FLOW TIME 4 GAL 5,616 TESTED BY AC/EW

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 183 LOCATION Hyd # 1-45

STATIC PRESSURE 72 psi RESIDUAL PRESSURE 70 psi

FLOW HYDRANT # 173 LOCATION Hyd # 1-52

FLOW PRESSURE [Pitot] 62 psi ***LINE FLOW CAPACITY*** 1321 gpm

TEST DATE: 8-13-25 1446 FLOW TIME 4 min GAL 5,284 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Eleanor Ave #13

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 242 LOCATION Hyd # 1-14

STATIC PRESSURE 57 psi RESIDUAL PRESSURE 55 psi

FLOW HYDRANT # 244 LOCATION Hyd # 1-13

FLOW PRESSURE [Pitot] 63 psi ***LINE FLOW CAPACITY*** 1332 gpm

TEST DATE: 8-14-25 1330 FLOW TIME 3min GAL 3,996 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Petaluma Ave #14

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm 1

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 234 LOCATION Hyd # 1-06

STATIC PRESSURE 61 psi RESIDUAL PRESSURE 56 psi

FLOW HYDRANT # 233 LOCATION Hyd # 1-07

FLOW PRESSURE [Pitot] 58 psi ***LINE FLOW CAPACITY*** 1,278 gpm

TEST DATE: 8-14-25 FLOW TIME 4 min GAL 3,834 TESTED BY AC/EN
1320

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Southpoint Ave #15

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm 1

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 225 LOCATION Hyd # 1-23

STATIC PRESSURE 61 psi RESIDUAL PRESSURE 53 psi

FLOW HYDRANT # 226 LOCATION Hyd # 1-24

FLOW PRESSURE [Pitot] 52 psi ***LINE FLOW CAPACITY*** 1210 gpm

TEST DATE: 8-14-25 1305 FLOW TIME 3 GAL 3,630 TESTED BY AK/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Hutchins Ave #16

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 223 LOCATION Hyd # 1-33

STATIC PRESSURE 67 psi RESIDUAL PRESSURE 63 psi

FLOW HYDRANT # 222 LOCATION Hyd # 1-32

FLOW PRESSURE [Pitot] 60 psi ***LINE FLOW CAPACITY*** 1,300 gpm

TEST DATE: 9-14-25 1140 FLOW TIME 4 min GAL 5,200 TESTED BY _____

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Evergreen Ave #17

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 218 LOCATION Hyd # 1-38

STATIC PRESSURE 69 psi RESIDUAL PRESSURE 63 psi

FLOW HYDRANT # 219 LOCATION Hyd # 1-37

FLOW PRESSURE [Pitot] 59 psi ***LINE FLOW CAPACITY*** 1259 gpm

TEST DATE: 8-14-25 1130 FLOW TIME 4min GAL 5,156 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Lynch Road #18

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 196 LOCATION Hyd #10-53

STATIC PRESSURE 50 psi RESIDUAL PRESSURE 46 psi

FLOW HYDRANT # 197 LOCATION Hyd #10-41

FLOW PRESSURE [Pitot] 45 psi ***LINE FLOW CAPACITY*** 1126 gpm

TEST DATE: 8-14-25 1050 FLOW TIME 3 GAL ~~1126~~ 3,378 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Lynch Rd #19

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 381 LOCATION Hyd # 10-3

STATIC PRESSURE 26 psi RESIDUAL PRESSURE 26 psi

FLOW HYDRANT # 340 LOCATION Hyd # 10-2

FLOW PRESSURE [Pitot] 27 psi ***LINE FLOW CAPACITY*** 872 gpm

TEST DATE: 9-14-25 1115 FLOW TIME 3min GAL 2616 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

Lynch Rd #20

HYDRANT TEST INFORMATION RECORD

SINGLE HYDRANT FLOW TEST [See Testing Directions on Laminated Card]
Determines available water supply at the selected hydrant. [*Preferred by Sebastopol FD; not NFPA.*]

TEST HYDRANT # _____ LOCATION _____

STATIC psi _____ RESIDUAL psi _____ FLOW PRESSURE [Pitot] psi _____

HYDRANT FLOW: At Test Outlet _____ gpm Project Available Hydrant Flow _____ gpm **1**

MANUFACTURER _____ CONNECTIONS 2 ½ _____ 4 ½ _____

TEST DATE: _____ FLOW TIME _____ GAL _____ TESTED BY _____

1. Projected available flows from hydrant calculated at 20 psi residual

FIRE MAIN FLOW TEST - *NFPA 291 Standard Test* [See Testing Directions on Laminated Card]
Determines the available water supply in the main line at the **Test** hydrant. Two hydrants are required for this test per NPFA 291: the Test Hydrant ["residual" hydrant] and a Flow Hydrant, which upon opening, will affect the residual psi at the Test Hydrant. Pitot gauge measures psi at Flow Hydrant at the same time.

TEST HYDRANT # 367 LOCATION Hyd # 10-11

STATIC PRESSURE 69 psi RESIDUAL PRESSURE 66 psi

FLOW HYDRANT # 374 LOCATION Hyd # 10-12

FLOW PRESSURE [Pitot] 68 psi ***LINE FLOW CAPACITY*** 1384 gpm

TEST DATE: 8-14-25 1100 FLOW TIME 3 GAL 4,152 TESTED BY AC/EN

CONDITION OF HYDRANTS	TEST HYDRANT	FLOW HYDRANT
NEEDS PAINT	Yes ___ No ___	Yes ___ No ___
NUMBERED	Yes ___ No ___	Yes ___ No ___
NEEDS CLEARANCE	Yes ___ No ___	Yes ___ No ___
STREET SHUTOFF VISIBLE	Yes ___ No ___	Yes ___ No ___
BLUE STREET MARKER	Yes ___ No ___	Yes ___ No ___

COMMENTS:

8-23-23 [REV 8-01-24]

ghd.com

→ The Power of Commitment

Matt Kennedy
Project Director
Abhishek Kumar
Project Manager

Water Master Plan (Final Draft)
City of Sebastopol

Welcome

GHD Design

Agenda

→ Example

1. Safety Moment
2. Updated Water Master Plan Report
   a. Existing System
   b. Model Development
   c. Water Demand Projections
   d. Water System Analysis
   e. CIPs and Cost Estimates
3. Council's Feedback
4. Final Steps and Q/A

Updated Water Master Plan Report

Scope/Objectives

- Water system evaluation – supply, storage and distribution
- Hydraulic model update
- Capital Improvement Projects (CIPs)

Updates in this Report

- Water distribution system model
- Water demand and projection
- Fire flow requirement
- Storage requirement
- CIPs

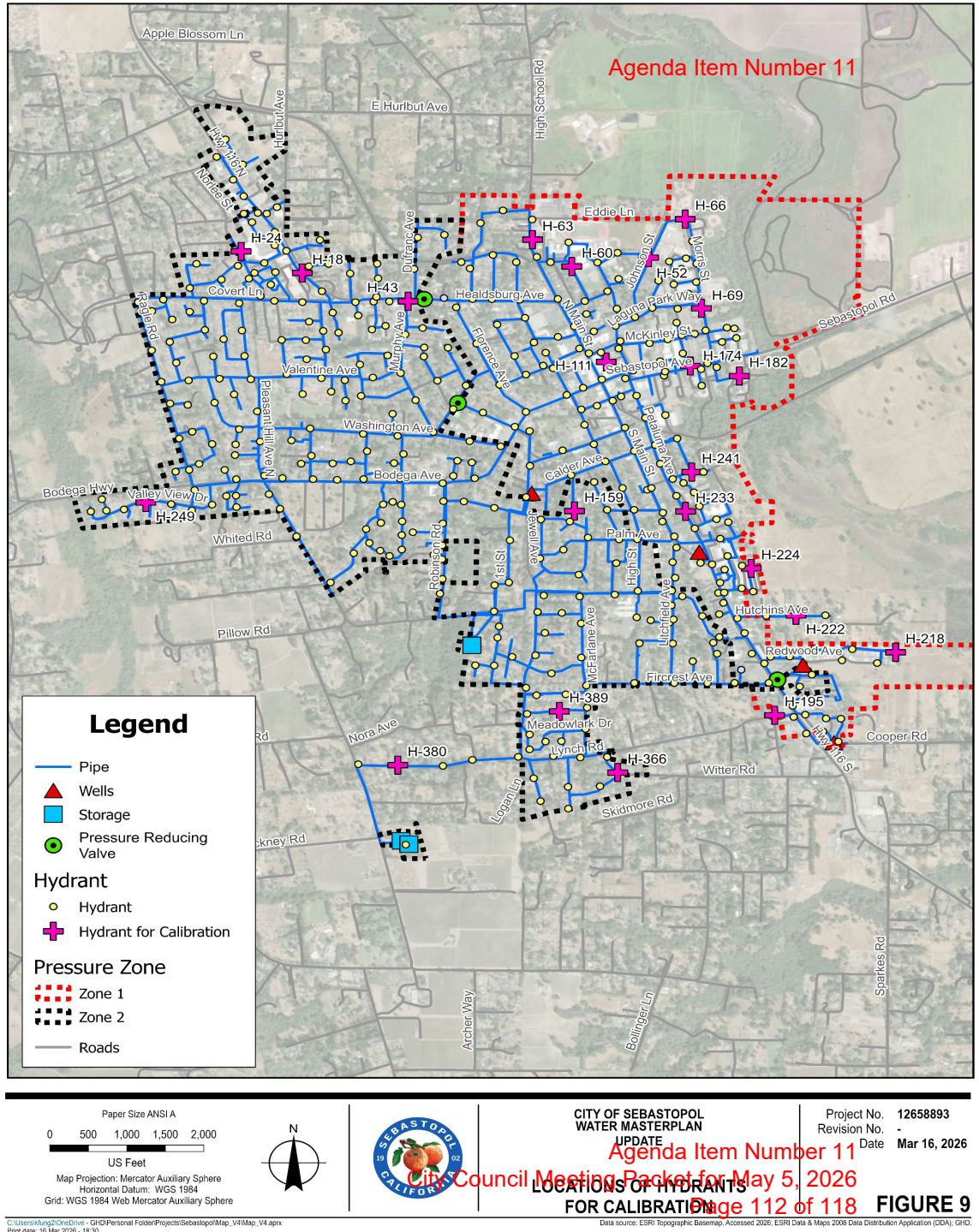
Water Master Plan Update

City of Sebastopol

April 03, 2026

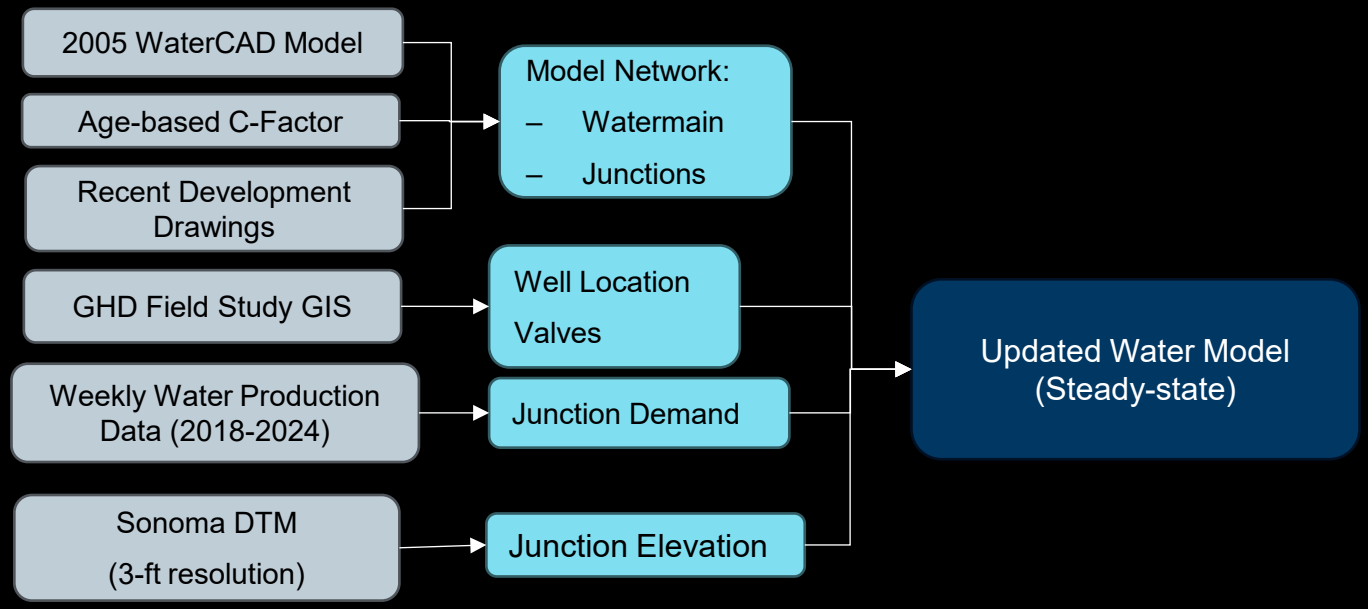
Existing System

Components	Details
Watermains	– 38 miles – Materials: AC, DI, CI and PVC
Average Water Demands	– 290 MG/year or 552 GPM (2018-2024)
Water Supply	– Zone 1: Wells 4 & 7 • 233 MG (2018-2024) – Zone 2: Wells 6 & 8 • 78 MG (2018-2024) – Stable groundwater level (2018-2023)
Water Storage	– Zone 1: x1 (1.5 MG total) – Zone 2: x2 (3 MG total)
Raw Water Quality	– Arsenic (4 µg/L avg) in water source – remediated by blending – PCE contamination in Well 4 – GAC filtration system in Well 4



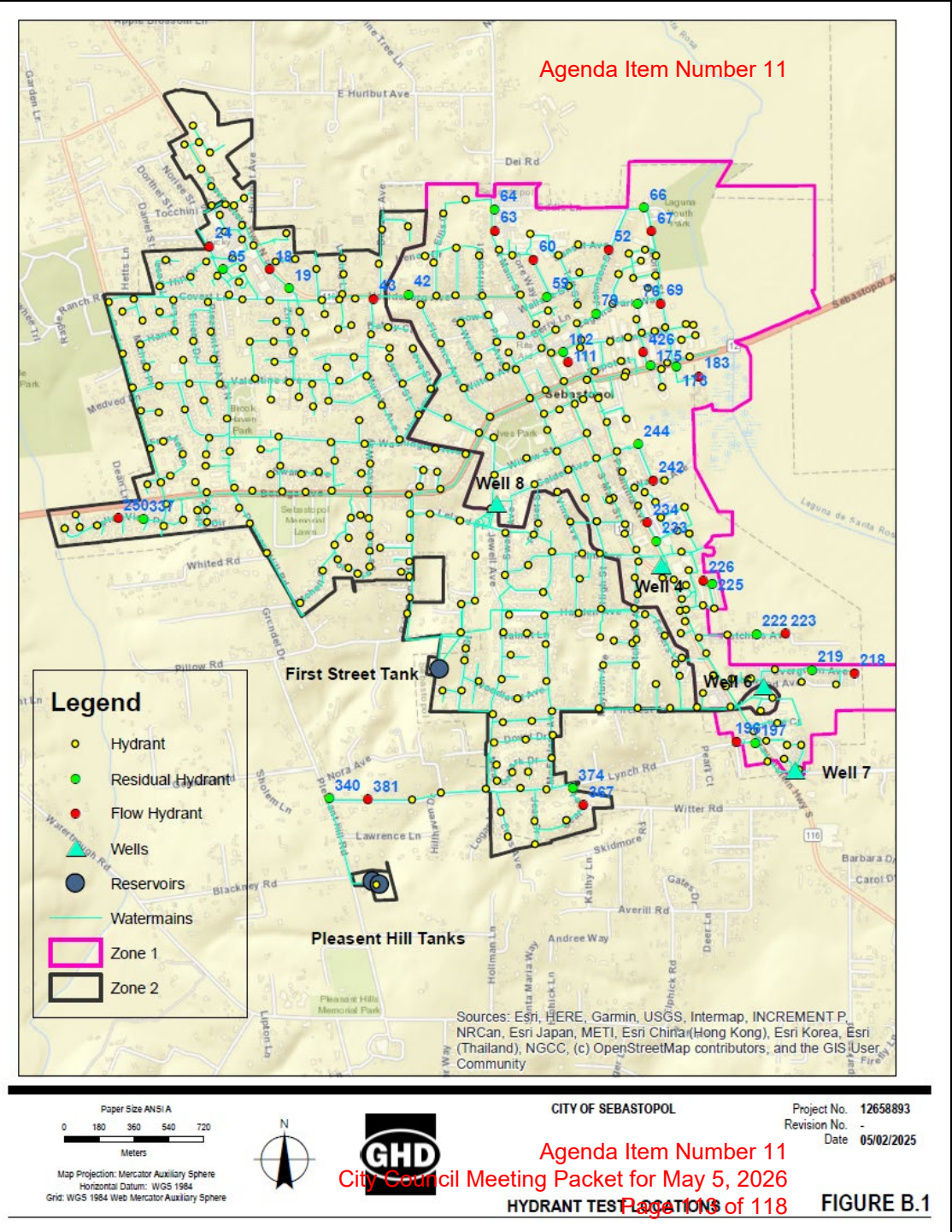
Modelling

Model Build



Model Calibration

- Calibrated with 20 hydrant flow tests
- Modelled pressure vs field static pressure
  - Range ± 5 psi



Water System Analysis

Water Demands

Peaking Factors:

2.0 (MDD)

5.0 (MHD)

Scenarios	2025 (GPM per node)	2045 (GPM per node)
ADD	0.74	0.86
MDD	1.48	1.72
PHD	3.70	4.29

Pressure Zone	Classification			
	Operational Storage (gallon)	Equalization Storage (gallon)	Fire Storage (gallon)	Zone Total (gallon)
1	639,706	319,853	540,000	**1,499,560**
2	212,406	106,203	540,000	**858,609**

Evaluation Criteria

- **Pressure**
  - Desired Minimum Pressure at Peak Hour Demand: 40 psi
  - Desired Minimum Pressure at Maximum Daily Demand plus Fire Flow: 20 psi
  - Desired Maximum Service Pressure: 100 psi
- **Available Fire Flow**
  - Minimum = 1,500 GPM @ 20 psi (as per CFC)
- **Water Storage Requirement**
  - Storage Requirement v.s. Storage Available
  - Operational + Equalization + Fire
    - **Operational**: 100% of ADD in Gallons
    - **Equalization**: 25% of MDD in Gallons
    - **Fire**: 540,000 Gallons

Water System Analysis – Existing Condition

Pressure

- Most of the system falls within 40-100 psi
- Areas below 40 psi: Pleasant Hill Road, West Hill Circle, Golden Ridge Avenue, Hayden Avenue

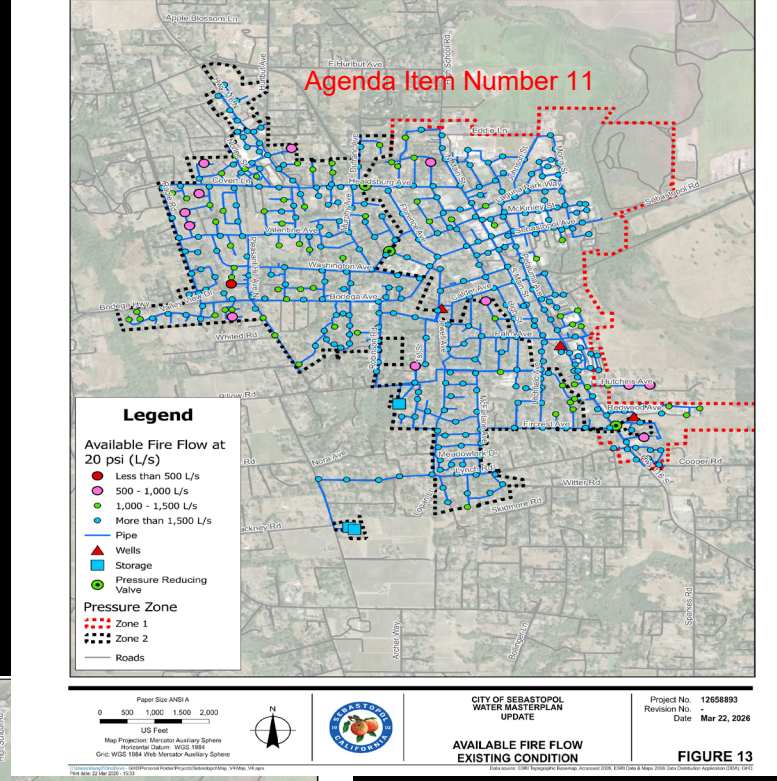
Available Fire Flow

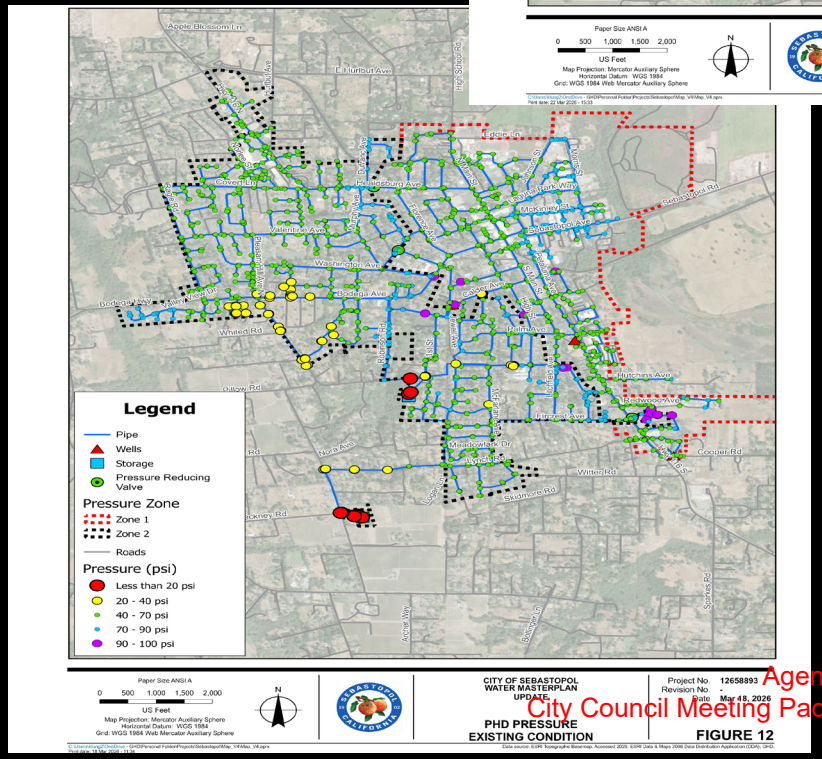
- Most of the hydrants meet the criteria of 1,500 GPM at 20 psi
- Hydrants below 1,500 GPM: Dead ends

Water Storage Requirement

- Both Zone 1 and Zone 2 meet the storage requirement

Pressure Zones	Total Storage Requirement (Gallon)	Reservoir Capacities (gallon)
1	1,499,560	1,500,000
2	858,609	6,000,000





Water System Analysis – Year 2045

Pressure

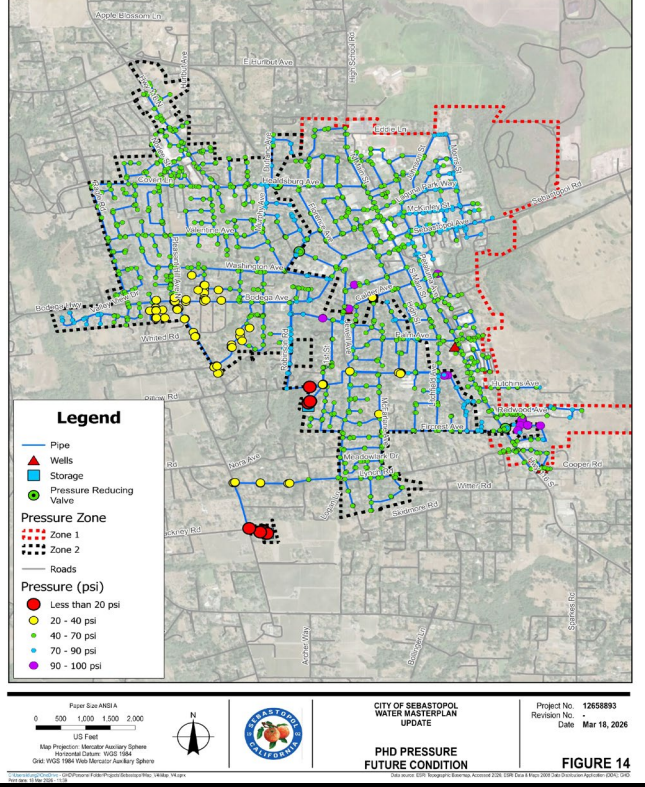
- Most of the system falls within 40-100 psi
- Areas below 40 psi: Similar to the existing condition.

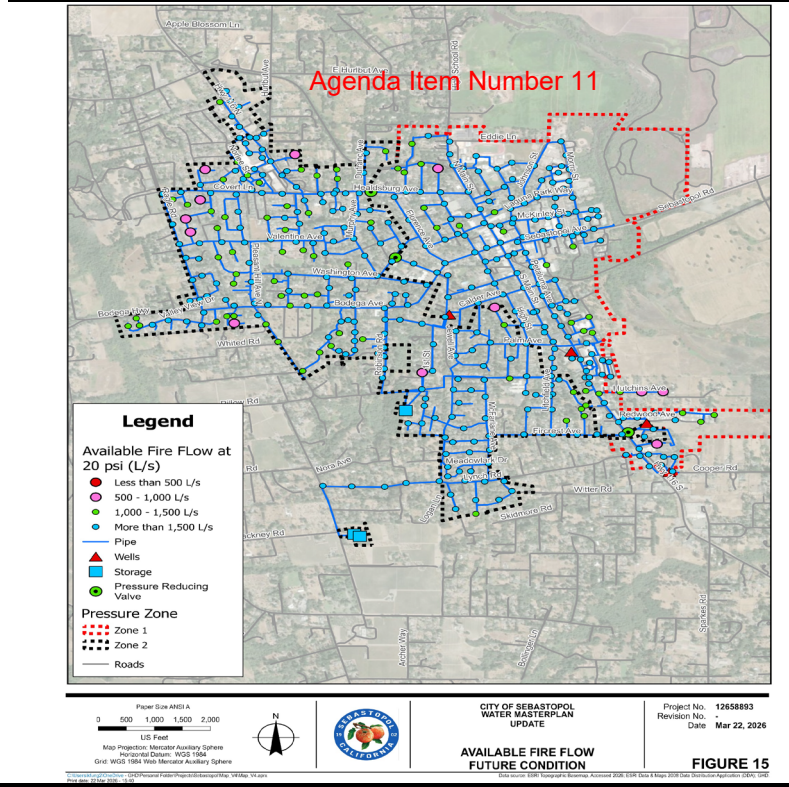
Available Fire Flow

- Most of the hydrants meet the criteria of 1,500 GPM at 20 psi
- Hydrants below 1,500 GPM: Dead ends

Water Storage Requirement

- In year 2045, the water storage requirement for Pressure Zone 1 will exceed its reservoir capacity by 10%
- Total storage in the City is sufficient for the City as a whole and interties are available to allow water to flow from Pressure Zone 2 to Pressure Zone 1





Pressure Zones	Total Storage Requirement (Gallon)	Reservoir Capacities (gallon)	Additional Required Storage (gallon)
1	1,643,430	1,500,000	143,000
2	906,401	6,000,000	0

CIPs and Cost Estimates

Link: CIPs Excel

Project No./ Priority	Ranking of Importance	Description	Start Year	Construction Cost [1]	Project Cost [2]
1	High	Well 4 Replacement	2027	$2,912,410	$3,352,000
2	High	Pleasant Hill Loop	2027	$750,680	$952,780
3	High	Structural Assessment of Existing Water Tanks	2027	N/A	$126,000
4	High	Seismic Retrofit Study for Existing Water Tanks	2027	N/A	$141,750
5	High	Gwendolyn Place Water Service Connection Replacement	2027	$57,690	$73,240
6	High	Installation of Automated Flow Meter	2027	$58,640	$74,430
7	High	500 South Main Street Watermain Replacement	2027	$120,110	$152,460
8	High	Replacement of Existing Pressure Reducing Valves	2027	$202,350	$256,830
9	Medium	Well 6 Water Treatment System	2030	$3,323,570	$3,635,700
10	Medium	Valley View Drive Water Service Connection Replacement	2030	$605,200	$682,870
11	Medium	Covert Lane CI Watermain Replacement	2030	$210,190	$237,190
12	Medium	Ellis Court CI Watermain Replacement	2030	$125,440	$141,550
13	Low	Installation of Isolation Valves	2032	$148,500	$154,930
14	Low	Painting and Relining of Existing Water Tanks	2032	$894,900	$827,490
			Total	**$9,409,680**	**$10,809,220**

Notes:
[1] Considered construction cost with inflation or 4% annual escalation.
[2] Included soft cost and construction cost without inflation or 4% annual escalation

Agenda Item Number 11

* Thank you