

Small Water System Management Plan

For new and expanding public water systems with fewer than 1,000 connections

July 2021

Water System Name: Whatcom County Water District 13 (ID #959143)



Whatcom County Water District 13

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Acronym	Definition
AC	Asbestos Cement
AC-FT/YR	Acre-feet per Year
A-COMM	Group A Community Water System
ADD	Average Day Demand
AG	Air Gap
ANSI	American National Standards Institute
A-NTNC	Group A Non-Transient Non-Community Water System
APWA	American Public Works Association
A-TNC	Group A Transient Non-Community Water System
AWWA	American Water Works Association
BAT	Backflow Assembly Technician
BTO	Basic Treatment Operator
CCCP	Cross Connection Control Program
CCF	100 cubic feet
CCR	Consumer Confidence Report
CCS	Cross Connection Specialist
CEU	Continuing Education Unit
CF	Commercial Forest
CFR	Code of Federal Regulations or Calculated Fixed Radius
CIP	Capital Improvement Plan
CPI	Consumer Price Index
CU	Color Unit
CWSP	Coordinated Water System Plan
CWSSA	Critical Water Supply Service Area
DBP	Disinfectant Byproduct
DCVA	Double Check Valve Assembly
DI	Ductile Iron
DOE	Washington State Department of Ecology
DOH	Washington State Department of Health
DS	Dead Storage
DSL	Distribution System Leakage
EPA	Environmental Protection Agency
ERU	Equivalent Residential Unit
ES	Equalizing Storage
EWRRC	East Whatcom Regional Resource Center
FF	Fire Flow
FPS	Feet per Second
FS	Fire Storage
FSS	Fire Suppression Storage
GC	General Commercial
GFC	General Facilities Charge
GMA	Growth Management Act

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gpd	Gallons per Day
gpm	Gallons per Minute
GROUP A	Group A Water System
GROUP B	Group B Water System
HAA5	Haloacetic Acids
HDPE	High Density Polyethylene
HERB1	General Herbicide
HGL	Hydraulic Grade Line
ILA	Interlocal Agreement
IOC	Inorganic Chemical and Physical
LID	Local Improvement District
LRAA	Locational Running Annual Average
LUST	Leaking Underground Storage Tank
MCL	Maximum Contaminant Level
MDD	Maximum Day Demand
MFL	Millions of Fibers per Liter
MG	Million Gallons
mg/L	Milligrams per Liter
MMAD	Maximum Month Average Demand
MTCA	Model Toxics Control Act
MWL	Municipal Water Law
N	Number of ERUs for Design
N/A	Not Applicable
NMUGA	Non-Municipal Urban Growth Area
NSF	National Sanitation Foundation
NTU	Nephelometric Turbidity Unit
O&M	Operation and Maintenance
OS	Operational Storage
pCi/L	Picocuries per Liter
PEST1	General Pesticide
PGG	Pacific Groundwater Group, Inc.
PHD	Peak Hour Demand
PLC	Programmable Logic Controller
PM	Preventative Maintenance
PRV	Pressure Reducing Valve
PSI	Pounds per square inch
PVC	Polyvinyl Chloride
PVCC	Peaceful Valley Country Club
PWTF	Public Works Trust Fund
Q _a	Maximum annual withdrawal allowed under a water right
Q _i	Maximum instantaneous withdrawal rate allowed under a water right
Q _L	Capacity of Largest Single Source, gpm
Q _{PH}	Peak Hourly Demand, gpm
Q _S	Total Source of Supply Capacity (excluding emergency supplies), gpm

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R	Rural
R5A	Rural 5 Acre Lots
R10A	Rural 10 Acre Lots
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RF	Rural Forest
ROW	Right-of-Way
RPBA	Reduced Pressure Backflow Assembly
RPDA	Reduced Pressure Detector Assembly
SCA	Sanitary Control Area
SCADA	Supervisory Control and Data Acquisition
SMA	Satellite Management Agency
SOC	Synthetic Organic Chemical
SS	Standby Storage
SWSMP	Small Water System Management Plan
t _M	Time of duration for fire flow
TS	Total Storage
TTHM	Total Trihalomethanes
UGA	Urban Growth Area
ULID	Utility Local Improvement District
UR-4	Urban Residential 4 Lots per Acre
UST	Underground Storage Tank
VES	Equalizing Storage, gallons
VFSS	Volume of Fire Suppression Storage, gallons
VOC	Volatile Organic Chemical
VSB	Total Standby Storage, gallons
WAC	Washington Administrative Code
WDM	Water Distribution Manager
WETRC	Washington Environmental Training Resource Center
WFI	Water Facilities Inventory
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Plan/Program
WLCAP	Water Loss Control Action Plan
WSDOT	Washington State Department of Transportation
WSP	Water System Plan
WTPO	Water Treatment Plant Operator
WUE	Water Use Efficiency
ZOC	Zones of Contribution (aka "Capture Zones")

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the future. A new well was installed and came online in June of 2003, which gives the District capability to meet future demands. There have been no major changes to the system since 1975.

The Engineering Report and Calculations, enclosed in Appendix F, utilizes information from the Whatcom County Comprehensive Plan, adopted August 9, 2016, updated May 2021 to estimate growth in population, service connections, and demand. The following elements of the county plan were used for growth projections:

- *Appendix E - Whatcom County 20-year Capital Facilities Plan*
- *Final Environmental Impact Statement (Final EIS) for 2016 Whatcom County Comprehensive Plan and Development Regulations Update and Urban Growth Area (UGA) Review, (Appendix E)*
- *Land Capacity Analysis Report, June 27, 2016*

In 2011, the District replaced eight water valves throughout the system. In 2014, both reservoirs were cleaned and minor repairs were completed. Backflow preventers were added at Wastewater Treatment Plant and Green Valley Lift Station in 2014, a new commodity water rate structure was adopted in 2017, all water meters were replaced in 2018, and repairs were made to Well 2, including replacement of the pump column.

The District is requesting approval of this Small Water System Management Plan for a period of 10 years.

C. Service Area Policies

The following is a list of policy subjects that may directly or indirectly affect the provision of water service. Defined policies will guide the growth of the system and firmly establish how the purveyor will respond to requests for water service within the water system's service area. See Appendix C for the District's service area policies. Please summarize each policy below:

Wholesaling Water: The District currently does not wholesale water.

Wheeling of Water: There is no wheeling of water.

Annexation/Membership Policy: Not applicable, the District serves properties within the established service area boundaries.

Design and Performance Standards Policies: The District requires all work to meet the requirements of the Washington State Department of Health, District Standards, and the WSDOT/APWA Standard Specifications for Road, Bridge and

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Municipal Construction. The District adopted a Developer Extension Manual in 2012, with new design and construction standards, attached in Appendix E.

Surcharge for Outside Customers: There are currently no customers served outside of the District. At such time that service outside the District is requested, policies regarding the same can be determined at that time.

Late-Comer Agreements: The District includes a sample Late-Comer Agreement in its Developer Extension Manual.

Urban Growth Area Responsibilities: Portions of the District are located within the Columbia Valley Urban Growth Area. Urban Growth boundaries are shown on the maps in Appendix H. Since the District provides both water and sewer service and has capacity for growth and a large area zoned for development, growth could be rapid. Between 2000 and 2008, the population of the UGA increased by more than 50 percent and the portion of the Columbia Valley UGA located within Water District 13 is now experiencing significant growth. Extensions of the distribution system to serve new customers since 2008 include the East Whatcom County Regional Resource Center opened in 2011 and five new single-family homes were constructed at the western terminus of Peaceful Valley Drive in 2014 (Tin Rock Development), a 25-lot plat completed 2018 in the eastern portion of the District (Red Mountain Phase 1, Trek Properties, LLC), an 8-lot plat was completed off Balfour Valley Lane in 2020 (Balfour Village Phase 1, Cowden, Inc.), 22 additional lots are pending final construction approval as Red Mountain Phase 2, 21 lots are pending final construction approval as Balfour Village Phase 2, and 35 lots are currently under design review for Red Mountain Phase 3. There is also a development application pending for Red Mountain Phase 4 (52 lots) and an application is anticipated for Balfour Village Phase 3 (39 lots).

Over-sizing Policy: The District has no over-sizing policy.

System Extension Policy: The District requires that developers install extensions to their property line at their expense. Extensions must be approved and inspected by the District and meet the requirements of the Department of Health. This includes design, inspection, and testing, under the direction of a registered engineer. All of this information can be found in the District's Developer Extension Manual.

Timely and Reasonable Policy: Because the Coordination Act and Municipal Water Law use different definitions of "timely" and because neither defines "reasonable," the term timely and reasonable" is defined as follows (in order of priority) in the Whatcom County CWSP, adopted herein by WCWD13:

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- *Water service is considered timely when:*
 - *the water utility can provide service within 120 days of receiving all necessary permits to begin installation of required system improvements, if the utility is conducting system installation; or*
 - *the water utility can provide service within 120 days of the applicant installing all necessary system improvements; or*
 - *as otherwise agreed to between the applicant and utility.*

- *Water service is considered reasonable if costs and conditions of service are consistent with the utility's acknowledged standard practice experienced by other applicants requesting similar service.*

In the event that the District cannot provide service in a timely and reasonable manner, construction of a well, or other water source, may be allowed under the condition that the property owner(s) served by the well, or other water source, will not protest connection to a future District water main, and will connect to said future water main and pay all applicable fees at the time of connection.

D. Conditions of Service

Conditions of Service are specific requirements that facilitate the implementation of the utility's service area policies. The conditions of service must be met prior to an applicant receiving water service. Please define responsibilities or conditions under each subject.

Purveyor Responsibility as a Water Service Provider: To provide adequate volume of safe drinking water efficiently to our consumers, meeting all state and federal requirements.

Customer Responsibility as a Water Service Customer: To maintain their service lines in a safe condition, free from leaks and cross connections, to avoid contaminating the water supply, and to pay for their service in accordance with District rules.

Water Service Connection Responsibility: It is the District's responsibility to ensure that all customers have approved connections, and to take immediate action in the case of an interruption of service to inform the customer and re-establish service.

Connection Fee: Connection fees are not charged for existing platted lots within the District's boundaries, since they were covered in the original ULID when the District was established. New customers whose property was not in the original ULID pay an assessment of \$1,939.00 per equivalent residential unit (ERU).

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Meter Requirements: A meter installation program was completed in 2007. New services are required to install meters. All service meters were replaced in 2018.

Customer Consent for inspection: The District has an inspection clause in the Developer Extension Manual.

Notification Procedures for inspections: The District will notify all customers a minimum of 24 hours in advance by telephone or hand-delivered notice before attempts to inspect a connection or line on their property. Customers will be requested to contact the District to set up an amicable inspection time.

Cross-Connection Control Device Requirements: The District has a Cross-Connection Control Program and policy. See Appendices B and E.

Developer Extension Policy: Developer Extension applications and agreements must be completed, a deposit must be paid, and plans must be approved before the connection is permitted.

Late-Comer/Developer Pay Back Provisions: The District does not currently have any late-comer or developer pay back provisions. However, the District includes a sample Late-Comer Agreement in its Developer Extension Manual.

Rate Structure: The District charges a base rate of \$43.00 bi-monthly per equivalent residential unit or ERU. The District also implemented a tiered block rate for consumption. See Chapter 9 for additional information.

E. Water Availability Procedures

Define the water systems policy and procedures for issuance of water availability commitments/letters:

The District issues water availability letters to customers within the District's boundaries after meeting with the owner/developer of the property and reviewing in detail the requirements for service.

Define the length of time that a water availability commitment is valid: *It is valid for one year from the date of application.*

Define the systems policy on subdivision development: *The District has a Developer Extension policy. The District includes a sample "Application to Construct Extension to District System" and "Agreement to Construct Extension to District System" in its Developer Extension Manual. A copy of each is provided in Appendix B.*

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Chapter 2 Basic Planning Data

A. Service Area Characteristics

Briefly describe the area in which the system proposes to provide service: *The main service area is a housing development with lots of approximately 0.2 acres in size. Other undeveloped acreage in the service area will be developed in accordance with Whatcom County Urban Growth and Zoning policies.*

Topography/Climate: *Topography is hilly and forested. Most of the existing services and future services are or will be located in a relatively flat valley. Climate is typical of Northwestern Washington, with annual totals of rainfall near 60 inches, and snowfall near 14 inches.*

A location map (Figure 1) and service area boundary map (Figure 2) are included in Appendix H.

B. Adjacent Purveyors

List and describe public water systems in the proximity of the proposed water system:

Columbia Valley Water District (formerly Evergreen Water & Sewer # 19) serving the Campers Paradise and Paradise Lakes residential and recreational community is located adjacent to the District, see Figure 3 in Appendix H.

C. Related Plans

Evaluate related plans for consistency with this water system.

Coordinated Water System Plan (CWSP) Consistency:

Design Standards used for this water system are consistent with or more strict than the minimum design standards required in the Local CWSP? Yes No

This system as designed will provide fire flow requirements consistent with local CWSP? Yes No

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Describe any other applicable related plans which may affect the provision of water service by this water system:

This water system is existing. All future development must meet the requirements of Whatcom County. A copy of a Local Government Consistency Determination Form from the Whatcom County Planning Department confirming the District's role in providing water service in compliance with the County's GMA policies is included in Appendix A.

D. Projected Land Use

Current Zoning: *The zoning within the District is predominantly urban residential (UR-4), with pockets of rural and commercial forestry (RF & CF), rural (R5A & R10A), and General Commercial (GC). A zoning map (Figure 4) is included in Appendix H.*

Future Anticipated Zoning Changes (if available): *None.*

Describe existing development type(s) (i.e., single family residential, multi-family, commercial, industrial, other?): *Existing development is predominantly single-family residential. Within the UGA, the District encompasses approximately 560 acres, of which 170 acres are currently developed as urban residential (UR4), 40 acres are zoned general commercial (GC), 300 acres are undeveloped (UR4), and 50 acres may be restricted due to critical stream/wetland habitat (UR4). A community association with a clubhouse and a decommissioned pool, Whatcom County Regional Resource Center, and a real estate office are also served. The pool at the clubhouse has been inoperative for some time. The total number of properties/lots under current and potential zoning which may be served by the system is estimated to be 1,200 residential units, plus the 40 acres of general commercial.*

E. Projected Population and Service Connections

**Table 2.1
Growth Projection Data**

Data	Number
Dwelling Unit Occupancy	90%
Population per occupied household average (WCWD13)	2.80
Area growth rate based on local land use (if applicable)	3.57%
Total active residential connections (current year)	354
Total active non-residential connections (current year)	5

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Brief description of non-residential use(s) and population served (if applicable): *Peaceful Valley Clubhouse, Misty Mountain Realty Office, Whatcom County Regional Resource Center, and Water District No. 13 wastewater treatment plant and Green Valley Lift Station. Misty Mountain Realty and the Water District's facilities are considered each as one equivalent residential unit (ERU). The Clubhouse is considered as 1 ERU, and the Resource Center is considered as 4.5 ERUs. The resource center completed Phase 2 in 2020, which included another building, at 1 additional ERU. There have been discussions of a possible commercial development including a grocery store and laundry mat in the future.*

Note: References and applicable calculations are provided in the engineering report in Appendix F.

Fill out Table 2.2 to evaluate and summarize water system growth projections as identified above and non-active water service commitments. Water service commitments are future connections that the utility has committed to serve in writing (Water Availability Letter) or through other formal agreement.

Potential or DOH approved connections/ERUs: 382 current residential connections plus five commercial connections (9.5 ERUs) for a total of 391.5 ERUs of 1,338 DOH approved total connections.

**Table 2.2
Water System Growth Projections**

Year	A-Non-active Connections and Commitments (ERU)	B-Active Residential Connections (ERU)	C-Active Non-Residential Connections (ERU)	Residential Population⁽¹⁾	Available Service Commitments (Approved # Connections Minus A, B, & C (ERU))
2020	126 ⁽²⁾	365	9.5	1,022	837.5
2030	107 ⁽³⁾	517	22	1,448	692
2040	131 ⁽⁴⁾	734	50	2,055	423

- (1) Based upon 2.80 persons per active residential connection
- (2) Includes 17 inactive connections + 109 commitments
- (3) Includes 57 inactive connections + 50 commitments
- (4) Includes 81 inactive connections + 50 commitments

F. Water Demand Forecasting and ERUs

Water Demand Forecasting must include consideration of projected population, land use, and conservation target savings. The engineering report in Appendix F was used to complete Table 2.3.

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**Table 2.3
Current and Future Demands**

Customer Class/Demand Type	Planning Period		
	2020 ⁽¹⁾ (ERU)	2030 ⁽¹⁾ (ERU)	2040 ⁽¹⁾ (ERU)
Residential	382	574	815
Commercial	9.5	22	50
Total (all classes)	391.5	596	865
ADD ⁽²⁾	181 gpd/ERU	181 gpd/ERU	181 gpd/ERU
MDD	362 gpd/ERU	362 gpd/ERU	362 gpd/ERU
Total ADD	70,862 gpd	107,876 gpd	156,565 gpd
Total MDD	98 gpm	150 gpm	217 gpm
Total PHD	227 gpm	319 gpm	422 gpm

(1) Reflects all connected ERUs, including commercial and inactive accounts.

(2) Includes an assumed DSL of 20 percent – see Appendix F.

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Chapter 3 System Analysis

A. Local Fire Service and Flow Requirements

Fire hydrant locations are shown in Figure 5, Appendix H. Fire service is provided by:

*Whatcom County Fire District 14
7520 Kendall Rd
Kendall WA 98266.*

Contact Person:

*Jerry Debruin
Phone #: (360) 988-4328*

Proximity to the water system:

Approximately 2 miles

Type of equipment/capabilities:

Engine, tender, aid, utility and rescue.

Summarize local flow requirements for new and existing buildings, per the 2016 Whatcom County Coordinated Water System Plan:

*500 gpm for 60 minutes.
1,000 gpm for 2 hours for commercial buildings*

Indicate the rate and duration of the fire flow which will be used in the analysis of the water system for the following land use designations:

**Table 3.1
Fire Flow Requirements**

Land Use	Rate (gpm)	Duration (mins)
Residential – UR4	500	60
Commercial - GC	1,000	120

Nesting provisions/allowances per local fire officials:

Fire suppression storage is nested within the Standby Storage Requirements.

Additional fire flow design considerations/policies:

Minimum pressure allowed at any point in the system during fire flows is 20 psi.

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B. System Evaluation

1. Water Quality Analysis

Briefly describe results of initial and/or historical monitoring for each source. The required Water Quality Monitoring Schedule and test reports for the District is included in Appendix F.

Total Coliform:

Historically, the District sampled for bacteria at several selected residential hose bibs. Until 2019, the samples consistently tested negative. However, after a sample tested positive for bacteria in November 2019, the District elected to install four sampling stations directly connected to the distribution system, plus two stations at the tanks. This will ensure greater control over the testing sites and prevent positive bacteria results from contaminated facilities. Installation of the sampling stations was completed in February 2020. Subsequent positive tests occurred in February and May 2020.

Inorganic Chemicals:

Well 1, in compliance 2007 and 2016.

Well 2, in compliance 2007 and 2016.

Volatile Organic Chemicals (VOC's):

Well 1, in compliance 2010 and 2016.

Well 2, in compliance 2010 and 2016.

Synthetic Organic Chemicals (SOC's):

Well 1, in compliance 2018.

Well 2, in compliance 2018

Radionuclides:

Well 1 and Well 2 tested in 2015 found to be below MCL.

Asbestos:

N/A. There is no asbestos cement pipe in the system.

Lead and Copper:

Tested in 2016, and all samples found to be below MCL.

Nitrate:

Wells 1 and 2, tested annually, all samples found to be below MCL.

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2. Source of Supply Analysis

Complete Table 3.2 and use the information from the demand analysis to determine source capacity in Table 3.3.

Well logs, protective covenants, pump tests, water rights, source and storage sizing, hydraulic analyses, water facilities inventory form (WFI), and initial water quality information are included in Appendix F.

Table 3.2
Source Assessment

DOH Source No.	Utility Name	Well Depth/Screen (feet)	Well Diameter (inches)	Distance to Surface Water (feet)	Pump Test Yield (gpm)	Installed Pump Capacity (gpm)	Recorded Annual Use (acre-ft)	Source Metered Yes/No
S01	Well #1 (North)	60/20	12	~3,500	450	450	40.38	Yes
S02	Well #2 (South)	104/15	10	~2,000	475	450	33.46	Yes
				Total	925	900	73.84	

Definitions for Table 3.2:

- **DOH Source No.** – Source number as listed on Water Facility Inventory (WFI) form.
- **Utility Name** – Name commonly used by the District to describe the well.
- **Well Depth/Screen** – Distance from the surface to the top of the screen interval/length of screen.
- **Well Diameter** – Nominal casing diameter.
- **Distance to Surface Water** – Horizontal distance to the nearest surface water body.
- **Pump Test Yield** – Rate of flow sustained during pump testing per DOH policy.
- **Installed Pump Capacity** – Installed pump capacity at the minimum design pressure.
- **Recorded Annual Use** – Average well production in acre-ft for the previous three years.

Table 3.3
Allowable ERUs based on Source Capacity Parameters

Source Parameter	Current	10-Year	20-Year
Maximum Pump Installed Capacity, 20 hours per day	900 gpm, 2,983 ERU	900 gpm, 2,983 ERU	900 gpm, 2,983 ERU

3. Treatment

Treatment type(s): *N/A*

Summarize process goals: *N/A*

Flow Rates and Capacity (in ERUs if applicable): *N/A*

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Summarize process deficiencies and recommended improvements: *N/A*

Note: If it becomes necessary, treatment will require a project report to be submitted to DOH and may involve pilot studies prior to approval of constructions documents and implementation.

4. Storage

Current Usable Storage Capacity: 298,760 gallons in 2 equal sized tanks

Table 3.4
Storage Requirements

Period/Storage Component	2020	2030	2040
ERUs	391.5	596	865
Operating Storage (O.S.)	15,522 gal	15,522 gal	15,522 gal
Equalizing Storage (E.S.)	N/A	N/A	N/A
Standby Storage (S.S.)	78,300 gal	119,200 gal	173,000 gal
Fire Storage (F.S.)	120,000 gal nested in S.S.	120,000 gal nested in S.S.	120,000 gal nested in S.S.
Total Storage (T.S.)	135,522 gal	135,522 gal	188,522 gal
Storage Provided	298,760 gal	298,760 gal	298,760 gal
Surplus/(Deficit)	163,238 gal	163,238 gal	110,238 gal

5. Booster Pumps/Pressure Storage

The District does not have, nor does it plan to install any booster pumps or pressure storage units at this time. Storage tanks are at an elevation high enough to provide adequate pressure to the entire system.

6. Distribution System

Summarize general distribution system characteristics (such as pipe sizes and material and age):

Most of the pipe in the District is the original 8-inch, 6-inch, and 4-inch PVC pipe and is approximately 42 years old. Hydrants, meter setters, and meter boxes are of similar age. Newer water main pipe installed in the last 10 years consists of 8-inch PVC C900. In 2011, the District replaced eight of their water gate valves and all the service meters were replaced in 2018.

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Summarize areas of known physical deficiencies and routine pipe replacement programs:

None. However, the 6-inch supply main downhill from the tanks between nodes J95 and J93 provides a hydraulic restriction that will limit pressure and fire flow as the District grows. As development occurs in the western portion of the District, a new 8-inch loop will be constructed from node J95 to J145, which will provide two mains from the tanks to the highway crossing at Peaceful Valley Drive.

7. Hydraulic Analysis and Fire Flow Capability – Existing System

The District’s water system is analyzed using InnoVize InfoWater hydraulic modeling software, which operates in ArcGIS environment. The schematics of the model are illustrated in Figure 7, Appendix H. The model has not been calibrated by an actual flow test. However, the system has not changed significantly over the past 30 years and is already a very simple system. The distribution system consists of 12,635 feet of 8-inch PVC pipe, 12,130 feet of 6-inch PVC pipe, and 2,976 feet of 4-inch PVC pipe, with 36 fire hydrants, two reduced pressure backflow assemblies (RPBA), 48 gate valves, and 24 blowoffs or air-vacuum relief valves.

Minimum distribution pressure must be maintained in order to provide a reliable and safe water system, including adequate fire suppression. The water system must be able to provide Peak Hour Demand (PHD) at no less than 30 psi at all service connections throughout the distribution system when all equalizing storage is depleted (WAC 246-290-230(5)). Table 3.5 provides information regarding the system’s ability to meet this requirement, with no system improvements, for the next 20 years.

Table 3.5
Peak Hour Demand (PHD) System Hydraulic Check⁽¹⁾
Existing Water System

Scenario	2020	2030	2040
Tank Water Level ⁽²⁾	631.0	631.0	631.0
PHD, gpm	227	319	422
One Pump Operating, Minimum Pressure	69.3 psi @ Node J78	65.8 psi @ Node J78	62.7 psi @ Node J78

(1) Assuming operation with existing system infrastructure.

(2) Bottom of equalizing storage, also bottom of operational storage.

(3) Node J78 is located at the intersection of Fall Valley Lane and Clear Valley Drive.

During fire suppression events, the water system must be able to provide 20 psi minimum pressure at ground level at all points throughout the distribution system.

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Table 3.6 illustrates the system’s performance under fire flow demands. The water system must be able to provide this minimum pressure under fire-flow conditions plus the MDD rate when all equalizing and fire flow storage is depleted (WAC 246-290-230(6)). In addition, DOH recommends a maximum velocity of no more than 8-feet per second under PHD conditions. The following modeling scenarios are run for the District’s water system:

Table 3.6
Residential Fire Suppression System Hydraulic Check⁽¹⁾
Existing Water System

Scenario	2020	2030	2040
Tank Water Level ⁽²⁾	615.5	615.5	615.5
MDD, gpm	98	150	217
One Pump Operating, Minimum Flow	562 gpm @ Node J79	553 gpm @ Node J79	526 gpm @ Node J79

- (1) 500 gpm, assuming operation with existing system infrastructure.
- (2) Bottom of fire flow storage.
- (3) Node J79 is located at the fire hydrant on Fall Valley Lane.

Since a portion of the District is now zoned for General Commercial, a fire flow of 1,000 gpm for two hours duration is required in those areas west of Sumas-Kendall Road and north/northwest of Balfour Valley Road. Modeling was performed for the commercial area with a fire flow demand of 1,000 gpm for years 2020, 2030, and 2040, with one well pump operating. The results are shown in Table 3.7.

Table 3.7
Commercial Fire Suppression System Hydraulic Check⁽¹⁾
Existing Water System

Scenario	2020	2030	2040
Tank Water Level ⁽²⁾	615.5	615.5	615.5
MDD, gpm	98	150	217
One Pump Operating, Minimum Flow	1,303 gpm @ Node J59	1,260 gpm @ Node J59	1,192 gpm @ Node J59

- (1) 1,000 gpm, assuming operation with existing system infrastructure.
- (2) Bottom of fire flow storage.
- (3) Node J59 is located at the fire hydrant in the parking lot for the East Whatcom County Regional Resource Center.

The existing infrastructure within the District meets the minimum peak demand pressure requirements (30 psi) and also fire flow requirements (20 psi minimum with a residential fire flow requirement of 500 gpm and commercial requirement of 1,000 gpm), assuming the growth stays on or near the valley floor. Currently the highest elevation served by the District is elevation 490, at the intersection of Fall Valley Lane and Clear Valley Drive. Areas to the west of PVCC, zoned for

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urban residential development, extend as high as elevation 525. Currently, there are no development proposals for these areas. At such time a proposal is brought forth for these areas, a feasibility study will be required. Depending on the amount and elevation of the proposal, it is likely that infrastructure improvements (booster station, additional storage at higher elevation, etc.) may be required of the development in order to adequately service these areas.

In addition to modeling the existing system configuration, several potential future capital water projects were added to the model and evaluated. These projects are included in Table 3.8 of the 2012 Small Water System Plan:

Project A: Install 8-inch line from existing 8-inch source line (from Well 1) to 6-inch line on Fall Valley Road. This project would provide for a second crossing of the state highway to serve the east side of the District, providing redundancy to the east side of the District.

Project B: Install 8-inch line from 6-inch line on Clear Valley Drive to 6-inch line on Boulder Valley Lane. This project would provide for a second connection to the King Valley Drive/Deep Valley Drive loop, providing additional water to the yet-to-be-developed northeast portions of the District.

Project C: Install 8-inch loop from Peaceful Valley Drive to Sprague Valley Drive across undeveloped land. This project, constructed by private development, would provide a looped system on the west side of the state highway to serve growth. For modeling purposes, this project is not expected to be complete until year 2040.

The following modeling scenarios were run for the District's water system:

Table 3.8
Summary of Modeling Scenarios

Model Scenario	2020	2030	2040
Existing System	X	X	X
Project A	X	X	X
Projects A and B	X	X	X
Project C			X
Projects A and C			X
Projects A, B, and C			X

Peak Hour Demand Check

Minimum distribution pressure must be maintained in order to provide a reliable and safe water system, including adequate fire suppression. The water system

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must be able to provide Peak Hour Demand (PHD) at no less than 30 psi at all service connections throughout the distribution system when all equalizing storage is depleted (WAC 246-290-230(5))). Table 3.9 provides information regarding the system’s ability to meet this requirement. Minimum distribution system pressure is easily maintained throughout the District, for all modeled scenarios. As expected, the lowest pressure calculated exists at, or near, the intersection of Fall Valley Lane and Clear Valley Drive, the highest elevation served by the District.

Table 3.9
Peak Hour Demand (PHD) System Hydraulic Check⁽¹⁾
Minimum Pressure – Proposed Improvements

Scenario	2020 PHD=227 gpm	2030 PHD=319 gpm	2040 PHD=422 gpm
Existing System	69.3 psi @ Node J78	65.8 psi @ Node J78	62.7 psi @ Node J78
Project A	72.4 psi @ Node J78	69.2 psi @ Node J82	66.0 psi @ Node J82
Projects A and B	71.7 psi @ Node J78	68.7 psi @ Node J78	65.7 psi @ Node J78
Project C	N/A	N/A	61.3 psi @ Node J78
Projects A and C	N/A	N/A	64.0 psi @ Node J82
Projects A, B, and C	N/A	N/A	72.7 psi @ Node J78

- (1) Tank level set at bottom of equalizing storage = 631.0 feet. One well pump operating.
- (2) Node J78 is located at the intersection of Fall Valley Lane and Clear Valley Drive.
- (3) Node J82 is located at the northern terminus of Clear Valley Drive.

Fire Suppression Check

During fire suppression events, the water system must be able to provide 20 psi minimum pressure at ground level at all points throughout the distribution system. The water system must be able to provide this minimum pressure under fire-flow conditions plus the MDD rate when all equalizing and fire flow storage is depleted (WAC 246-290-230(6)). For residential areas, the required minimum fire flow is 500 gpm for 1 hour and for commercial areas, 1,000 gpm for 2 hours. At the current time, all nodes are capable of meeting the assigned fire flow rates under the modelled system conditions. Hydrants providing the lowest flow rate under each scenario are shown in Table 3.10.

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Table 3.10
Fire Suppression System Hydraulic Check⁽¹⁾
Lowest Flow – Proposed Improvements

Scenario	2020	2030	2040
Existing System	562 gpm @ Node J79	553 gpm @ Node J79	526 gpm @ Node J79
Project A	877 gpm @ Node J74	798 gpm @ Node J141	768 gpm @ Node J141
Projects A and B	877 gpm @ Node J74	831 gpm @ Node J141	800 gpm @ Node J141
Project C	N/A	N/A	533 gpm @ Node J79
Projects A and C	N/A	N/A	802 gpm @ Node J141
Projects A, B, and C	N/A	N/A	877 gpm @ Node J74

- (1) Tank level set at bottom of fire flow storage = 615.5 feet. One well pump operating.
- (2) Node J79 is located on Fall Valley Lane.
- (3) Node J74 is located on Blackbird Valley Lane.
- (4) Node J141 is located at the northern terminus of Gold Run Drive.

Under all scenarios, the completion of Project A results in a significant increase (greater than 20 percent) in flow to Clear Valley Drive, Blackbird Valley Lane, and Fall Valley Lane, with smaller increases throughout the east side. The completion of Projects A and B, results in an increase in flow to Boulder Valley Lane and Deep Valley Drive, with moderate increases throughout the east side. However, the inclusion of Project B adds only minor improvements above Project A alone. The completion of Project C alone, results in significant increases in flow to Flair Valley Drive, Balfour Valley Lane, Boulder Valley Lane, Balfour Valley Road, and the commercial area. Completion of Projects A and C, or A, B, and C results in significant increases in flow throughout the District, except at dead-end lines, as expected. Again, Project B adds little improvement.

Are the current water system facilities capable of delivering 30 psi to all customers at PHD under:

Current Demand conditions?	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>
10-year demand conditions?	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>
20-year demand conditions?	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>

Are the current water system facilities capable of providing 20 psi to all customers during fire flows during MDD:

Current Demand conditions?	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>
10-year demand conditions?	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>
20-year demand conditions?	YES	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>

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If any of the above responses are NO, summarize necessary distribution system improvements:

8. Instrumentation and Control Systems

Well Pump Control: *The well pumps are controlled by the water elevation in the storage tanks, with information transmitted via hard wire.*

Storage Level Control (If Applicable): *There are two float switches in the reservoirs that control the well pumps.*

Other Telemetry (If Applicable): *N/A*

Summary of proposed instrumentation and control system improvements: *None*

C. Water Rights Analysis

A summary of the District's water rights is provided on the following page in the Water Rights Self-Assessment Form, Table 3.11. Between the two wells, the District has withdrawal rights for 900 gpm and 454 acre-feet per year.

D. Physical Capacity Summary

**Table 3.12
Physical Capacity Summary**

Current Physical Capacity (ERU's)			
Source (water rights – annual volume)	2,239		
Source (water rights – rate)	3,580		
Existing Pump Capacity	2,983		
Treatment	N/A		
Storage	1,416		
Limiting Physical Capacity	Storage		
Demand (ERUs)			
	2020	2030	2040
Total Demand	391.5	596	865
Limiting Physical Capacity	1,416	1,416	1,416
Surplus/(Deficit)	1,024.5	820	551

Table 3.11 Water Right Self-Assessment Form for Water System Plan

Mouse-over any link for more information. Click on any link for more detailed instructions.

<u>Water Right Permit, Certificate, or Claim #</u> <small>*If water right is interruptible, identify limitation in yellow section below</small>	<u>WFI Source #</u> <small>If a source has multiple water rights, list each water right on separate line</small>	<u>Existing Water Rights</u> <small>Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold</small>				<u>Current Source Production – Most Recent Calendar Year</u> <small>Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold</small>				<u>10-Year Forecasted Source Production (determined from WSP)</u> <small>This includes wholesale water sold</small>				<u>20-Year Forecasted Source Production (determined from WSP)</u> <small>This includes wholesale water sold</small>			
		<u>Primary Qi</u> <small>Maximum Rate Allowed</small>	<u>Non-Additive Qi</u> <small>Maximum Rate Allowed</small>	<u>Primary Qa</u> <small>Maximum Volume Allowed</small>	<u>Non-Additive Qa</u> <small>Maximum Volume Allowed</small>	<u>Total Qi</u> <small>Maximum Instantaneous Flow Rate Withdrawn</small>	<u>Current Excess or (Deficiency) Qi</u>	<u>Total Qa</u> <small>Maximum Annual Volume Withdrawn</small>	<u>Current Excess or (Deficiency) Qa</u>	<u>Total Qi</u> <small>Maximum Instantaneous Flow Rate in 10 Years</small>	<u>10-Year Forecasted Excess or (Deficiency) Qi</u>	<u>Total Qa</u> <small>Maximum Annual Volume in 10 Years</small>	<u>10-Year Forecasted Excess or (Deficiency) Qa</u>	<u>Total Qi</u> <small>Maximum Instantaneous Flow Rate in 20 Years</small>	<u>20-Year Forecasted Excess or (Deficiency) Qi</u>	<u>Total Qa</u> <small>Maximum Annual Volume in 20 Years</small>	<u>20-Year Forecasted Excess or (Deficiency) Qa</u>
1 G1-22158C	S01 – Well #1	450 gpm		275 ac-ft		450 gpm	0 gpm	38.8 ac-ft	380.4 ac-ft	450 gpm	0 gpm	60.4 ac-ft	333.2 ac-ft	450 gpm	0 gpm	87.7 ac-ft	278.6 ac-ft
2 G1-22178P	S01 – Well #1	See notes		See notes	275 ac-ft	450 gpm	0 gpm	34.8 ac-ft	See notes	450 gpm	0 gpm	60.4 ac-ft	See notes	450 gpm	0 gpm	87.7 ac-ft	See notes
3 G1-22178P	S02 – Well #2	450 gpm		179 ac-ft													
4																	
TOTALS =		900 gpm		454 ac-ft		900 gpm	0 gpm	73.6 ac-ft	380.4 ac-ft	900 gpm	0 gpm	120.8 ac-ft	333.2 ac-ft	900 gpm	0 gpm	175.4 ac-ft	278.6 ac-ft

Column Identifiers for Calculations: A B C =A-C D =B-D E = A-E F =B-F G =A-G H =B-H

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.						
Application Number	New or Change Application?	Date Submitted	Quantities Requested			
			Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.															
Name of Wholesaling System Providing Water	<u>Quantities Allowed In Contract</u>		<u>Expiration Date of Contract</u>	<u>Currently Purchased</u> <small>Current quantity purchased through intertie</small>				<u>10-Year Forecasted Purchase</u> <small>Forecasted quantity purchased through intertie</small>				<u>20-Year Forecasted Purchase</u> <small>Forecasted quantity purchased through intertie</small>			
	<u>Maximum Qi</u> <small>Instantaneous Flow Rate</small>	<u>Maximum Qa</u> <small>Annual Volume</small>		<u>Maximum Qi</u> <small>Instantaneous Flow Rate</small>	<u>Current Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> <small>Annual Volume</small>	<u>Current Excess or (Deficiency) Qa</u>	<u>Maximum Qi</u> <small>10-Year Forecast</small>	<u>Future Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> <small>10-Year Forecast</small>	<u>Future Excess or (Deficiency) Qa</u>	<u>Maximum Qi</u> <small>20-Year Forecast</small>	<u>Future Excess or (Deficiency) Qi</u>	<u>Maximum Qa</u> <small>20-Year Forecast</small>	<u>Future Excess or (Deficiency) Qa</u>
1															
2															
3															
TOTALS =															

Column Identifiers for Calculations: A B C =A-C D =B-D E =A-E F =B-F G =A-G H =B-H

INTERRUPTIBLE WATER RIGHTS: Identify limitations on any water rights listed above that are interruptible.		
Water Right #	Conditions of Interruption	Time Period of Interruption
1		
2		

ADDITIONAL COMMENTS:

1. Superseding Permit G1-22178P limits total instantaneous withdrawal from Well #1 to 450 gpm, and Well #2 to 450 gpm.
2. Superseding permit G1-22178P limits total annual withdrawal from combined Wells #1 and #2 to 454 ac-ft/yr.
3. Future volume of annual withdrawal is split evenly between both wells.

Chapter 4 Water Use Efficiency Program

A. Requirements

The Department of Health adopted Part 8 of WAC 246-290 in 2007 to implement RCW 70.119A.180, requiring water systems to evaluate and implement water use efficiency measures. Per WAC 290-246-800, water purveyors are required to collect water use data, forecast water demand, evaluate water use efficiency measures, calculate distribution system leakage (DSL), set goals for water use, and implement a program to accomplish those goals.

Water is lost or wasted from the system in two distinct areas: supply and demand. Losses in the supply side include leaks (DSL) and unaccounted for water use such as firefighting, theft, flushing, etc. Losses on the demand side include customer leaks, waste, theft, and inaccurate metering. In accordance with WAC 246-290-810(4)(d)(i), the District is required to evaluate or implement one water use efficiency measure now, but will have to evaluate or implement four measures when the number of connections reach 500.

The District must develop and implement a water use efficiency program which includes sufficient cost-effective measures to meet the goals established by the District. The water use efficiency goals must be designed to enhance the efficient use of water by the District's customers. The water use efficiency goals must be set in a public forum, with a minimum of two weeks' notice prior, and the public must be provided specific information regarding the District's current program to assist in their understanding of the program. The Board must review and consider all comments received, before adopting the water use efficiency goals.

In addition, the District is required to determine and report their distribution system leakage (DSL) annually and demonstrate compliance with the DSL standards per WAC 290-246-820(4), or develop and implement a Water Loss Control Action Plan (WLCAP), if the District is not compliant.

B. Existing Water Use Efficiency Program

The District's existing water use efficiency program, since 2009, includes the following demand elements:

- Goal to reduce consumption by 1 percent over 6 years (set in 2011). More specifically, to reduce average day demand to 205 gpd/ERU and

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- annual withdrawal to 93 acre-ft/year (30.3 million gallons).
- Distribution of water use efficiency education materials in two newsletters and the annual consumer confidence report.
- Notification to high water users of potential leaks.
- Website to include water savings tips, since 2012.
- District offers water savings kits to customers upon request, since 2012.
- Leak forgiveness policy, if repaired, since 2014.
- Implementation of commodity rate structure in 2017.
- Replacement of all customer meters in 2018.

And includes the following supply elements:

- Added isolation valves to system in 2009, 2010, and 2011 to assist in finding distribution leaks.
- Determine and report DSL monthly.
- Investigate for leaks in distribution system when DSL exceeds 10 percent.
- Repair leaks in distribution system, when found.
- Monitor and calibrate source meters - replaced failed source meter for Well 1 in 2010 and Well 2 in 2018.
- Implemented new policies to reduce inconsistencies in meter reading/recording in 2019.

The success of the existing program has been mixed. Water production has decreased since 2011, from a 3-year average of 30.2 million gallons per year to 23.2 million gallons per year in 2020. Likewise, water consumption per customer has dropped dramatically since 2008, from an average daily demand (2007-2010) of 215 gpd/ERU to 151 gpd/ERU for 2016-2020.

However, distribution system leakage (DSL) continues to be a problem, varying between 7.3 percent in 2013 to 23.0 percent in 2017, with the 2018-2020 average at 16.8 percent. Since the average DSL is above 10 percent, per WAC 246-290-820(4), the District is required to develop and implement a water loss control action plan (WLCAP), unless per WAC 246-290-820(5), a request is made to DOH to allow up to 20 percent average DSL and the following information is submitted with the request:

- Production volume,
- DSL volume,
- Evidence documenting that:
 - A leak detection survey using the best available technologies has been completed on the system within the past six years,

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- All leaks found have been repaired,
- The system is unable to locate additional leaks,
- Ongoing efforts to minimize leakage are included as part of the system's water use efficiency program, and
- Any technical concerns or economic concerns, or other system characteristics justifying the higher distribution system leakage.

As described above, the District routinely measures the water production and consumption, searches for leaks, and repairs them when found. Due to the very porous nature of the underlying soils in the District, it is very difficult to locate leaks without the assistance of leak detection technology, which the District uses to detect significant leaks. It should be noted that a series of problems with the solenoid for Well 1 in August and September of 2017; and with the source meter for Well 2 in late 2017 and into early 2018; plus inconsistent readings of customer meters has brought into question the accuracy of past DSL calculations. The District believes with the corrections and measures undertaken since 2018, and considering the system characteristics, that the DSL will vary between 10 and 20 percent and is requesting that the requirement to develop and implement a WLCAP be deferred until additional data is collected.

C. Goals and Implementation

The stated goal of “reduce consumption by 1 percent over 6 years,” which has been reported on the District Water Use Efficiency reports since 2009 has been achieved, but can remain as a demand side goal. However, reducing demand to less than 151 gallons per ERU/day will be challenging to achieve since this is already a low demand.

The District's focus is in reducing DSL. A virtual public meeting was held on October 27, 2020 to review the Whatcom County Water District 13 Small Water System Management Plan and establish goals for water use efficiency. Notice of the meeting was provided by posting the meeting on the District's website on October 13, 2020, and sending an email blast (reaches about 75% of the customers) on October 15, 2020. There was only one member of the public present and he did not have any questions or comments on the Plan or WUE goals. Various goals and measures were presented and discussed, with the following goal established by the Board:

Reduce customer demand, currently at 151 gpd/ERU, by 1 percent by 2030.

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This goal can be achieved by implementing the following water use efficiency measures during the 10-year planning period:

1. Continue to provide educational materials on the District's website, in regular newsletters, and in the consumer confidence report regarding using water wisely. Provide historical water use information on customer bills.
2. Continue to notify customers of potential leaks based upon metering data and continue to implement a leak forgiveness policy to encourage customers to repair leaks.
3. Continue to implement a commodity rate structure and evaluate its effectiveness at reducing consumption. Evaluate rate structure every 5 years.
4. Continue to train personnel and implement policies to ensure accurate and timely customer and source meter reading.
5. Continue to monitor and replace customer meters as required to maintain accurate readings. Since all the customer meters were replaced in 2018, and the manufacturer of the meters recommends replacement or recalibration every 10 to 15 years, this plan assumes that all meters will be replaced in 2033. However, inaccurate meters will be replaced as needed.
6. Continue tracking DSL every month.
7. Continue to utilize leak detection equipment to locate distribution main line leaks, until DSL drops below 10 percent. For budgeting purposes, it is assumed that professional leak detection will be required every year.
8. Repair distribution main line leaks, when found. For budgeting purposes, it is assumed that a leak will be repaired every year.
9. Continue to evaluate fire hydrants for leaks.
10. Fire Department Coordination. The District will coordinate with the fire department to document all firefighting and training activities to acquire an accurate estimation of water used and also to educate personnel on the proper way to fully close a fire hydrant valve.

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11. Training. Train District personnel to accurately measure water used for flushing and provide additional inspection of water tanks to check for signs of leaking or overflows.

Table 4.1 describes the WUE 10-year implementation schedule and estimated costs:

**Table 4.1
WUE Implementation Schedule and Cost**

Measure Number	Measure	Schedule	Cost ⁽¹⁾
1	Customer Water-Wise Education	Annually	\$0
2	Customer Leak Notification & Forgiveness	Bi-Monthly	\$0
3	Commodity Rate Structure Update	2022 & 2026	\$20,000
4	Meter Reading Policies	Annually	\$3,000
5	Replace Customer Meters	2033	\$50,000
6	Track and Monitor DSL	Monthly	\$0
7	Leak Detection	Annually	\$12,000
8	Leak Repair	Annually	\$100,000
9	Evaluate Hydrants	Annually	\$0
10	Fire Department Coordination	Annually	\$0
11	Training	Annually	\$6,000
Total			\$191,000

(1) Costs represent total 10-year cost. A cost of \$0 implies measure can be completed through regular operations.

The estimated savings from these selected water use efficiency measures is significant. A reduction in customer consumption of 1 percent will reduce annual water consumption by approximately 328,500 gallons by 2030. A reduction in DSL of 1 percent will reduce annual water production by approximately 285,000 gallons.

D. Components of Plan

Public Education:

The Washington State Department of Health publications on water conservation shall be distributed to all new customers at the time of application for water service and periodically thereafter with the water bills. Future similar AWWA, state, and county publications, may also be distributed.

The District will direct mail a District newsletter at least on an annual basis. These newsletters describe how an individual customer can use water more efficiently and alert the District of a potential leak (surface water present during

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dry periods, hydrant use, low pressure, spike is usage, failing pavement, etc.).

Currently the District promotes voluntary conservation. Any abnormal increase in the customer's consumption initiates an inquiry into a possible leak in the customer's plumbing system. Any major ongoing increase initiates a check into the accuracy of the water meter.

Over the last several years, the District has observed a significant reduction in average daily water use, not including DSL, from 264 gpd/ERU in 2007 (87.6 acre-feet withdrawal) to 157 gpd/ERU in 2020 (65.1 acre-feet withdrawal). The exact reasons for this reduction are not understood, but one opinion is that the District's notification to customers with suspected leaks, plus a leak forgiveness program (requiring the leak to be repaired), combined with an improving economy, has resulted in an increase in repairs to customer plumbing.

Conservation Water Rate Structure:

Water rates, after completing a rate study in 2016, now include a surcharge for excess use to encourage conservation. *The District charges a base rate of \$43.00 bimonthly per equivalent residential unit or ERU. The District also implemented a tiered block rate for consumption: 0-19,000 gallons included in bi-monthly base rate, 19,001-25,000 gallons charged at \$1.00 per 1,000 gallons, 25,001+ gallons charged at \$3.00 per 1,000 gallons.*

Metering:

To measure Distribution System Leakage (DSL - unauthorized water use and leakage), the District has installed a meter at each well source and at each service connection. All service meters were replaced in 2018. All meters are read once per month, on the same day.

Water Audit:

Every month a calculation of Distribution System Leakage (DSL) is made by comparing the source (well) meters and the sum of residential and non-residential consumption, system flushing, and fire hydrant usage. Should unauthorized water use and leakage exceed 10 percent of the source production, a cursory water audit is performed to determine if the difference is due to an unusual occurrence, such as a water main break.

If the unauthorized water use and leakage exceeds 10 percent of production in a subsequent comparison review, the water audit will be extended to include a check of meter calibration and a leak detection survey. If the water loss cannot be accounted for by an extended audit, a professional leak detection service will be

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called in to conduct a leak detection survey.

Low Water Use Plumbing Fixtures:

For new construction, all plumbing and related fixtures shall comply with current state and local laws and regulations establishing water conservation performance standards.

Water for Lawn Irrigation:

Customers are encouraged to adopt landscaping schemes to utilize water efficiently. The use of drip or mechanically-timed irrigation systems, drought tolerant plantings, and small lawn areas is encouraged.

Lawn Sprinkling and Other Water Use Restrictions:

Through the insert of a notice with the water bill, and/or during periods of warm, dry weather, customers will be requested to comply voluntarily with restricting lawn irrigation to once per week and watering lawns during mornings and late evenings, etc. as outlined in public education materials described herein.

E. Evaluation of Effectiveness

The effectiveness of the program will be evaluated by tracking and observing water consumption and DSL over the planning period. Prior to the end of each calendar year, the District will evaluate the program and implement additional measures to be carried out in subsequent years, as necessary to meet the goals of the program.

Chapter 5 **Wellhead Protection Program**

A . Background

The District withdraws water from the highly permeable aquifer that lies beneath the floor of the Columbia Valley. Based upon past hydrogeologic studies, this shallow, unconfined aquifer supplies the District, and others in the valley, with an abundant amount of clean drinking water. These studies indicate that water in the aquifer moves quickly from north to south through the valley. Figure 6 identifies the aquifer recharge areas within the District.

The Wellhead Protection Program will give the District and the general population within the wellhead protection area insight as to possible contaminants and contamination prevention measures.

B . Wellhead Protection Area Delineation and Inventory

Completed susceptibility assessment forms are included in Appendix G.

Well 1 is located in the northern portion of the District, approximately 600 feet west of Kendall Road. The well, valves, flow meter, controls, and electrical panel are located inside a small wood framed building, inside a chain link fence. The area surrounding the well was used as a golf course years ago and is now privately owned and vegetated with grass. A 100-foot radius sanitary control area (restrictive covenant) was granted to the District in 1982.

Well 2 is located approximately 100 feet west of Kendall Road and approximately 100 feet north of Peaceful Valley Drive. The well, valves, flow meter, controls, and electrical panel are located inside a small wood framed building, inside a chain link fence. The area surrounding the well is owned by the Peaceful Valley Country Club. The area around the well is mostly forested, with the gravel driveway to the clubhouse approximately 100 feet to the west of the well house. A 100-foot radius sanitary control area (restrictive covenant) was granted to the District in 1996.

No new sources of contamination have been constructed or discovered within the sanitary control areas, or the well capture zones, as very little change has occurred in the surrounding areas.

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Table 5.1
Wellhead Protection Areas - Well 1

Time of Travel	Zone of Contribution Radii
6 month	
1 year	1530'
5 year	3380'
10 year	4800'

Source: 2005 Whatcom County Water District 13 Water System Plan

Table 5.2
Wellhead Protection Areas - Well 2

Time of Travel	Zone of Contribution Radii
6 month	440'
1 year	620'
5 year	1390'
10 year	1970'

Source: 2005 Whatcom County Water District 13 Water System Plan

Based on the information in Tables 5.1 and 5.2, and as shown in Figure 6, the inventory of potential contaminant sources is summarized as follows:

Within the 1-year zone of contribution: Well 1 – Paradise Lakes Country Club maintenance yard and individual septic drain fields in Columbia Valley Water District. Well 2 – Whatcom County Water District 13 sewage effluent disposal field. Effluent disposal field is downstream of both wells.

Within the 5-year zone of contribution: Well 1 – Whatcom County Water District 13 sewage effluent disposal field. Effluent disposal field is downstream of both wells.

Within the 10-year zone of contribution: Well 1 – Whatcom County Water District 13 sewage treatment plant, an abandoned gravel pit, and hard rock mining site. Well 2 – individual septic drain fields in Columbia Valley Water District.

It should be noted that the wellhead protection zones for Wells 1 and 2 shown in Tables 5.1 and 5.2 and Figure 6 were taken from the 2005 Whatcom County Water District 13 Small Water System Plan and have not been updated. Information in both tables appear to be generated using the Calculation of Fixed Radius (CFR) method recommended by DOH as an initial estimation of the 1-, 5-, and 10-year travel distances for water to be drawn to the wells. The CFR method is typically not very accurate in highly permeable, shallow, unconfined aquifers. Since water in the aquifer moves quickly to the south, in all likelihood, the wells' capture zones extend only a short distance (~100-200 feet) to the south, but may

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extend several thousand feet to the north. It is recommended that the District hire a hydrogeologist to use hydrogeologic mapping and an analytical groundwater model to calculate more accurate capture zones.

C. Management Program for the Wellhead Protection Area

A summary of the wellhead protection area management program is provided below (*See Appendix G*):

Public education/notification:

All customers within the wellhead protection area will be direct mailed or hand delivered information about the areas outlined in the Wellhead Protection Plan, possible sources of contamination in the area, and suggested action to prevent contamination.

Summarize emergency spill response:

The District will notify identified emergency responders immediately once a spill has been detected. (see Chapter 6 for a complete list of responders)

D. Summary of WHPP Needs

The following table identifies the wellhead protection program needs which require development and carryover to the Financial Program.

Table 5.3
WHPP Program Needs

Description	Purpose	Year	Cost	Financing
WHPA Delineations	Greater Accuracy	2025	\$10,000	Rates

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Chapter 6 Operation and Maintenance Program

A. Water System Management and Personnel

Person(s) Responsible for day-to-day Operations & Management:

Name: *Kelly Wynn*
Address: *14263 Calhoun Road*
Mount Vernon, WA 98273
Phone #: *(360)466-4443*

Applicable maintenance contracts are included in Appendix B.

B. Operator Certification Requirements

Is the system required to have a certified operator? Yes No

Level Required: *Water Distribution Manager I (WDM I)*

If yes, who will be the certified operator?

Name: *Kelly Wynn*
Phone #(s): *(360)466-4443*
Certification level: *WDM I*
Certification #: *007816*

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C. Routine Operation and Preventative Maintenance Procedures

Specific routine operation and maintenance activities are included in Table 6.1:

Table 6.1
Routine Operations and Preventative Maintenance Schedule

Daily	Weekly	Monthly	Quarterly	Annually
Site Visits	Clean well houses	Inspect storage tanks	Take samples for bacteria testing from source wells	Flush main through hydrants and blowoffs
Read and record source meters at wells		Meter inspection Read customer meters		Collect required routine annual samples
Inspect storage tanks		Collect required routine monthly samples		Inspect water tanks and clean as needed
Inspect pump houses and pumps		Measure & record well depths		Exercise all main line valves
Inspect distribution system, including hydrants		Service well pumps and motors		Test backflow devices
Record reservoir levels				

Provide a summary of complaint response procedures:

Complaints are directed to the operator. Operator assesses the nature of the complaint. If the complaint concerns public health, the DOH Regional Engineer is notified and action is coordinated with the agency. If complaint concerns loss of pressure or service, maintenance personnel are sent to the site to assess and repair the facilities. Outside contractors may be required.

D. Water Quality Monitoring

Detailed sampling requirements are found in WAC 246-290-300. Table 6.2 identifies parameters and monitoring locations. The District added four new sampling stations to the distribution system in February 2020, plus two stations at the tanks. More detailed requirements can be found in WAC 246-290-320.

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A copy of the updated Coliform Monitoring Plan is included in Appendix D.

**Table 6.2
Monitoring Procedures**

Parameter	Sample Location	Frequency if MCL is Not Exceeded	Next Sample Date
Coliform	Representative sampling stations in the distribution system.	See Coliform Monitoring Plan in Appendix D.	Monthly
Radionuclides	From source after treatment.	Every 6 years	Both Wells, 2021
VOCs (IIN)	From source after treatment.	Every 6 years	Both Wells, 2022
IOCs (WV)	From source after treatment.	Every 9 years	Both Wells, 2026
Nitrate	From source after treatment.	Every year	Both Wells, Oct., 2020
Asbestos	Representative points in the distribution system.	Every 9 years	Waiver through 2028
Lead and Copper	10 distribution sites.	Every 3 years	July 2022

Actual sampling methods are directed by laboratories currently involved in processing samples. Since frequency of a majority of the samples is small, it is recommended that the actual sampling methods are determined through the lab at the time of sampling.

If a primary MCL is exceeded, per WAC 246-290-320, the District is required to take the following actions:

- Notify the appropriate DOH Regional office
- Notify the customers
- Determine cause of contamination
- Take action as directed by DOH

If a secondary MCL is exceeded, the District is require to notify DOH and take action as directed.

E. Future Monitoring and Regulatory Requirements

Susceptibility Waiver Status: *Asbestos waived through 2028.*

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Area Wide Waiver Status: *N/A*

F. Vulnerable Facilities

The following table indicates certain types of facilities, normal failure mode, and anticipated repair time for each.

**Table 6.3
Vulnerable Facilities**

Facility	Failure Mode	Repair Time/Comments
Well	Collapse/ Contamination	Manually set controls to operate an unaffected well. Replace failed well in 1 to 3 months
Well Pump	Seals/Motor/ Impeller	Manually set controls to operate an unaffected well. Replace failed pump in 2 weeks
Electrical Power	Outage	Approximately 3 days storage in tanks, W/O fire flow. Rent generator for well, 1 day.
Transmission Main	Leaks	Notify customers, locate leak, call contractor, repair 4 hours
Distribution Main	Leaks	Notify customers, locate leak, call contractor, repair 4 hours
Reservoir	Contamination	Isolate bad reservoir, operate on second reservoir, clean, disinfect contaminated reservoir, 1 week
Distribution System	Contamination	Notify customers and DOH, repeat samples, determine source, flush and disinfect system
Reservoirs	Earthquake damage	Inspection & testing within 2 days, repair, 1 month
Other:		

Summarize the most critical concerns: *Power failure, well pump failure.*

Most vulnerable system facilities and estimated cost to replace/repair is:

**Table 6.4
Most Vulnerable System Facilities**

Facility	Cost
Well and pump	\$40,000

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G. Emergency Response Program

In case of emergency which may cause or threaten lack of continuous water service, customers will be instructed through mass email, phone, and local social media sites to contact the following people in order:

<u>Name</u>	<u>Phone #</u>
Kelly Wynn	(360) 466-4443 (office) (360) 661-0930 (cellular)
Emergency cell	(360) 630-0970

Provide a brief description of the water system response to failure of the following facilities:

Source: If contaminated, shut well down, switch to second well, notify DOH, take appropriate action to notify customers, flush and disinfect system if necessary. If well or pump is out of service, call driller or pump service company.

Treatment: N/A

Transmission: Staff will locate break or problem, isolate the leak and call contractor to schedule repairs.

Storage: Call staff to monitor tank levels, and take generator to source pumps if necessary. If problem is contamination, call DOH, notify customers if required, isolate tank, locate problem and repair, flush and disinfect tank.

If emergencies are not readily fixed by simple operation procedures, the water system representative will call one of the emergency contacts listed on the following emergency call-up list:

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**Table 6.5
Emergency Call-Up List**

Contact	Phone Number
Fire/Police/Medical	911
County Emergency Services: Sheriff's Department	360-676-6650
Electric Utility: Puget Sound Energy	1-888-225-5773
Pump Service: Water & Wastewater Services	360-466-4443
Pipe Service: Howard Denson	360-988-4910 - office 360-410-7499 - cell
Electrician: Ackermann Electric	360-336-6188
DOH Engineer: Laura McLaughlin	253-395-6761
DOH Office of Drinking Water mainline	253-395-6750
DOH Office of Drinking Water Emergency After-Hours Hotline:	1-877-481-4901
Darin Klein, Drinking Water Supervisor, Whatcom County Health Department	360-778-6032 360-778-6000
System Owner: Whatcom County Water District 13 Office	360-599-1801
System Operator: Kelly Wynn/Water & Wastewater Services	360-466-4443 - office 360-661-0930 - cell
Emergency Phone: Kelly Wynn/Water & Wastewater Services	360-630-0970
System Engineer: Roger Kuykendall, PE	206-284-0860 – office

H. Cross-Connection Control Program

See Appendix B for the Cross-Connection Control Program.

The District has prepared a Cross-Connection Control Program (CCCP) in accordance with WAC 246-290-490. The District will require all new applicants for service to sign an agreement allowing inspections for cross connection purposes. The agreement also requires that the District be notified of any potential cross connection prior to construction. Approved backflow prevention devices may be required and, if so, are to be installed at the customer's expense.

Priority service for potential cross connection control: *Commercial first, then residential.*

Record keeping and tracking: *The operator will keep track of all backflow devices and schedule inspection and/or maintenance.*

CCCP Implementation Status: *Implemented beginning in 2004*

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I. Record Keeping and Reporting

Summarize water system record keeping and reporting activities: *Operator schedules all testing, meter readings, maintenance and other required maintenance and operating activities. Operator records, files and forwards reports to appropriate agencies. In case of contamination or unsatisfactory water samples, operator notifies DOH and customers. All records are kept on file in District office.*

J. O&M Program Improvements

Summarize O&M program deficiencies and recommended improvements: *The District is working to acquire a portable generator to power the wells during an extended power outage. In order to safely connect the generator to the wells, each pumphouse must be equipped with a receptacle, a manual transfer switch, and replacement of the motor starters with a reduced voltage soft starter (RVSS). This project will be added to the capital improvement plan.*

Chapter 7 Distribution System Design & Construction Standards

A. System Design Standards

List any deviation from the DOH Design Standards in regard to design, sizing or analysis of facilities:

The District's Standards are in conformance with the DOH Standards. A copy of the Standards is included in Appendix E.

List any other references or local standards used in the design or sizing of this water system:

None.

B. Standard Construction Materials and Specifications

The water system shall adopt the current version and any amendments to the “WSDOT/APWA Standard Specifications for Road and Bridge Construction” by policy upon DOH approval of this WSP. Other standards adopted by reference for this water system include:

None.

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Chapter 8 Capital Improvement Plan

A. System Deficiencies

As described in the preceding chapters, the District's water system is simple and operates with few problems. The system is adequate for all system demands now and into the foreseeable future. However, there are some recommended improvements to the water system to improve reliability, provide redundancy, improve water quality, improve operations, improve system performance, accommodate growth, and remedy a high distribution system leakage (DSL).

B. Capital Improvement Program

Table 8.1 identifies the recommended capital projects for the next 10 years. Figure 7 provides the approximate locations of the projects. Cost estimates are included in Appendix J. The District has included a distribution water main replacement project every 7 years as a means to begin replacing aging assets.

Table 8.1
Capital Improvement Program Summary

Description	Purpose	Year	Cost	Financing
Leak Detection ⁽¹⁾	DSL	Annual	\$12,000	Rates
Leak Repair ⁽¹⁾	DSL	Annual	\$100,000	Rates
WUE Programmatic Tasks ⁽¹⁾	Conservation	Annual	\$9,000	Rates
Rate Study	Update	2021	\$10,000	Rates
Equip Well 1 for Portable Generator	Reliability	2025	\$35,000	Rates/GFCs
Analytical Model for WHPA	Water Quality	2025	\$10,000	Rates
Rate Study	Update	2026	\$10,000	Rates
Replace Distribution Lines – 1,000 LF	DSL, Asset Replacement	2028	\$435,000	Rates
Project A: Install 8-Inch Loop from 8-Inch Source Line (Well 1) to 6-Inch Line on Fall Valley Road	Reliability/ Performance/ Redundancy	2030	\$310,000	Rates/GFCs
Total			\$931,000	

(1) Represents total 10-year cost

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Chapter 9 Financial Program

See Table 9.1 for the 20-year financial model.

A. Operating Budget

Revenues meet or exceed expenses for the entire ten year projected budget? Yes No

If NO, explain how cost is recovered:

B. Operating Cash Reserve

Operating cash reserve meets or exceeds 1/8 of annual O&M and general expenses? Yes No

If NO, explain how the operating cash reserve will be funded:

C. Emergency Reserve

Emergency reserve meets or exceeds cost of most vulnerable system component? Yes No

If NO, explain how the emergency reserve fund will be funded:

D. Water Rates

Billing schedule: Monthly Bi-monthly other

Current water rates: Basic Charge: \$43.00 per bi-month
Commodity Charge: \$1.00 per 1,000 gallons over 19,000
\$3.00 per 1,000 gallons over 25,000
Connection Fee: None for existing platted lots.
\$1,939.00 for others.

Proposed water rates: Basic Charge: _____
Commodity Charge: _____
Connection Fee: _____

**WHATCOM COUNTY WATER DISTRICT 13
SMALL WATER SYSTEM MANAGEMENT PLAN**

TABLE 9.1

OPERATIONS & MAINTENANCE

Line #	O&M Revenue	Rate	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
1	Beginning Operating Fund Balance		\$38,129	\$47,838	\$49,033	\$50,259	\$51,516	\$52,804	\$54,124	\$55,477	\$56,864	\$58,285	\$59,742	\$61,236	\$62,767	\$64,336	\$65,945	\$67,593	\$69,283	\$71,015	\$72,790	\$74,610
2	SFR ERUs	3.57%	419	434	449	465	482	499	517	535	554	574	594	615	637	660	684	708	733	759	786	814
3	SFR Monthly Service Rate	3.00%	\$21.50	\$23.00	\$25.00	\$25.75	\$26.52	\$27.32	\$28.14	\$28.98	\$29.85	\$30.75	\$31.67	\$32.62	\$33.60	\$34.61	\$35.64	\$36.71	\$37.81	\$38.95	\$40.12	\$41.32
	Commercial ERUs		9.5	11	12	13	14	16	17	18	20	22	24	26	28	30	33	36	39	42	45	50
	Commercial Monthly Service Rate	3.00%	\$21.50	\$23.00	\$25.00	\$25.75	\$26.52	\$27.32	\$28.14	\$28.98	\$29.85	\$30.75	\$31.67	\$32.62	\$33.60	\$34.61	\$35.64	\$36.71	\$37.81	\$38.95	\$40.12	\$41.32
	Total RCEs		429	445	461	478	496	515	534	553	574	596	618	641	665	690	717	744	772	801	831	864
	Estimated Commodity Revenue		\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
4	Total Rate Revenue		\$115,553	\$127,820	\$143,300	\$152,702	\$162,862	\$173,826	\$185,307	\$197,324	\$210,616	\$224,901	\$239,859	\$255,908	\$273,111	\$291,536	\$311,681	\$332,777	\$355,316	\$379,380	\$405,053	\$433,418
5	Non-Rate Revenue	3.50%	\$4,044	\$4,474	\$5,016	\$5,345	\$5,700	\$6,084	\$6,486	\$6,906	\$7,372	\$7,872	\$8,395	\$8,957	\$9,559	\$10,204	\$10,909	\$11,647	\$12,436	\$13,278	\$14,177	\$15,170
6	Investment Interest on Beginning Balance	2.00%	\$763	\$957	\$981	\$1,005	\$1,030	\$1,056	\$1,082	\$1,110	\$1,137	\$1,166	\$1,195	\$1,225	\$1,255	\$1,287	\$1,319	\$1,352	\$1,386	\$1,420	\$1,456	\$1,492
7	Total O&M Revenue		\$120,360	\$133,250	\$149,296	\$159,052	\$169,592	\$180,966	\$192,875	\$205,339	\$219,125	\$233,939	\$249,449	\$266,089	\$283,926	\$303,027	\$323,909	\$345,776	\$369,137	\$394,078	\$420,686	\$450,080
O&M Expenses																						
8	Cash O&M Expenses	2.50%	\$95,675	\$98,067	\$100,519	\$103,032	\$105,607	\$108,247	\$110,954	\$113,728	\$116,571	\$119,485	\$122,472	\$125,534	\$128,672	\$131,889	\$135,186	\$138,566	\$142,030	\$145,581	\$149,220	\$152,951
9	Spare		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
10	Spare		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
11	Total O&M Expenses		\$95,675	\$98,067	\$100,519	\$103,032	\$105,607	\$108,247	\$110,954	\$113,728	\$116,571	\$119,485	\$122,472	\$125,534	\$128,672	\$131,889	\$135,186	\$138,566	\$142,030	\$145,581	\$149,220	\$152,951
12	Operating Surplus (Deficiency)		\$24,685	\$35,184	\$48,778	\$56,020	\$63,985	\$72,719	\$81,921	\$91,612	\$102,554	\$114,454	\$126,977	\$140,555	\$155,253	\$171,138	\$188,723	\$207,210	\$227,107	\$248,497	\$271,466	\$297,129
13	Ending Operating Fund Balance		\$62,814	\$83,021	\$97,811	\$106,280	\$115,501	\$125,522	\$136,045	\$147,089	\$159,418	\$172,739	\$186,719	\$201,792	\$218,020	\$235,474	\$254,667	\$274,803	\$296,390	\$319,512	\$344,256	\$371,739
14	Required Operating Reserve, months	6	\$47,838	\$49,033	\$50,259	\$51,516	\$52,804	\$54,124	\$55,477	\$56,864	\$58,285	\$59,742	\$61,236	\$62,767	\$64,336	\$65,945	\$67,593	\$69,283	\$71,015	\$72,790	\$74,610	\$76,475
15	Transfer of Operating Surplus to Capital Fund		\$14,977	\$33,988	\$47,552	\$54,764	\$62,697	\$71,399	\$80,568	\$90,225	\$101,132	\$112,997	\$125,483	\$139,025	\$153,684	\$169,529	\$187,074	\$205,520	\$225,375	\$246,722	\$269,646	\$295,264

CAPITAL

Line #	Capital Revenue	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040			
16	Beginning Capital Investment Fund		\$165,205	\$206,245	\$252,447	\$322,461	\$402,482	\$481,243	\$571,144	\$684,053	\$212,913	\$341,800	\$27,504	\$159,095	\$326,526	\$429,875	\$635,524	\$865,870	\$1,118,398	\$1,396,863	\$1,703,242	\$2,039,632		
17	Connection Charge Revenue	\$1,939	\$71,743	\$31,994	\$31,024	\$32,963	\$34,902	\$36,841	\$36,841	\$40,719	\$42,658	\$42,658	\$44,597	\$46,536	\$48,475	\$52,353	\$52,353	\$54,292	\$56,231	\$58,170	\$63,987			
18	Spare		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
19	Transfer from Operating Surplus (from Line #15)		\$14,977	\$33,988	\$47,552	\$54,764	\$62,697	\$71,399	\$80,568	\$90,225	\$101,132	\$112,997	\$125,483	\$139,025	\$153,684	\$169,529	\$187,074	\$205,520	\$225,375	\$246,722	\$269,646	\$295,264		
20	Loan Proceeds		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1	\$2	\$3			
21	Investment Interest on Beginning Balance	2.00%	\$3,304	\$4,125	\$5,049	\$6,449	\$8,050	\$9,625	\$11,423	\$13,681	\$4,258	\$6,836	\$550	\$3,182	\$6,531	\$8,598	\$12,710	\$17,317	\$22,368	\$27,937	\$34,065	\$40,793		
22	Total Capital Fund Revenue		\$90,024	\$70,106	\$83,625	\$94,176	\$105,649	\$117,865	\$128,832	\$140,747	\$146,110	\$162,491	\$168,692	\$186,803	\$206,751	\$226,602	\$252,137	\$275,190	\$302,035	\$330,891	\$361,883	\$400,046		
Capital Expenses			2020 Value	Schedule	1.04	1.08	1.12	1.17	1.22	1.27	1.32	1.37	1.42	1.48	1.54	1.60	1.67	1.73	1.80	1.87	1.95	2.03	2.11	2.19
23	Leak Detection		\$1,200	Annual	\$1,248	\$1,298	\$1,350	\$1,404	\$1,460	\$1,518	\$1,579	\$1,642	\$1,708	\$1,776	\$1,847	\$1,921	\$1,998	\$2,078	\$2,161	\$2,248	\$2,337	\$2,431	\$2,528	\$2,629
24	Leak Repair		\$10,000	Annual	\$10,400	\$10,816	\$11,249	\$11,699	\$12,167	\$12,653	\$13,159	\$13,686	\$14,233	\$14,802	\$15,395	\$16,010	\$16,651	\$17,317	\$18,009	\$18,730	\$19,479	\$20,258	\$21,068	\$21,911
25	WUE Programmatic Tasks		\$900	Annual	\$936	\$973	\$1,012	\$1,053	\$1,095	\$1,139	\$1,184	\$1,232	\$1,281	\$1,332	\$1,386	\$1,441	\$1,499	\$1,559	\$1,621	\$1,686	\$1,753	\$1,823	\$1,896	\$1,972
26	Water Rate Study		\$10,000	2022		\$10,816																		
27	Equip Well #1 for Portable Generator		\$35,000	2021	\$36,400																			
28	Analytical Model for WHPA		\$10,000	2025			\$12,167																	
29	Water Rate Study		\$10,000	2026					\$12,653															
30	Replace Distribution Lines - 1,000 LF		\$435,000	2028						\$595,328														
	Project A: Install 8" Loop from 8" Source Line (Well #1) to 6" line on Fall Valley Rd.		\$310,000	2030							\$458,876													
31	Water Rate Study		\$12,000	2031									\$18,473											
32	Replace Customer Meters		\$50,000	2033											\$83,254									
33	Water Rate Study		\$13,000	2036																				
34																								
35	Total Capital Fund Expenses		\$897,100		\$48,984	\$23,903	\$13,611	\$14,155	\$26,888	\$27,964	\$15,923	\$611,887	\$17,222	\$476,787	\$37,101	\$19,372	\$103,401	\$20,953	\$21,791	\$22,663	\$23,570	\$24,512	\$25,493	\$26,513
36	Ending Capital Investment Fund		\$206,245	\$252,447	\$322,461	\$402,482	\$481,243	\$571,144	\$684,053	\$212,913	\$341,800	\$27,504	\$159,095	\$326,526	\$429,875	\$635,524	\$865,870	\$1,118,398	\$1,396,863	\$1,703,242	\$2,039,632	\$2,413,166		

Beginning Fund Balances per August 1, 2020

Whatcom County Water District 13

E. Median Household Income Index Test

Are water rates greater than 1.5 percent of the median household income for the area?

Yes No